ASGBI abstracts 2007
Oral presentations

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ASGBI abstracts 2007

Oral presentations

The Annual Scientific Meeting of the Association of Surgeons of Great Britain and Ireland takes place this year at Manchester Central (18th–20th April 2007), under the presidency of Professor Brian J Rowlands.

Papers were presented in the following categories:

1. Moynihan (pp. 2–4)
2. Predicting outcome (pp. 5–7)
3. Getting to the bottom of the problem (pp. 8–10)
4. Arterial disease (pp. 11–13)
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19. Training and assessment (pp. 59–62)
20. Post-operative outcome (pp. 63–65)
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23. Trauma and emergency surgery (pp. 72–74)

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You can search the pdf document (available online at www.bjs.co.uk) by selecting ‘Edit’ and then ‘Search’. You can then type the word, words or part of a word that you want to search for and select ‘Search’. The results appear in page order, showing a few words of the context in which the search appears.
Moynihan 0922
Post operative Crohn’s disease: The role of faecal lactoferrin in detecting clinical relapse after ileocaecal resection and measurement of faecal ASCA
M. K. Mohiuddin, J. Gicquel, J. Robson, C. Todhunter, J. M. Hanson, J. C. Mansfield
1Royal Victoria Infirmary, Newcastle, 2Freeman Hospital, Newcastle

Background: Relapse or recurrence after ileocaecal resection for Crohn’s disease poses an important and difficult problem in routine clinical practice. Faecal lactoferrin, a neutrophil-derived iron binding protein, is both sensitive and specific for assessing intestinal mucosal inflammation in IBD. However, no data on the role of lactoferrin in detecting post-surgical relapse or recurrence in Crohn’s disease are available. Our aim was to assess and correlate faecal lactoferrin (FLA), faecal anti-Saccharomyces cerevisiae antibodies (ASCA), blood parameters and clinical severity in patients with ileocaecal resection for diagnosed Crohn’s disease.

Methods: A single stool sample was collected from each patient and FLA and ASCA concentrations were assessed by commercially available enzyme-linked immunosassays. FLA results are reported as mcg/g faeces (normal: < 7.25). Clinical severity score was assessed based on frequency of loose stools, abdominal pain and usage of analgesia in a one week period (0 = no symptoms to 4 = severe symptoms).

Results: The mean values (±SE) in 43 patients (28 female, 33 smokers) were: FLA 68.3 mcg/g (±26.7), CRP 11.5 mg/L (±2.8), white cell count 8 (±0.3) and platelets 303 (±11). Mean FLA concentration was highly elevated at 209 mcg/g (±122) in the clinically severe group and not elevated in patients without symptoms of active disease 6 mcg/g (±4.3). The CRP values did not discriminate these groups (CRP 14 mg/L (±1.5) versus 9 mg/L (±4)). FLA concentration was significantly related to the severity of clinical symptoms (p = 0.046), as was platelet count (p = 0.013). There was a significant Spearman’s correlation between FLA and CRP (p = 0.04, correlation coefficient = 0.37). Faecal ASCA was positive in 30/43 patients (70%), but did not correlate with FLA or clinical severity (p = 0.07 and p = 0.8 respectively). The mean absorbance value for positive faecal ASCA was 1 (70%), but did not correlate with FLA or clinical severity (p = 0.40).

Conclusion: Faecal lactoferrin concentrations detect active disease in the post resection Crohn’s patient. Our results show that FLA concentration correlates with other assessments of clinical severity and support its use as a non-invasive marker for monitoring Crohn’s disease after ileocaecal resection.

Moynihan 0098
The Logistic Organ Dysfunction Score-modified Atlanta categorization of acute pancreatitis
S. Balachandra, J. M. Mason, A. Bagul, A. K. Siriwardena
Hepatobiliary Surgery Unit, Manchester Royal Infirmary, Manchester

Background: The 1992 Atlanta consensus conference defined two categories of acute pancreatitis – severe and mild - according to the presence or absence respectively of organ failure (OF). However OF can be transient. This study tests the hypothesis that application of a contemporary, well-validated organ dysfunction scoring system such as the Logistic Organ Dysfunction Score (LODS) will provide greater precision in categorization.

Methods: A prospective single-centre study was undertaken in a consecutive series of 181 patients with a clinical diagnosis of acute pancreatitis (AP) presenting to a University Teaching Hospital from June 2001 through November 2004. Patients with known chronic pancreatitis and those transferred for tertiary care were excluded. In addition to demographic detail, data were collected on critical care occupancy, in-patient stay and in-hospital mortality. Charts were reviewed at end-of-episode for allocation of conventional Atlanta category (blind to other scoring). Variables required for calculation of LODS (omitting hepatic score component) were collected on admission and 24 hours with principal end-points being in-patient stay and critical care occupancy as these translate across health-care systems. Data were analyzed by receiver operator curves (ROC) with 95% confidence intervals (c.i.).

Results: The LODS-modified Atlanta, used as a predictor of severity at admission generates sensitivity of 89% and specificity of 68%, AUC = 0.8 for LODS ≤ 1, and 41% sensitivity and 96% specificity when modelled with LODS ≥ 2 as the definition of severity. Applied prospectively, in real-time, a LODS score cut-off of 1 or over at 24 h would correctly classify the level of care required by 89% of patients but would misclassify 11% of patients subsequently needing ICU support.

Conclusion: Calculation of a one-off logistic dysfunction score on the day of admission in patients with acute pancreatitis permits precise assessment of prognosis with cut-off of LODS ≥ 2 as 24 h identifying severe disease. Calculation of the LODS-modified Atlanta score on admission in acute pancreatitis combines the value of admission prognostic tests with improved disease categorization.

Moynihan 0200
Cathepsin K, osteopontin and calcium sensing receptor gene expression in primary breast tumour tissue and their involvement in the metastatic process
A. Manning, J. Garvin, R. McNeill, N. Miller, E. Hennessy, M. Kerin
University College Hospital Galway, Galway

Background: Cathepsin K, the major cysteine protease responsible for bone resorption and osteopontin, an integrin binding bone matrix protein have been implicated in the metastatic process in breast cancer. The calcium sensing receptor has also been implicated through its action on parathyroid hormone related peptide in the vicious cycle of metastases. Our aim was to quantitate the expression of these three genes in primary breast tumour tissue and to examine for a relationship between gene expression and the subsequent development of metastases.

Methods: Relative gene expression in primary breast tumours (n = 35) and normal breast tissue (n = 5) was determined using quantitative real-time PCR. Breast cancer patients were of similar age and disease stage at diagnosis, but had differing outcomes in terms of disease progression at 5 years. Associations between relative gene expression in the primary tumour and development of metastases were determined using the ANCOVA (analysis of covariance) statistical test.

Results: The cathepsin K gene was significantly down-regulated in the primary breast tumour tissue of patients who subsequently developed metastases compared to patients who remained metastases free, and compared to normal breast tissue (p < 0.0001). The osteopontin gene was significantly up-regulated in primary breast tumour tissue compared to normal breast tissue with an approximate 10-fold increase in expression (p < 0.0001). Despite its low abundance the calcium sensing receptor was amplified in all samples although levels of expression did not differ significantly between groups.

Conclusion: We have shown for the first time that cathepsin K may have an important role in development of breast cancer metastases. We have also shown that the osteopontin gene may be of importance in breast cancer development. This study identifies potential targets for future therapeutic intervention in breast cancer. This is also the first study to quantitate the expression of the calcium sensing receptor in breast tumour tissue.
Moynihan 0558

Gut function is an independent prognostic indicator and can be modulated to benefit patient outcome: proof of principle

M. Gart, J. MacFie, L. McNaughton, C. Ramsey, A. Coppack, M. M. Rao, R. Kallam, S. McKenzi
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Background: Inadequate gut function or intestinal failure (IF) is common in the critically ill. However, it is difficult to measure objectively, and treatment options are limited. The aims of this investigation were to define IF, determine its effects, if any, on prognosis and to evaluate the role of gut-specific pharmaconutrients (GSN) on stimulating the return of gut function.

Methods: This was assessed by 2 prospective studies. In the first, 315 consecutive patients requiring adjuvant nutritional support had their gut function accurately assessed. Normal gut function was defined by the enteral/oral intake of nutrients admitted (probiotics, probiotics, glutamine, multivitamins and antioxidants) or placebo. Those involved in the trial were blinded to treatment allocation and the primary endpoint of this study was return of normal gut function. Morbidity and mortality was recorded.

Results: Patients with IF were more likely to develop sepsis ($p < 0.001$) and die ($p < 0.001$). Multivariate analysis demonstrated that IF was associated with outcome independently of other organ failures ($p = 0.012$). GSN were associated with a quicker median return of normal gut function (164 versus 214 hours, $p = 0.016$), and a lower rate of sepsis ($p = 0.015$).

Conclusion: IF is independently associated with prognosis, irrespective of other organ failures. GSN stimulate the return of gut function and this is associated with improved outcomes. Therapies specifically targeted to preserve gut function are therefore justified.

Moynihan 0645

Motion analysis predicts laparoscopic experience as accurately as expert assessment

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$^1$Northumbrian Upper Gastrointestinal Team of Surgeons (NUGITS), Northumbria Healthcare NHS Trust, Northumbria

Background: No gold standard measure of surgical skills exists. Validated Global Rating Scales (GRS) have improved biased subjective assessment, but are time-consuming and require multiple assessors. New hybrid simulators (ProMIS, Haptica, Dublin) allow subjects to perform structured tasks while performance is simultaneously recorded and instruments movements measured. We assessed whether immediate information provided by motion analysis metrics (MM) were as accurate as structured expert opinion using GRS.

Methods: 30 subjects, consisting of 10 Expert Laparoscopic Surgeons, 10 Senior Trainees and 10 Novice Medical Students were assessed. All received instruction on the simulator and performed familiarisation tasks before completing a single assessment Sharp Dissection task. Recorded video footage was coded and reviewed by 2 blinded expert assessors experienced in laparoscopic surgery and training. The GRS consisted of 4 components described by a 5 point Likert Scale. Correlation with MM was tested using Spearman’s Rho and significance level 0.05. Inter-rater reliability was measured using intraclass correlation coefficient (ICC).

Results: Strongest GRS-MM correlations were found for Time/Motion/Progress with Time (Spearman’s Rho 0.88, $p < 0.05$) and Instrument Handling with Path Length (Spearman’s Rho 0.80, $p < 0.05$). Smoothness correlated well with Respect for Tissue in Rater 1 (Rho 0.68) but not Rater 2 (Rho 0.18). Mean GRS showed stronger inter-rater agreement than its individual components (ICC 0.68). Correlation coefficients with actual experience group were 0.58–0.74 for Mean GRS Score and 0.67–0.78 for MM (Spearman’s Rho, $p < 0.05$).

Conclusion: Motion analysis shows concurrent validity with GRS assessment. MM predict experience level at least as accurately as experts. MM data is immediate, objective and independent of rater agreement for whom video analysis is time-consuming. Motion analysis simulators could supplement course assessment, providing resource-efficient feedback and free trainers to concentrate on teaching.

Moynihan 0449

Renal preservation by normothermic resuscitation perfusion with autologous blood: a comparison with static hypothermic storage and hypothermic machine perfusion

A. Bagul, S. Hosgood, M. Kaushik, M. Kay, H. Waller, M. Nicholson
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Background: Normothermic preservation (NP) has the potential to improve the metabolic support and maintain the viability of ischaemically-damaged organs retrieved from non-heart beating donors (NHBD) prior to transplantation. This study investigated the effects of Warm resuscitation perfusion (WRP) with oxygenated blood in a model of controlled NHBD transplantation. This study investigated the effects of Warm resuscitation perfusion (WRP) with oxygenated blood in a model of controlled NHBD transplantation.

Methods: Porcine kidneys ($n = 6$) were subjected to 10min warm ischaemia and preserved as follows:

- Group 1: 2 hr cold storage (CS) - minimal ischaemia controls
- Group 2: 18 hr CS
- Group 3: 18 hr Cold machine perfusion (CP)
- Group 4: 16 hr CS + 2 hr WRP

Renal haemodynamics and function were then measured during 3 hr reperfusion with autologous blood.

Results: Increasing CS from 2 hr to 18 hr reduced renal blood flow (AUC 444 ± 57 versus 325 ± 70, $P < 0.001$), but this was restored by WRP (563 ± 119, $P = 0.035$ versus 18 hr CS) with no difference seen compared to CP (600 ± 319). Renal function was also better in Groups 1, 3 and 4 versus Group 2 (% serum creatinine full 92 ± 6, 79 ± 9 and 64 ± 17 versus 44 ± 13% respectively, $P < 0.001$). AUC serum creatinine was significantly lower in Group1 compared to Group2 (1102 ± 260 versus 2156 ± 401, $P = 0.002$) and to Group 4 (1756 ± 280, $P = 0.009$), while Group 4 was similar to Group 3 (1154 ± 300). Two hours of NP reduced the ADP : ATP ratio to a significantly lower level than the pre-perfusion values of all other groups ($P = 0.046$).

Conclusion: Normothermic perfusion with oxygenated blood was able to restore depleted ATP levels and to reverse some of the deleterious effects of cold storage in porcine kidneys. This new method of organ preservation has potential in the field of NHBD kidney transplantation and can be succinctly described by the term normothermic resuscitation perfusion.

Moynihan 0850

Effectiveness of the free radical scavenger edaravone in experimental colitis

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$^1$Department of Surgery, Queen’s University Belfast, Belfast, $^2$Department of Pathology, Royal Victoria Hospital, Belfast

Background: The aetiology of Inflammatory Bowel Disease (IBD) remains uncertain. It is known however that oxygen free radicals play a role in the pathogenesis of many diseases including IBD. Edaravone is a potent free radical scavenger recently licensed in Japan for the treatment of patients with acute stroke. The aim of this study is to determine whether edaravone suppresses experimental colitis.

Methods: The dextran sodium sulphate (DSS) model of colitis in Sprague Dawley rats was used. DSS was dissolved in drinking water (4%, w:v) and
Moynihan 0709

Gut hormones as mediators of appetite and weight loss after gastric bypass

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²Department Metabolic Medicine, Imperial College London, London

Background: Bariatric surgery remains the most effective treatment option for obesity and gut hormones are implicated in the reduction of appetite and weight after laparoscopic Roux-en-Y gastric bypass (LRYGB). We aimed to evaluate the physiological importance of the satiety gut hormones.

Methods: Two studies were performed. In both studies patients undergoing LRYGB were studied after a 12 hour fast and plasma levels of peptide YY (PYY) and glucagon like peptide 1 (GLP-1) were correlated with changes in appetite over three hours using visual analogue scores (VAS). Firstly, hormone responses after a standard 420 kcal meal were quantitated by Western-blot. DC function was assessed by MTT in mixed lymphocyte reactions (MLR). Donor bone marrow derived DCs were prepared and genetically transduced with SOCS-1 transgene under non-recombinant conditions. SOCS-1 transduced DCs (SOCS-1-DC) were injected intravenously, then transplantation was performed between SD donor and Wistar recipient.

Results: In the present study, we found that compared with untransduced DC, SOCS-1-DC could suppress allogeneic mixed lymphocyte reaction (MLR). The inhibitory effect was the most striking with the stimulator/effector (S/E) ratio of 1:10. The inhibition rate was 29 ± 5%, 40 ± 5% (P < 0.01) and 35 ± 5% (P < 0.05). SOCS-1-DC pretreated recipients had a moderate survival prolongation with a mean allograft survival of 23 ± 5 days (P < 0.01), compared with 6 ± 2.6 days in control group. Therefore, the difference between untreated DC group and control group was not significant.

Conclusion: These results indicate that SOCS-1-DC can induce allogenic T-cell hyporesponsiveness in vitro and apoptosis may be involved in it. SOCS-1-DC pretreatment can prolong intestinal allograft survival in the recipient.

Moynihan 0031

Prolongation of rat intestinal allograft survival by administration of donor dendritic cells transduced with SOCS-1

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Background: Approaches to modify donor-derived dendritic cells (DC) in order to induce an immunological hyporesponsive state in the recipient have been attractive as a potential strategy in transplantation. Suppression of cytokine signaling (SOCS)-1 critically regulates the stimulatory capacity of DCs and is a potent inhibitor of STAT4 transduction pathway for IL-12. In this study, we investigated whether SOCS-1 transduced DCs could induce tolerogenicity and prolong allograft survival in rat intestinal transplantation.

Methods: Donor bone marrow derived DCs were prepared and genetically transduced with pEFSOCS-1 by liposome. The level of SOCS-1 expression was quantitated by Western blot. DC function was assessed by MTT in mixed lymphocyte reaction. Allogeneic T-cell apoptosis was examined by flow cytometry analysis. Seven days before heterotopic intestinal transplantation, 2 × 10⁶ donor-derived SOCS-1-DC were injected intravenously, then transplantation was performed between SD donor and Wistar recipient.

Results: For hormone responses 5 men and 11 women were recruited (mean age 48, mean body mass index (BMI) 49 kg/m²). Postprandial PYY and GLP-1 profiles started rising as early as two days following gastric bypass (P < 0.05). Changes in appetite were also evident within 2 days of gastric bypass (P < 0.05). The patients participating in the inhibition of the gut hormone responses were a mean of 9.5 months post surgery (mean age 41, mean BMI 33 kg/m²). Octreotide resulted in return of appetite and increased food intake (P < 0.05).

Conclusion: The attenuated appetite after gastric bypass is associated with elevated PYY and GLP-1 concentrations, while appetite returns when the release of gut hormones is inhibited. The results suggest a role for gut hormones in the mechanism of weight loss after gastric bypass and may have implications for the treatment of obesity.
Predicting outcome 0192
An assessment of the predictive value of trauma scoring systems in penetrating trauma in the United Kingdom
A. T. Stearns, J. Kerssens, C. Payne, D. Beard, A. J. McKay
Gartnavel General Hospital, Glasgow and Scottish Trauma Audit Group, Edinburgh

Background: Trauma research is dependent on standardizing injuries across patients, and has led to the development of several anatomical scales to describe injury extent. These anatomical scales are combined with physiological data to form predictive models that predict probability of death for an individual patient. These are predominantly derived from American major trauma series. To date there has been no validation of these injury models in a European penetrating trauma population. We aimed to assess the validity of two current predictive models, TRISS (Trauma Injury Severity Score) and ASCOT (A Severity Characterization Of Trauma), in predicting mortality for a British penetrating trauma cohort. Subsequently, we aimed to validate three anatomical scales in predicting mortality: injury severity score (ISS), new injury severity scale in penetrating trauma (NISS) and anatomical profile (AP).

Methods: Data was collected prospectively on all trauma patients presenting to 23 hospitals in Scotland over the period 1992 to 2001, including patient demographics, mechanism of injury, physiological data and anatomical injuries recorded at laparotomy or autopsy. Patients were followed to discharge from hospital. Models were assessed with Hosmer-Lemeshow statistics, where p greater than 0.05 indicates a satisfactory model. Anatomical scales were assessed by using them as the anatomical component of the TRISS model, together with coefficients derived by regression analysis.

Results: Of 52887 patients on the database, 3110 patients presented with penetrating injuries. 231 patients died (7.4%). Neither TRISS nor ASCOT modelled outcome satisfactorily (p < 0.01), underestimating survival for severe injuries and overestimating survival for more moderate injuries. ISS did not model outcome satisfactorily (p < 0.01). Refitting the models using NISS and AP significantly improved model performance (p > 0.25 and p > 0.05 respectively). All models and scores had excellent discrimination.

Conclusion: Current TRISS and ASCOT models are unsatisfactory in predicting outcome after penetrating injury in a UK population. Replacing ISS with AP or NISS as the anatomical component improves the performance of the TRISS predictive model in penetrating trauma.

Predicting outcome 1124
Can a genetic algorithm improve prediction of severity in patients with acute pancreatitis?
R. Mofidi, K. K. Madhavan, O. J. Garden, R. W. Parks
Department of Clinical and Surgical Sciences, University of Edinburgh, Edinburgh

Background: The aim of this study was to compare a genetic algorithm (GA) with a Multi Layered Perceptron (MLP) Artificial Neural Network (ANN) and conventional predictive models to predict the development of severe acute pancreatitis (AP) and to predict fatal outcome.

Methods: Data on all patients who presented with AP from January 2000 to December 2004 were reviewed. Clinical data on admission and at 48 hours were collected. APACHE II and Glasgow severity scores (GS) were calculated. A GA and a MLP ANN were created and trained to predict development of severe AP and mortality from AP. The accuracy of predictions was reported as the area under receiver-operator characteristic curve (AUC).

Results: 759 patients with AP were identified of whom 219 (28.9%) presented with severe acute pancreatitis and 45 patients died (5.9%). GA (AUC = 0.94) was significantly more accurate than APACHE II score at 24 hours (AUC = 0.78) or GS at 48 hours (AUC = 0.65) at predicting progression to a severe course (P < 0.01 and P < 0.01 respectively) and at predicting death from AP (P < 0.05). A modest but significant improvement in the accuracy of prediction for the development of severe AP was observed when GA rather than MLP ANN (AUC = 0.89) was used (P < 0.01).

Conclusion: GA was able to predict progression to severe disease and mortality from acute pancreatitis with considerable accuracy and outperformed clinical risk scoring systems.

Predicting outcome 0083
Visual analogue scale pain scores accurately predict acute appendicitis
V. S. Marla, P. J. O’Dwyer
Western Infirmary, Glasgow

Background: Acute appendicitis (AA) and non-specific abdominal pain (NSAP) comprise more than 50% of patients admitted with acute abdominal pain. Clinical diagnosis has always been a challenge with increasing reliance on CT. The aim of the present study was to determine if pain scores at rest and on movement on a visual analogue scale (VAS) could differentiate AA from NSAP.

Methods: Patients admitted with acute abdominal pain over a period of 2 years were prospectively evaluated using a structured proforma. This included clinical findings, standard blood and radiological tests. Abdominal pain scores were recorded on VAS with 0 indicating ‘no pain’ and 100 indicating ‘worst pain imaginable’. Patients were followed up until a final diagnosis was made.

Results: Over the study period 107 patients with AA and a further 100 with NSAP were admitted. Logistic regression analysis found 3 main predictors of AA. The probability of a patient having AA increased independently with (i) increases in the difference between moving and resting pain scores i.e. the differential pain score (DPS), (ii) increases in white blood cell (WBC) count, and (iii) the presence of migration of pain (MP).

Table 1 Results of the ROC curve analysis

<table>
<thead>
<tr>
<th>Area under ROC curve</th>
<th>Criterion for positive test</th>
<th>Sens.</th>
<th>Spec.</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS 0.902</td>
<td>DPS ≥ 20</td>
<td>87%</td>
<td>82%</td>
<td>85%</td>
</tr>
<tr>
<td>MP N/A</td>
<td>MP present</td>
<td>57%</td>
<td>98%</td>
<td>77%</td>
</tr>
<tr>
<td>WBC 0.793</td>
<td>WCC &gt; 11</td>
<td>65%</td>
<td>80%</td>
<td>72%</td>
</tr>
</tbody>
</table>

Combining all the 3 variables resulted in a slight improvement of accuracy to 89%.

Conclusion: A differential pain score of greater than 20 mm, as recorded on a visual analogue scale is an independent predictor of acute appendicitis. Its accuracy is similar to CT and clinical trials are required to compare both when assessing patients with suspected appendicitis.

Predicting outcome 0188
Development and validation of a weighted predictive index to differentiate a functional or organic diagnosis in patients referred with bowel symptoms
Southern General Hospital, Glasgow

Development of a weighted predictive index to differentiate a functional or organic diagnosis in patients referred with bowel symptoms
Southern General Hospital, Glasgow

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Background: Patients and clinicians are increasingly intolerant of diagnostic uncertainty. Insights from diagnostic studies may permit the avoidance of invasive tests allowing appropriate triage of patients, ultimately providing more cost-effective healthcare. Patients with a likely functional diagnosis and hence normal investigation results may avoid unnecessary investigation. We aimed to develop a weighted predictive index for functional or organic diagnosis.

Methods: 3650 consecutive patients referred with bowel symptoms to six colorectal surgeons for assessment with a complete pathway of care were identified from a prospective database of all G.P Colorectal referrals. Referral symptoms and signs were recorded from a 35-point referral proforma. All investigation results and diagnostic outcomes were prospectively recorded. The first 1825 (50%) patients formed the development group and the second 1825 (50%), the validation group. Functional disorders were diagnosed after exclusion of infectious, metabolic or anatomical abnormalities. The weighted index was based upon independent predictors from multiple logistic regression analysis. ROC analysis on the validation group assessed index performance.

Results: Multivariate analysis generated a weighted index based upon age (< 40 years [OR 3.35 (95% CI 2.21–5.09]), normal physical condition [OR 2.11 (95% CI 0.94–4.60]), absent rectal bleeding [OR 2.23 (95% CI 1.61–3.10]), with no recent change in bowel habit [OR 2.12 (95% CI 1.51–2.99]) [Satisfactory goodness-of-fit (Hoosmer-Lemeshow; p = 0.530)]. The index performed poorly in predicting a functional or organic diagnosis [Area under curve = 0.601 (95% CI 0.569–0.617)].

Conclusion: It was not possible to develop a reliable index for accurately predicting functional or organic diagnosis. Alternative attributes require identification however; factors that may be predictive may not be very useful clinically. For diagnostic research to determine a diagnosis based upon patient history, a range of diagnostic studies conducted in different settings with different designs is required with careful prospective collection of a detailed symptom assessment.

Predicting outcome 0362

Portsmouth POSSUM aids the referral of patients undergoing emergency laparotomy to Intensive Care

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North Bristol NHS Trust, Bristol

Background: NICEPOD recommend developing local guidelines to select which surgical patients should be referred to Intensive Care (ITU). A prospective clinical effectiveness study was undertaken to assess the role of the Portsmouth POSSUM (P-POSSUM) score in predicting which surgical patients would benefit from ITU admission following an emergency midline laparotomy for non-vascular surgery.

Methods: All patients undergoing an emergency midline laparotomy for non-vascular surgery were identified in a 3-month period. Their age, ASA grade, P-POSSUM score, ITU/ward admission, length of ITU stay, length of hospital stay and 30 day mortality were recorded and analysed. The P-POSSUM score and predicted death rate (PDR) were calculated retrospectively.

Results: 45 patients were identified during the study period. 16 (35.6%) were admitted to ITU post operatively. 29 (64.4%) patients were admitted to the ward. The mean PDR of ward admissions was 9.9%, median 3.4% and the actual mortality 2/29 (6.9%). The mean PDR of ITU admissions was 39%, median 32.8% and the actual mortality 5/16 (31%). All the patients who died had a PDR > 9%. We have classified patients with a PDR > 9% as high risk and < 9% as low risk.

<table>
<thead>
<tr>
<th>High Risk ITU</th>
<th>Low Risk ITU</th>
<th>High Risk Ward</th>
<th>Low Risk Ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>3</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>39%</td>
<td>0%</td>
<td>25%</td>
<td>0%</td>
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<tr>
<td>47%</td>
<td>2.8%</td>
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</table>

There is a significant difference in the mortality of low and high risk ward patients ($\chi^2$ 5-6, $p < 0.025$). High risk patients also had a greater length of stay (24 versus 12 days) although this was not statistically significant ($p = 0.145$).

Conclusion: P-POSSUM is an accurate scoring system in our emergency laparotomy patients and may aid referral to ITU. We recommend that all emergency laparotomy patients undergo P-POSSUM scoring and patients with a P-POSSUM PDR > 9% should be discussed with ITU.

Predicting outcome 0359

RASS – Ruptured Aneurysm scoring system: A novel equation to predict the probability of post operative death following repair of ruptured AAA

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Heart of England NHS Foundation Trust, Birmingham

Background: Serum lactate is a marker of tissue ischaemia and is used to assess the adequacy of resuscitation. This study examined the prognostic value of immediate post-operative levels of serum lactate and base deficit in ruptured AAA. Moreover it aims to produce a simplistic formula to predict mortality after successful repair of a ruptured AAA.

Methods: Thirty patients (24 men and 6 women) were prospectively studied. They were divided into 2 groups: survivors to at least 12 hours after surgery and non-survivors. Their age, ASA grade, weight, time from admission to presentation, mean lactate and base deficit and measured and predictive mortality were recorded and analysed. Risk factors associated with outcome were compared using chi-squared testing and logistic regression analysis. The sensitivity and specificity of this equation in prediction of mortality was 80% and 93.3% respectively.

Conclusion: These data demonstrate that immediate post-operative serum lactate and base deficit level are good predictors of outcome after ruptured AAA repair. The prognostic value of this simple and inexpensive test/formula requires corroboration in a larger prospective study.

A web interface is currently under development to facilitate clinical use.

Predicting outcome 0867

Leukoaorioasis predicts the need for intra-operative shunt placement during carotid endarterectomy

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Queen's Medical Centre, Nottingham

Background: Leukoaorioasis seen as white matter hyperintense lesions (WMHL) in magnetic resonance brain imaging (MRI) is related to age and is thought to reflect small vessel disease. WMHL also increases the risk of stroke in patients with carotid stenosis as well as the risk of perioperative stroke during carotid endarterectomy. One of the explanations for these associations comes from a link between WMHL and haemodynamic impairment. We hypothesised that the extent of ischaemral WMHL, as an indirect marker of haemodynamic risk, may predict an increased risk of shunt requirement upon clamping during carotid endarterectomy.

Methods: A retrospective analysis of symptomatic patients with significant carotid stenosis (> 60%) with a preoperative brain MRI scan, who subsequently
underwent a carotid endarterectomy under local anaesthesia, was done. A shunt was required in those who had impaired cerebral function on clamping of the carotid arteries. Ipsilateral WMHL volumes were calculated using a semi-automated technique on fluid attenuated inverted recovery MRI scans. WMHL volumes were compared between patients requiring and not requiring a shunt controlling for known risk factors.

**Results:** 70 patients met the inclusion criteria. The mean age of patients was 70.5 years (+/− 8.6) and 27 (38.6%) were female. 12 (17.1%) of patients required shunting and 2 of these developed perioperative strokes. Patients who required a shunt had a larger WMHL adjusted volume (adjusted means = 16.2 +/− 2.9 ml for shunt group versus 8.7 +/− 1.2 ml for non-shunt group; F = 5.6, P = 0.02), controlling for age, sex, cortical infarcts and the degree of ipsi- and contra-lateral carotid stenosis.

**Conclusion:** Ipsilateral WMHL volume is a significant predictive factor for intra-operative shunting upon clamping in carotid endarterectomy. WMHL is an indicator of cerebral haemodynamic compromise and may call for more dedicated haemodynamic assessment of people to identify patients at high risk of shunt requirement prior to undergoing CEA.

**Predicting outcome 0622**

**Prognostic value of preoperative renal function in patients undergoing elective endovascular repair of abdominal aortic aneurysm (EVAR)**


Belfast City Hospital, Belfast

**Background:** Patients with pre-existing renal impairment undergoing EVAR are at an increased risk of morbidity and mortality. The aim of this study was to assess if pre-operative creatinine concentration and estimated glomerular filtration are predictive of short and long-term outcome following elective EVAR.

**Methods:** All patients undergoing elective EVAR over a 7-year period were included. Data were retrieved from the vascular database. Serum creatinine measurements were taken pre-operatively, and at day-1, day-5, 1-month, 3-months, 12-months and annually thereafter post-operatively. An estimated glomerular filtration rate (eGFR) was calculated using the formula MDFR = 186 × creatinine − 1.154 × age − 0.203 × 0.742 for females. Patients were classified as normal if eGFR ≥ 60 ml/min per 1.73 m² and ESRD if < 60 ml/min per 1.73 m². The overall peri-operative mortality was 2.6% with no significant difference observed between those with and without abnormal pre-operative creatinine concentration and eGFR. However, at 4-years, 30% of patients with creatinine concentration > 110 mmol/l were still alive compared to over 60% of those with normal concentration (p < 0.02). The difference in survival was not as significant in patients with eGFR < 60 ml/min compared to those with greater eGFR (p = 0.13). However, Neither creatinine nor eGFR were found to be accurate predictors of survival even though both demonstrated strong predictivity for renal failure.

**Conclusion:** These findings suggest that impaired renal function is not a reliable predictor of mortality and therefore, should not be used to exclude patients for EVAR.

**Predicting outcome 0473**

**Predicting persistent post-operative pain following laparoscopic hernia repair**

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Dewsbury District Hospital, Dewsbury

**Background:** Post-operative pain is reduced following laparoscopic hernia repair compared with open repair, however some patients still experience significant post-operative pain. Predicting the risk of this pre-operatively may improve our management of these patients. Our aim was to identify risk factors for development of persistent post-operative pain (PPP) after laparoscopic hernia repair.

**Methods:** Postal questionnaires were sent to all patients undergoing laparoscopic hernia repair between 1996–2004 inclusive at one District General Hospital. Data collected included patient demographics, BMI, whether the patient suffered pre-operative pain, type of laparoscopic hernia repair (including whether repair was TEP or TAPP, primary or recurrent, unilateral or bilateral), post-operative complications and details of any post operative pain (we defined PPP as lasting >equal to 1 year).

**Results:** 881 patients underwent laparoscopic repair of 1029 hernias. 523 patients (60%) completed the questionnaire. In this group, male:female ratio was 36:1 and median age at surgery was 58 years (range 19–90). We divided patients depending on the presence or absence of persistent post-operative pain (PPP). 72/523 (13.6%) patients reported PPP. This was not related to patient sex (p = NS). Median age at surgery for patients with PPP was 53.5 years (range 20–81) compared with 58 years (range 19–90) for those with no pain at 1 year (p = 0.001). Median BMI was not significantly different between the two groups (p = 0.18). Patients with pre-operative pain, even if this was ‘slight’, were significantly more likely to suffer from PPP (p < 0.0001). Type of laparoscopic repair (TEP or TAPP) and whether this repair was unilateral or bilateral was not related to presence of PPP. Recurrent hernia repairs were associated with more PPP than primary repairs (p = 0.02). Post-operative haematoma formation was not associated with increased PPP (p = 0.3).

**Conclusion:** Pre-operative pain, younger age at surgery, and surgery for recurrent hernias, are all significant predictors of increased persistent post-operative pain following laparoscopic hernia repair. Pre-operative identification of patients at increased risk of PPP may help in their management and reduce morbidity.
Getting to the bottom of the problem 0871

Variability in measurements of anal cushions in continent people

D. Thelkinkhardt, S. Gonsalves, M. Nicholls, R. Dunham, P. Finan, P. Sagar, D. Burke

Background: Anal cushions play a role in the normal continence mechanism. However their contribution is poorly understood. The aim of this study was to measure anal cushions in a cohort of continent patients and to examine the effects of parity, age, concurrent haemorrhoidal symptoms and posture on anal cushions.

Methods: Transvaginal ultrasound scan was performed to visualize and measure the anal cushions. Patients were recruited from the gynaecological scan sessions. Areas enclosed by the internal sphincter (A1) and by the anal cushions (A2) were measured at the mid anal canal level. A cushion: canal ratio (CC ratio) (A1−A2)/A1 was calculated to make direct comparison between patients. 15 of these patients had their measurements in both supine and erect posture.

Results: 102 females with a median age of 41 (IQR 32–49) years underwent the scan. The median CC ratio was 0.68 (IQR 0.61–0.73). Interobserver error was 0.98 and intraobserver error was 0.99. The variations in measurements are shown in table.

Conclusion: There is a range in the size of anal cushions within continent females, which is unaffected by age, history of obstetric trauma or haemorrhoidal disease but the size increases following vaginal deliveries, and also in the erect posture.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Median (IQR)</th>
<th>P-Value</th>
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<tbody>
<tr>
<td>&gt; 40 (n = 49)</td>
<td>0.69 (0.61–0.74)</td>
<td>0.70</td>
</tr>
<tr>
<td>&lt; 40 (n = 53)</td>
<td>0.68 (0.62–0.72)</td>
<td>0.04</td>
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Getting to the bottom of the problem 0863

Role of anal cushions in idiopathic faecal incontinence

D. Thelkinkhardt, S. Gonsalves, M. Lim, R. Dunham, P. Finan, P. Sagar, D. Burke

Background: Faecal incontinence can occur in a subset of patients who have completely normal anorectal investigations. It is hypothesised that the anal cushions are deficient in patients with idiopathic faecal incontinence (IFI). The aim of this study was to compare the anal cushion of patients with IFI with healthy controls.

Methods: Measurements of the anal cushions were performed using a transvaginal ultrasound scanner. Areas enclosed by the internal sphincter (A1) and by the anal cushions (A2) were measured at the mid anal canal level. A Cushion: Canal ratio (CC ratio) was calculated to make direct comparison between patients (A1−A2)/A1. We measured the anal cushions firstly in healthy controls, and then in patients with IFI. Patients with IFI had normal endoanal ultrasonography, pudendal nerve assessment and anal manometry.

Results: There were 102 asymptomatic controls and 21 patients with IFI. Median CC ratio was significantly lower in the IFI group when compared with controls (CC ratio was 0.57 (IQR 0.54–0.60) versus 0.66 (IQR 0.57–0.7), Mann Whitney U-test p-value = 0.001). Median age was significantly higher in the IFI group when compared with controls (60 (IQR 52–64) versus 41 (IQR 32–49) years, Mann Whitney U-test p-value = 0.001) but there was no correlation between age and CC ratio (Spearman correlation coefficient = 0.021, p-value = 0.821).

Conclusion: Cushion canal ratios are significantly lower in patients with idiopathic faecal incontinence when compared with healthy controls. Deficiency of the anal cushions may be the elusive aetiology in patients with idiopathic faecal incontinence.

Getting to the bottom of the problem 0176

Sequential medical therapy can heal over 80 per cent of anal fissures


Gloucestershire Royal Hospital, Gloucester

Background: Pharmacological therapy is now an accepted first-line treatment for anal fissures. However, there has been concern over healing rates with individual therapies and both the safety and the cost implications of using botulinum toxin. The purpose of this study was to assess the impact of a specialist fissure clinic using sequential medical therapies, on overall healing rates.

Methods: All patients with anal fissures seen in a two-year period were reviewed. Crohn’s fissures were excluded. Fissures were treated with a combination of 0.2% GTN, 2% diltiazem, and botulinum toxin injection. Cost of individual therapies was established from pharmacy records. Symptomatic relief, healing rates and side effects were recorded for each therapy.

Results: One hundred and thirty-one patients were studied, 39 with anterior fissures, 78 with posterior and 14 with both anterior and posterior or with lateral fissures. GTN healed 25% of anterior but 42% of posterior fissures. Healing with diltiazem was 52% for anterior fissures and 44% for posterior. Injection of botulinum toxin was significantly better than both GTN and diltiazem healing 74% of fissures resistant to topical therapies. GTN caused side effects in 16% of patients with headaches in 10% and 15% experienced side effects after diltiazem, 11% of which was perianal itching. 1 patient experienced anal tag swelling following botulinum toxin injection. GTN costs £23.83 per prescription, diltiazem £49.64 and by using 1 vial of botulinum toxin for more than 1 patient it’s cost can be reduced to £35.98 per patient. Overall, healing was achieved in 84% of patients using sequential medical therapy.

Conclusion: Botulinum toxin injection was safe and well tolerated with minimal complications. By comparison GTN and diltiazem cause significantly more side effects. The use of botulinum toxin is more effective at healing anal fissures than either GTN or diltiazem and when its use is limited to a specialist clinic it is also cost effective. By concentrating medical and nursing skills in a specialist clinic it is possible to heal over 80% of anal fissures using sequential medical treatment.
Getting to the bottom of the problem 0756
Sacral nerve stimulation for constipation: An international multi-centre study

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1St Mark’s Hospital, Harrow, 2University Hospital Maastricht, Maastricht, Netherlands, 3Aarhus County Hospital, Aarhus, Denmark, 4Danderyd Hospital, Stockholm, Sweden, 5Danube Hospital, Vienna, Austria, 6University Hospital Erlangen, Erlangen, Germany

**Background:** We evaluated the symptomatic and physiological effect of sacral nerve stimulation (SNS) in patients with slow transit constipation and normal transit constipation with impaired evacuation.

**Methods:** A prospective multi-centre trial was performed. 65 patients (58 female), median age 40 (range 17–79) years underwent test stimulation. The effect of stimulation was assessed by a 21-day bowel habit diary. Patients with > 50% improvement in symptoms were eligible for permanent SNS. Long-term results from chronic stimulation were assessed by bowel habit diary, symptom questionnaire, Cleveland Clinic constipation score (CCCS), visual analogue score (VAS), short form-36 (SF-36) questionnaire, anorectal physiology and colorectal transit studies.

**Results:** 41 (66%) underwent successful temporary SNS. Mean baseline and latest follow-up data (median 12 (range 1–24) months) are reported. Frequency of defaecation increased from 1±4 to 6±1 evacuations per week (p < 0.001). Evacuation days per week increased from 2±4 to 4±4 (p < 0.001). Time spent on toileting decreased from 17±6 to 9±3 minutes (p < 0.001), straining decreased from 4±4 to 2±9 episodes per week (p = 0.114), abdominal pain decreased from 4±4 to 2±0 days per week (p < 0.001) and perception of incomplete evacuation decreased (p = 0.022). The CCCS (0 = no constipation, 10 = severe constipation) decreased from 18±0 to 10±2 (p < 0.001). Mean VAS (0 = severe symptoms, 100 = no symptoms) increased from 18±8 to 66±0 (p < 0.001). Subjects with both slow transit constipation and impaired evacuation benefited from therapy. SF-36 quality of life subsets of physical functioning, general health, vitality, social functioning and mental health significantly improved. Rectal sensation and transit times were altered.

**Conclusion:** SNS is effective in the treatment of idiopathic slow and normal transit constipation resistant to conservative treatment. Improvement occurs in bowel frequency, associated symptoms, quality of life, and objectively measured colonic transit.

Getting to the bottom of the problem 0876
A comparison of anorectal functions in rectocoele patients presenting with obstructive defaecation or faecal incontinence as the leading symptom

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Division of Coloproctology, Leeds General Infirmary, Leeds

**Background:** Rectocoele can present with features of obstructive defaecation (OD) or faecal incontinence (FI) as leading symptom. The aim of our study is to compare anorectal function and investigations in these 2 groups.

**Methods:** A systematic review of patients with a diagnosis of rectocoele over the last 6 years was performed. Patients had manometry, endoanal ultrasound and defaecating proctography. Patient demographics, maximum mean resting pressure (MMRP), maximum mean squeeze pressure (MMSP), resting pressure gradient (RPG) and vector volume (VV) were recorded. Size of rectocoele was assessed by percentage of dye retained and was classified into 2 groups: small rectocoele with (< 30% retention of paste) and large rectocoele (> 30%).

**Results:** Total of 244 patients had rectocoele. 149 patients presented with obstructive defaecation (OD) as the prime symptom whereas 95 patients presented with faecal incontinence (FI).

Getting to the bottom of the problem 1202
Circular stapled anapexy for haemorrhoids: Therapeutic advance or technological misadventure

M. A. Thaha1, K. L. Campbell1, S. A. Kazmi1, L. A. Irvine1, N. R. Binnie1, W. S. Hendry1, H. J. Staines1, R. J. C. Steele1
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**Background:** The need for a painless yet effective method to treat haemorrhoids is long standing and calls for innovation rather than modification of available treatment.

**Methods:** In a global evaluation of stapled anapexy (SA), a multi-centre RCT compared SA with excisional haemorrhoidectomy (EH), studying its efficacy, safety, and patient acceptability including quality of life (QoL) up to one year after surgery.

**Results:** 182 randomised (91 SA, 91 EH) patients with grade 2, 3, and 4 haemorrhoids underwent SA or EH. 162 patients’ data were included in the intention to treat population at 1-year (drop out rate 11% (5 SA, 15 EH)). Demographics (age, gender, ) were comparable. 61 SA & 50 EH patients had grade 3 or 4 haemorrhoids with comparable symptom severity score (SSS) (mean score 8) and disease severity score (DSS) (mean score 4.9 SA, 3.4 EH). The mean operative time was similar, and 37.4% day case completion rate for both groups but intra-operative adverse events (6 SA versus 1 EH, p = 0.054 X2-test) differed. Pain (at rest and at bowels) and analgusic use were significantly lower in SA group (p < 0.05) but time back to work did not differ (median 14 days, both groups). Both SA and EH reduced the overall symptom load, but only 20.9% SA and 22.4% EH patients remained symptom free at one year. SA controlled bleeding better but had inferior control of prolapse compared to EH at 1-year. SSS and DSS decreased at 1-year but non-significant difference. Downgrading of haemorrhoids was significantly better following EH at 24 weeks (p = 0.045 FE-test). Overall complication rate was 50% (125 complications; 64 SA, 61 EH) with faecal urgency accounting for more than half (incidence 38%, more in SA), no sphincter damage on ultrasound scan and comparable preservation of anal electroosensitivities. Re-admission rate of 15% (p = 0.42), re-treatment rate for complication of 20.3% (p = 0.7) but 8 fold increase in re-treatment rate for residual prolapse after SA (p = 0.027). QoL (SF36 and HADS) and patient satisfaction to symptom control were similar but better acceptability of SA at 6 weeks (p = 0.01 logistic regression).

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Conclusion: Overall equivalency of symptom control except prolapse control, but SA significantly less painful with better patient acceptability.

Getting to the bottom of the problem 0567
Colonic pouches: Lessons from a prospective audit
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Leicester Royal Infirmary, Leicester

Background: Restorative colonic pouch formation with pouch-anal anastomosis is the treatment of choice following anterior resection for low rectal cancers. The pouch is commonly defunctioned with a proximal loop ileostomy. Controversy currently exists as to whether anal anastomotic integrity needs to be checked prior to ileostomy reversal. The aim of this prospective study was to investigate this position and report accordingly.

Methods: Data on all patients undergoing resectional surgery for rectal cancer in our unit are entered prospectively onto a data-base. Patients who underwent anterior resections with colo-colonic pouch formation and defunctioning stoma were identified and a review of notes and radiological records was carried out to identify outcomes.

Results: Forty two patients with adenocarcinoma of the rectum had anterior resections with covering loop ileostomy with colo-colonic pouch formation. Of these 38 (90.5%) patients had distal loopograms 6 to 8 weeks postoperatively. Two (5.3%) confirmed the presence of normal colo-colonic pouch but 24 (63.2%) normal reports made no mention of the presence of pouch. Three (7.9%) reported true leaks and 1 (2.6%) reported an anastomotic stricture. Eight (21.1%) reported anastomotic leaks, which upon review by a team of gastrointestinal radiologists and examination with flexible sigmoidoscopy were confirmed to be appearances consistent with normal colo-colonic pouches and anastomosis with no evidence of a leak. These patients went on to have an uneventful stoma closure.

Conclusion: The necessity of assessing the colo-colonic pouch prior to closure of defunctioning stoma has been questioned by other authors. Our study suggests that pouches are difficult to clearly delineate on distal loopogram and the appearances may be mistaken for false positive leaks. This leads to the question of the suitability of a distal loopogram in assessing pouch integrity although a true positive leak rate of 7.9% would suggest that postoperative assessment prior to closure is still necessary in some patients.

Getting to the bottom of the problem 0129
A rapid non invasive test for the qualitative detection of elevated faecal lactoferrin in ileal pouch patients with inflammation
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Department of Colorectal Surgery, The General Infirmary at Leeds, Leeds

Background: Pouchitis is a common long term complication of ileal pouch surgery. Currently, diagnosis requires a triad of clinical symptoms, endoscopic appearance and histological confirmation of inflammation. Elevated lactoferrin, a marker of intestinal inflammation, can be measured in faeces and may be a useful adjunct. The IBD EZ VUETM test, an immunochromatographic assay, is non-invasive, easy to perform and provides a result within 10 minutes. Visual interpretation of positive and negative results is simple because of the membrane cassette format of the test. We studied the sensitivity and specificity of the IBD EZ VUETM faecal lactoferrin kit (TechLabTM) in diagnosing pouchitis.

Methods: Consecutive ileal pouch patients with change in pouch function were recruited from a colorectal outpatients department. A faecal sample was taken prior to ileostomy reversal. The aim of this prospective study was to investigate this position and report accordingly.

Results: There were 32 ileal pouch patients (11 with and 21 without pouchitis). Median PDAI was significantly higher in those with pouchitis compared with those with healthy pouches (8 (7–9) versus 3 (2–4), p-value = 0.001). Overall the IBD EZ VUETM test had a sensitivity of 100 percent and a specificity of 86 percent for diagnosing pouchitis. The positive predictive value was 79 percent. The three elevated lactoferrin results in the non-inflamed pouch group occurred in 1) bleeding haemorrhoids, 2) a pouch anal anastomotic stricture and 3) a patient with cutitus. All 3 causes were confirmed by clinical and radiological examination with flexible sigmoidoscopy.

Conclusion: The IBD EZ VUETM is a simple, non-invasive and rapid test for indicating pouchitis. It is a sensitive method for diagnosing pouch inflammation without the need for routine endoscopic pouch examination or biopsy. Antibiotic treatment can be commenced with greater confidence and is appropriate in more than three quarters of patients. Further investigations can be reserved for those patients who have a positive lactoferrin test that fail to respond to standard antibiotic treatment.

Getting to the bottom of the problem 0852
Early ligation of the inferior mesenteric vein in rectal cancer surgery reduces the intra-operative systemic release of pro-inflammatory cytokines and post-operative inflammatory and stress response
V. Shumeyko1, E. Kennedy2, I. Eid1, E. Simpson2, D. Clough3, V. H. Muir3, A. Macdonald1
1Department of Surgery, Monklands Hospital, Airdrie, 2Department of Biochemistry, Monklands Hospital, Airdrie, 3Department of Anaesthetics, Monklands Hospital, Airdrie

Background: Intra-operative release of pro-inflammatory cytokines is thought to be responsible for the post-operative systemic inflammatory response (SIR), as measured by C-reactive protein. Historically, early ligation of the inferior mesenteric vein (IMV) was performed as in this paper it is presumed to release cancer cells into the peripheral circulation. However the effect of this manoeuvre on circulating cytokine levels has not been studied before. This study examines the effect of early versus later ligation of the IMV on the SIR.

Methods: Elefate colorectal cancer patients were randomised prospectively to early ligation (n=11) of the IMV before mobilisation or late ligation (n=10) of IMV after full mobilisation. Perianal veins and IMV blood samples were taken at induction, prior to and after full mobilisation, on completion of surgery and at 24 and 48 hours post operatively for IL1α, IL6, TNFα, CRP and Cortisol. Samples were analysed using ELISA. Results are expressed as a median (interquartile range). Statistical analysis was carried out using the Chi square test for paired samples and considered significant at p < 0.05.

Results: There was no difference in circulating peripheral blood levels of measured cytokines between both study groups at induction. There was no rise in peripheral levels of IL1α, IL6, and TNFα prior to mobilisation of the colon. The rise in circulating IL1α, IL6, and TNFα in peripheral venous blood samples at induction, prior to and after full mobilisation, on completion of surgery and at 24 and 48 hours post operatively for IL1α, IL6, TNFα, CRP and Cortisol. Samples were analysed using ELISA. Results are expressed as a median (interquartile range). Statistical analysis was carried out using the Chi square test for paired samples and considered significant at p < 0.05.

Conclusion: Early ligation of the inferior mesenteric vein in rectal cancer surgery reduces the intra-operative systemic release of pro-inflammatory cytokines and post-operative inflammatory and stress response.

Pro-inflammatory cytokines rise in response to tissue handling during mobilisation of the colon. The main source of this rise seems to be from the colon, through the drainage of the inferior mesenteric vein. Early ligation of this vein at the start of surgery reduces the circulating levels of these cytokines and impacts on the systemic inflammatory response, as measured by C-reactive protein. In addition the postoperative stress reaction, as measured by serum Cortisol levels is reduced.
Arterial disease 0442

Screening for abdominal aortic aneurysm reduces emergency operating workload
C. A. Carden, K. Cassar, J. L. Duncan
Raigmore Hospital, Inverness

Background: Screening for abdominal aortic aneurysm has been shown to reduce aneurysm related mortality and is said to reduce emergency workload. In areas of low population density and geographical isolation a pure vascular on-call rota cannot be justified. We set out to show that screening may facilitate the provision of an emergency service by reducing the emergency vascular workload.

Methods: Community based screening for abdominal aortic aneurysm was started in 2000 in a geographically isolated area with a population of 210,000. Screening was offered to men aged between 65 and 74. Data for both the diagnosis of ruptured abdominal aortic aneurysm (RAAA) and operations performed for RAAA were obtained from the Information Services Division of the NHS in Scotland and death certification data from the Registrar General for the period 1 Jan 1992 to 31 Dec 2005.

Results: Screening achieved a 90% uptake. Screening achieved a 90% uptake. Screening achieved a 90% uptake.

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<tbody>
<tr>
<td>Total no. of RAAA</td>
<td>n = 198</td>
<td>n = 121</td>
</tr>
<tr>
<td>No. of aneurysm deaths</td>
<td>n = 133</td>
<td>n = 87</td>
</tr>
<tr>
<td>% of non-survivors</td>
<td>67%</td>
<td>72%</td>
</tr>
<tr>
<td>Total no. of emergency operations</td>
<td>n = 109</td>
<td>n = 15</td>
</tr>
<tr>
<td>Average no. of emergency operations per yr</td>
<td>n = 13.6</td>
<td>n = 2.2</td>
</tr>
<tr>
<td>% of ruptures requiring emergency operation</td>
<td>55%</td>
<td>12%</td>
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</table>

Conclusion: This study shows a dramatic decrease in the number of operations for RAAA following the implementation of a Screening Programme. There was no reduction in the total number of RAAA annually, but this is in the face of an ageing population and an increase in the diagnosis of AAA as a consequence of the Screening Programme. Patients who have a AAA diagnosed and are considered unfit for elective surgical intervention, are less likely to be offered surgery for RAAA. In this study, screening has been successful in its objective of reducing the emergency vascular workload where general surgeons provide the majority of vascular cover.

Arterial disease 0077

Does surgical repair of popliteal artery aneurysms remain the gold standard treatment option? 18 years experience
Heart of England NHS Foundation Trust, Birmingham and University Hospital Birmingham NHS Foundation, Birmingham

Background: To determine the long-term outcome of surgical repair of popliteal artery aneurysms (PAA).

Methods: A retrospective review of consecutive patients who underwent surgical PAA repair in two vascular surgery units between 1988 and 2006 was performed. Primary and secondary graft patency, limb salvage and patient survival rates were determined using Kaplan-Meier methods. Median (range) follow-up was 78 (1–246 months).

Results: 48 patients (45 men and 3 women of median age 69, range 46–88, years) underwent surgical repair of 61 PAAs (ligation and bypass = 45, interposition grafting = 18) with a 30-day mortality rate of 1.5%. 13 patients with 16 PAAs required a total of 21 late e-interventions for graft thrombosis (n = 9), graft stenosis (n = 4) symptomatic aneurysm sac re-perfusion (n = 2), or graft aneurysmal change (n = 1). The 5- and 10-year patient survival rates were 81% and 64%, respectively. The 5- and 10-year primary graft patency rates were 75% and 63%, respectively, with no significant difference between exclusion and bypass and interposition grafting (p = 0.6). The 10-year primary graft patency rates were significantly lower for emergency cases (59%) compared with elective cases (86%) (p = 0.0023) with a hazard ratio (95% CI) for elective versus emergency of 0.157 (0.034–0.73). The 5- and 10-year secondary graft patency rates were 98% and 95%, respectively, with no significant difference between exclusion and bypass and interposition grafting (p = 0.32). The 5- and 10-year limb salvage rates were 98% and 95%, respectively. Post-operative duplex ultrasound imaging was available in 33 of 45 PAAs treated by exclusion and bypass. Five (15%) PAAs demonstrated active re-perfusion of the aneurysm sac at median (range) follow up of 75 (1–246) months after primary PAA repair. Two patients required re-operation for symptomatic and ruptured recurrent PAA.

Conclusion: These data demonstrate that surgical repair is a durable treatment for patients with PAA and provide an important benchmark with which to compare results of endovascular PAA repair. Patients undergoing ligation and bypass may benefit from aneurysm sac surveillance.

Arterial disease 0304

The common iliac artery (CIA): When does it become an aneurysm?
A. Dharmadasa, R. Davies, J. Walton, T. Richards
John Radcliffe Hospital, Oxford

Background: We wished to assess the natural history of CIA growth in the presence of an AAA and secondly to develop a model to predict if a CIA will become aneurysmal.

Methods: Data were gathered at a single centre from 1996–2006 where AAA surveillance was established. Data on baseline AAA and CIA size were documented data from sequential scans analysed. From these data a mixed-effects regression model was conducted to predict AAA and CIA growth rates.

Results: 189 patients underwent duplex ultrasound on at least two occasions (median 4, max 11). Average size at baseline were; AAA 3.9 cm (s.d.0.83) & CIA 1.2 cm (s.d.0.5). Larger AAAs were associated with a larger CIA, (p = 0.0041). One pattern of CIA growth was seen, as with AAA CIA growth was exponential and increased with size. Isolated CIA growth separate to the AAA was not seen. Over 5 years an AAA of 3 cm was predicted to grow 7.7 mm this increased to 9.1 mm for a 5 cm baseline. CIA growth was slower; in 10 years a CIA of 1 cm was predicted to grow 8.3 mm and 11 mm for a 2 cm baseline. A CIA of 1.6 was predicted to take 10 years to reach 2.5 cm or if 2.3 cm at baseline to reach 3.5 cm.

Conclusion: Routine duplex examination of a CIA less than 1.6 cm is not necessary when following up AAA. A CIA of greater than 2.3 cm should be repaired at the time of AAA operation.

Arterial disease 0316

Intravenous heparin reduces the perioperative mortality in patients with ruptured abdominal aortic aneurysm (AAA)
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www.bjs.co.uk British Journal of Surgery 2007; 94(S2): 1–74
Background: Heparin is given in open aneurysm repair before aortic cross-clamping to prevent distal thrombosis and it also reduces the risk of perioperative myocardial infarction. Administration of heparin to patients with ruptured AAAs is contentious.

The aim of this study was to investigate whether intravenous heparin administration was associated with a reduction in perioperative mortality and distal thromboembolism in patients with ruptured AAAs.

Methods: 131 patients who received heparin and 68 did not. The data was prospectively collected and a multivariate analysis was performed for independent predictive factors.

Results: The thirty day mortality of the series was 29% (38 out of 131). Patients who received heparin had a lower perioperative mortality than those that did not (16% versus 42%, p = 0.001). Heparin administration was not associated with increased blood loss and patients did not require more blood replacement. Multivariate analysis confirmed that heparin administration was an independent predictive factor for survival (p = 0.036). Other factors found to reduce survival were age (p = 0.023), smoking (p = 0.042) and systolic blood pressure (< 100 mmHg) at presentation (p = 0.045). Tachycardia, previous ischaemic heart disease, diabetes, stroke, renal disease, hypertension, gender and transfer from another hospital were not found to affect survival. Fewer patients had a thromboembolism after heparin (8% versus 12%) but this did not reach statistical significance. Perioperative complications were very similar in both groups.

Conclusion: The administration of systemic heparin before the clamp is applied to leaking aneurysms is not harmful and appears to decrease perioperative mortality.

Arterial disease 0792

Endoluminal repair of acute thoracic aortic syndrome is associated with excellent outcome

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Background: Acute aortic syndrome involving the thoracic aorta includes ruptured and symptomatic aneurysms, complicated aortic dissection, aortic transection and ruptured penetrating ulcers. Open surgery carries a high mortality with even highly selected series reporting a mortality rate of over 20%. We report our results for endoluminal repair for this condition.

Methods: All patients having thoracic endoluminal repairs have been collected on a prospective computerized database. Since 1997 to 2006, 64 patients were presented with acute thoracic aortic syndrome.

Results: The overall mortality was 9·4% (6/64). Ruptured aneurysms had the highest mortality 3/18 (17%) followed by acute complicated aortic dissection at 2/21 (9·5%) and ruptured mycotic aneurysm 1/10 (10%). No deaths occurred with other pathologies, which included transection (7), penetrating ulcers (3) aneurysms secondary to vasculitis (2), false aneurysms from previous surgical grafts (2) and ruptured aneurysm related to chronic dissection (1). Causes of death included myocardial infarction (2), stroke, ruptured abdominal aorta, uncontrolled thoracic rupture and rupture of a second unsuspected mycotic aneurysm.

Conclusion: Endoluminal repair of acute thoracic aortic syndrome is safe and associated with good medium term results. Long-term follow up is essential.

Arterial disease 0414

Prospective evaluation of cephalic/basilic vein grafts for infrainguinal arterial revascularisation

D. Harris, C. Gibbons
Morriston Hospital, Swansea

Background: Infrainguinal arterial reconstruction for limb salvage in the absence of long saphenous vein is a challenging problem. We sought to establish the adequacy of arm vein for infrainguinal bypass when long saphenous vein is absent or inadequate.

Methods: Between 1989 and 2005 data from 317 patients undergoing infragenual bypass with autogenous conduit by a single surgeon were prospectively collected. Outcome measures were limb salvage and graft patency rates (primary/primary assisted/secondary). Data were compared using Kaplan-Meier survival curves with log rank test.

Results: Of 317 primary infrainguinal bypasses, 256 used long saphenous vein, 22 cephalic/basilic vein and 39 arm-leg vein composites (5 primary bypasses used superficial femoral vein). 281 (86·6%) procedures were performed for critical ischaemia. 57 bypasses were above-knee popliteal, 95 below-knee popliteal, 142 tibial and 20 plantar. Median follow up was 46 months (range 1–182). Three year patient survival (arm vein versus leg vein) was 70% versus 63% (p = 0.3). Limb salvage rates at 3 years were 95·5% versus 86·9% (p = 0.24). Three year primary patency was 44·7% versus 48·9% (p = 0.7), primary assisted patency 71·1% versus 75·4% (p = 0.28) and secondary patency 84% versus 80·6% (p = 0.56). Additionally, 13 cases utilised arm vein to salvage primary graft occlusion. 5 year limb salvage in this group was 70·5% with a 5 year patency of 53·9%.

Conclusion: Cephalic and basilic vein harvest offers a useful autogenous conduit in patients with few alternatives for reconstruction. Despite being labour intensive, sufficient vein length can be obtained to reach below the knee. We have demonstrated equivalent limb salvage rates with cephalic/basilic vein conduits although patency rates are not significantly different from saphenous vein.

Arterial disease 0478

Platelet activity is significantly increased in patients with severe limb ischemia compared to intermittent claudication

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Background: Patients with peripheral arterial disease (PAD) have increased mortality from cardiovascular disease compared to age and sex matched controls, which increases with the severity of the disease. Platelets play a major role in atherosclerosis and thrombotic vascular events. Platelet activity is increased in patients with PAD compared to healthy controls. We aimed to determine the relationship, if any, between platelet activity and severity of disease.

Methods: 200 Patients with claudication or severe limb ischemia (SLI), defined as the presence of rest pain or ulceration had the following investigations performed: flow cytometry, P-selectin expression and fibrinogen binding (ADP stimulation), platelet aggregation using the Rapid Platelet Function assay (RPFA) with Arachidonic acid (AA) and Thrombin receptor activation peptide (TRAP) as agonists.

Results: Patients with SLI have a significantly higher ADP stimulated fibrinogen binding than patients with claudication [73·7%, (54·3%–83·2%)] median (inter-quartile range) versus 63·7% (41·8%–76·5%), p = 0.001]. ADP stimulated p-selectin expression was also increased (42·45% ±3·12%–58·5%) versus 55·2% (26·07–46·32%), p = 0·002]. TRAP stimulated aggregation was increased [207 (151–238) versus 183(155–199), p = 0·04] but there was no significant difference in AA mediated aggregation. There was no significant difference in aspirin resistance in the two groups [14·9% (14·0%) versus 5·3% (5·6%), p = 0·069]. Multivariate analysis showed ADP stimulated fibrinogen binding and TRAP stimulated aggregation to be independent predictor of the severity of the disease.

Conclusion: This is the first study to show that platelet activity is significantly higher in patients with SLI compared to patients with intermittent claudication despite the use of aspirin and statin therapy. Our findings suggest the need for more potent antiplatelet agent, such as the use of clopidogrel alone in patients with more advanced PAD.

Arterial disease 0415

Infrainguinal revascularisation in the over-eighties – a worthwhile practice?

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Background: It is uncertain whether aggressive attempts at lower limb revascularisation in octogenarians are worthwhile, in view of reduced life expectancy and increased co-morbidities. We compared the patient survival and graft patency rates in patients over 80 years with those under 80 years over a 16 year period in a DGH.

Methods: Data were extracted from a prospectively maintained database of procedures over 16 years. Outcome measures were survival, limb salvage, primary, primary assisted (PAP) and secondary graft patency rates. Results were analysed using Kaplan Meier survival curves with the log rank test.

Results: 409 procedures were performed in 351 patients. Of these, 77 patients were aged 80 or above with a median age of 83 (range 80–96). 34 femoro-popliteal and 43 femoro-distal bypasses were constructed using autogenous vein in 75% cases. Mean patient survival was predictably lower in the over 80's (34.4 (SE 5.5) months versus 94.6 (5.3) months, \( p = 0.00001 \)). Female sex, presence of diabetes or CAD and a distal bypass were risk factors for poor survival (Cox regression analysis).

There was no significant difference in 3-year limb salvage or graft patency rates when elderly and younger age groups were compared (see table) despite a higher number of procedures for claudication in the younger age group (14.8% versus 1.3%, \( p = 0.01 \)) and a higher proportion of femorodistal grafts in the over 80 age group (55.8% v 43.1%, \( p = 0.04 \)).

<table>
<thead>
<tr>
<th>3 year % (±SE)</th>
<th>Over 80</th>
<th>Under 80</th>
<th>Log rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limb salvage</td>
<td>87.2 (5)</td>
<td>84.7 (2)</td>
<td>0.11</td>
</tr>
<tr>
<td>Primary patency</td>
<td>36.6 (7.1)</td>
<td>47.1 (3.1)</td>
<td>0.09</td>
</tr>
<tr>
<td>PAP</td>
<td>60.1 (7)</td>
<td>68.1 (2.9)</td>
<td>0.15</td>
</tr>
<tr>
<td>Secondary patency</td>
<td>70.2 (6.3)</td>
<td>73.2 (2.8)</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Conclusion: Despite a limited life expectancy octogenarians have an excellent 3 year limb salvage rate and satisfactory graft patency rates. This study supports an aggressive approach to lower limb revascularisation in the elderly.

Arterial disease 0745

Is the retrojugular approach safer than conventional antejugular carotid endarterectomy?

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Background: The retrojugular approach is promoted as an alternative to traditional antejugular carotid endarterectomy. Absence of named posterior venous branches and ease of distal internal carotid dissection with retrojugular dissection reduces time for carotid exposure. However, a higher incidence of hoarse voice has been reported. Our aim was to compare the incidence of hoarse voice and other complications in patients undergoing antejugular and retrojugular carotid endarterectomy.

Methods: A nonrandomised prospective database of consecutive patients was retrospectively reviewed. Case notes and typed operation notes were reviewed for completion follow-up data.

Results: 123 patients underwent carotid endarterectomy, 40 as part of the GALA trial. Their mean age was 71 years and 66% were men. 73 patients (60%) underwent antejugular and 49 (40%) retrojugular surgery.

The respective incidence of variables in the antejugular and retrojugular group were as follows: General anaesthesia 45% versus 57%; shunt 36% versus 65%, patch 41% versus 51%, and eversion 26% versus 12%. Incidences of stroke or death for the antejugular and retrojugular approaches were 2.7% and 2.0% respectively. 5.5% of antejugular patients and 4.1% of retrojugular patients developed transient postoperative hypertension. The incidence of persistent hoarse voice was 0% versus 6.1% in the antiejugular and retrojugular groups respectively.

Conclusion: In this non-randomised study we found a comparable of strokes and deaths for retrojugular and antejugular approaches. However, the retrojugular approach was associated with a higher incidence of persistent hoarse voice.
Basic science 1134

The potential role of PI-88 (sulfonated mono-phosphorylated mannose oligosaccharide) in the modification of intimal hyperplasia after carotid artery patch grafting

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Background: To assess the utility of PI-88 (sulfonated mono-phosphorylated mannose oligosaccharide) as a potential inhibitor of intimal hyperplasia after carotid artery patch grafting in an ovine model.

Methods: 22 sheep underwent patch grafting of the left common carotid artery. Treatment of the sheep consisted of a weight-dependent intramuscular dose of PI-88. The sheep were divided into four groups: a control group and three treatment groups dosed with a once daily intramuscular injection of PI-88 at 2, 10 and 30 mg/kg/day respectively. The sheep were treated for a continuous 28-day period after which they were euthanased and the carotid arteries with grafts in situ were removed for further analysis. Markers of intimal hyperplasia included: IH index, IH area/lumen area and IH perimeter. Results were analysed using statistical regression mixed effects models with significance set at 5% throughout.

Results: A statistically significant reduction was displayed between the treated groups and the controls with regard to the IH index ($p = 0.0006$) and IH area/lumen area ($p = 0.0001$) along the length of the graft, being maximal at the anastomosis site. However, this significant reduction in IH formation was not dependent on the dose of PI-88 used.

Conclusion: PI-88 inhibits the development of intimal hyperplasia along the perimeter of vascular grafts where the hyperplastic response is normally greatest. Higher doses of PI-88 did not appear to further reduce the amount of hyperplasia. PI-88 may have a role in preventing the restenosis seen after vascular grafting; however further evaluation may be needed to determine the optimal dose for long-term patency.

Basic science 0538

Proteomics profiling of tumour cells for identification of candidate prognostic markers in breast cancer

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Background: Many known cellular phosphoproteins are frequently altered, both qualitatively and quantitatively in tumour cells in a pattern that is highly variable and often correlated with disease pathobiology. Proteomics profiling of tumour cells by mass spectrometry is becoming established as an approach for identifying disease markers that are predictive of survival and that can in principle, be used to tailor therapy to the individual patient. In an initial pilot study, we have evaluated the potential utility of spectral profiling of the tumour cell phosphoproteome for generating diagnostic fingerprints in primary breast cancer.

Methods: Total cellular protein was isolated from 14 surgically resected breast tumour specimens (10 ductal, 4 lobular; 7 early, 7 advanced based on Nottingham Prognostic Index) following detergent lysis and the phosphoprotein fraction further purified by using a commercial metal affinity matrix column (Qiagen). Spectra were acquired on a Bruker-Daltonics Reflex IV MALDI-Tof mass spectrometer.

Results: In preliminary analysis, reproducible, analysable spectra were obtained from 12 phosphoprotein preparations. Spectra were comprised of approximately 600 individual peaks representing proteins/peptides in the m/z range, 3kDa-25kDa. While many spectral peaks were common to all tumour specimens, 50–75 phosphoprotein peaks displayed significant variation (> 3-fold difference in intensity) amongst the tumour series. Unsupervised hierarchical cluster analysis using a panel of variable phosphoprotein peaks discriminated most of the early from advanced cases.

Conclusion: Profiling of the breast tumour cell phosphoproteome by mass spectrometry generates patient-specific molecular ‘signatures’ that could, in future prospective studies, be evaluated as biomarker profiles both for predicting disease course and as a source of candidate therapeutic targets for breast cancer. Abbreviations: MALDI: matrix assisted laser desorption/ionization; TOF – Time of flight.

Basic science 0298

Genes associated with radiotherapy resistance in human breast cancer cells

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Background: Resistance to radiotherapy may be a significant factor in the development of local recurrence following surgical resection and radiotherapy in breast cancer. In addition, if patients with radioresistant breast cancers can be identified, harmful side effects from exposure to unnecessary ionizing radiation could be prevented. We aimed to develop a novel in vitro model of radioresistance in a breast cancer cell line and to subsequently identify molecular markers, which may be associated with the radioresistant phenotype.

Methods: We established a novel breast cancer cell line which was significantly resistant to radiotherapy by irradiating MCF-7 cells in fractionated doses of 2Gy up to a total dose of 40Gy. Suifficient time was allowed for the cells to recover between subsequent irradiations. A dose response curve was assessed at the end of treatment to demonstrate a statistically significant increase in radiosensitivity for the novel cell line when compared with parental cells. A 3 k cancer-related oligonucleotide microarray was used to identify targets, which were differentially expressed between the novel radioresistant derivative and the parental cell line. Real-time quantitative PCR was used to confirm the difference in expression of a subset of genes, which demonstrated significant (at least 2-fold) differential expression.

Results: A novel breast cancer cell line was established which demonstrated a significant increase in radiosensitivity when compared with parental cells. Using microarray analysis, the expression of four genes was found to be significantly altered between the radiotherapy-resistant cell line and the parental cell line. The 4 genes were: GSTM3 (glutathione S transferase mu 3), LGALS3BP (galectin 3 binding protein), PSME1 (proteasome activator subunit 1) and UTX (ubiquitously expressed transcript). Real-time quantitative PCR expression analysis has confirmed the differential expression of all four genes.

Conclusion: The development of this novel radiotherapy-resistant breast cancer cell line and identification of candidate genes associated with radiotherapy resistance may reveal novel therapeutic targets in breast cancer. Further validation, functional and clinical evaluation of these genes is required.

Basic science 0400

The effect of epirubicin, cisplatin and 5-fluorouracil on [18F]2-fluoro-2-deoxy-d-glucose (18-FDG) uptake in gastric adenocarcinoma cells in-vitro

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Background: [18F]2-fluoro-2-deoxy-d-glucose (18-FDG) is an imaging agent that is avidly taken up by proliferating tumour cells. In-vitro studies allow for the investigation of the effects of chemotherapy on cellular glucose uptake. Previous work from this laboratory has shown that gastric adenocarcinoma cells in-vitro have a high capacity for glucose uptake.

Methods: The effect of three chemotherapeutic agents, epirubicin, cisplatin and 5-fluorouracil, on the uptake of [18F]2-fluoro-2-deoxy-d-glucose (18-FDG) in gastric adenocarcinoma cells in-vitro was investigated.

Results: The uptake of [18F]2-fluoro-2-deoxy-d-glucose (18-FDG) was significantly reduced in gastric adenocarcinoma cells in-vitro after exposure to epirubicin, cisplatin and 5-fluorouracil.

Conclusion: The effect of chemotherapy on the uptake of [18F]2-fluoro-2-deoxy-d-glucose (18-FDG) in gastric adenocarcinoma cells in-vitro was investigated. The results suggest that the uptake of [18F]2-fluoro-2-deoxy-d-glucose (18-FDG) is reduced in gastric adenocarcinoma cells in-vitro after exposure to epirubicin, cisplatin and 5-fluorouracil.
Background: 18-FDG Positron Emission Tomography has been used with varying success to predict response to chemotherapy in gastro-oesophageal cancers. The aim of this study was to assess the ability of 18-FDG to predict response to chemotherapy at the cellular level.

Methods: Gastric adenocarcinoma (AGS) cells were exposed to increasing concentrations of epirubicin, cisplatin and 5-fluorouracil for 48 and 72 hr. We investigated the ability of 18-FDG cellular uptake to predict response, in terms of cell death and tumour re-growth, using MTT cytotoxic assay and Annexin V-PE flow cytometry (identifies living cells, cells in early apoptosis and late apoptosis/necrotic cells).

Results: The LD50 (50% cell death) and LD10 (10% cell death) concentrations of each agent were identified upon 48 hr exposure. Exposure to LD10 cisplatin for 72 hr resulted in the largest cell death (77%), in comparison to epirubicin (69%) and 5-fluorouracil (55%). Following on from 72 hr exposure to LD50 of each drug, AGS cells were washed and re-incubated in fresh, chemotherapy free media for a period of 144 hr. MTT cytotoxicity assay revealed that cells exposed to both cisplatin and 5-fluorouracil were able to regenerate and multiply, whilst exposure to epirubicin resulted in continuous cell death. Annexin V-PE flow cytometry confirmed this finding. Although exposure to LD50 epirubicin, for 72 hr, resulted in 69% cell death, of the remaining respiring cells, 35% (15% cisplatin, 5% 5-fluorouracil) were in early apoptosis with 38% (6% cisplatin, 4% 5-fluorouracil) in the late stages of apoptosis. Cellular uptake of 18-FDG paralleled these findings, with exposure to LD50 epirubicin, for 72 hr, resulting in the greatest reduction in cellular 18-FDG uptake in the remaining respiring cells (63%), with cisplatin and 5-fluorouracil causing a much lesser reduction in cellular 18-FDG uptake (25% and 3% respectively).

Conclusion: 18-FDG uptake, at the cellular level, predicted response to chemotherapy in terms of cell death and tumour re-growth.

Basic science 0864

The phosphoinositide 3-kinase (pi3k) pathway is involved in Tlr2- and tlr4-induced proinflammatory responses

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Background: Phosphoinositide 3-kinase (PI3K) has important functions in immune response. TLR2 and TLR4 signalling are both known to activate the PI3K/Akt pathway in monocytes/macrophages. Despite this, the role of PI3K/Akt pathway in modulating TLR2 and TLR4 signalling remains controversial. In this study, we examined whether the PI3K/Akt pathway is involved in TLR2- and TLR4-mediated activation of proinflammatory responses.

Methods: Purified C57BL/6 murine peritoneal macrophages were pre-treated with the pharmacological PI3K-inhibitor LY294002 (10, 25, and 50 µM) for 1 hour. Macrophages were then stimulated with the TLR2 agonist bacterial lipoprotein (BLP) (1,000 ng/ml), TLR4 agonist lipopolysaccharide (LPS) (1,000 ng/ml), gran-positive Staphylococcus aureus (S. aureus) (macrophage/bacteria ratio: 1:50), or gram-negative Salmonella typhimurium (S. typhimurium) (macrophage/bacteria ratio: 1:50) for 16 hours. Pro-inflammatory cytokines, TNF-α, and IL-6, in the culture supernatants, were assessed by ELISA. Statistical analysis was performed using MINITAB (version 13.32).

Results: Both TLR agonist and bacterial stimulation resulted in marked increases in proinflammatory cytokines, TNF-α, and IL-6, release from murine peritoneal macrophages. Inhibition of the PI3K/Akt pathway with LY294002 significantly reduced BLP-induced TNF-α (1436 ± 698 versus 510 ± 302 pg/ml (p = 0.0235) and IL-6 (2226 ± 877 versus 907 ± 772 pg/ml) (p = 0.0192) production. S. aureus-induced TNF-α release was also significantly reduced following PI3K/Akt pathway inhibition (2013 ± 570 versus 275 ± 154 pg/ml) (p = 0.0461). In contrast to stimulation of peritoneal macrophages with BLP, stimulation with S. aureus following PI3K/Akt pathway inhibition, failed to suppress IL-6 production. Attenuated proinflammatory cytokine production was also observed following LPS or S. typhimurium stimulation of murine macrophages where the PI3K/Akt pathway was blocked.

Conclusion: These results indicate that the PI3K/Akt pathway is involved in both TLR2- and TLR4-mediated proinflammatory responses. Thus, inhibition of PI3K/Akt pathway may represent a potential therapeutic target for preventing development of septic shock.

Basic science 0096

Pre-treatment with human recombinant Drotrecogin alfa is not associated with pancreatic parenchymal haemorrhage and leads to amelioration of inflammation in L-arginine-induced experimental acute pancreatitis

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Background: Human recombinant drotrecogin alfa (Xigris, Eli Lilly, Indianapolis USA) is a 55 kDa glycoprotein analogue of endogenous protein C that inhibits thrombin generation, stimulates fibrinolysis and reduces mortality in sepsis. This study evaluates the effect of xigris on pancreatic inflammation in an experimental model of AP with particular reference to indices of parenchymal haemorrhage.

Methods: Male Sprague Dawley rats median (range) weight 300 (250–340) g were allowed free access to standard rat chow and water. After acclimatization, they were divided into three groups at random as follows: control (n = 7), animals treated with L-arginine 300 mg/100 g body weight in pH-buffered sterile saline. All animals received regular subcutaneous buprenorphine for analgesia and studies were undertaken under a UK Home Office Licence. At 48 hours, animals were sacrificed by terminal anaesthesia. Plasma was taken for lipase, haematological indices and cytokine profiles and pancreata were fixed in formalin and stained with haematoxylin and eosin. Pancreatic injury was scored on a scale from 0–16 with a maximum of 4 points for each of edema, haemorrhage, necrosis and inflammatory infiltrate. Analyses were undertaken by Mann-Whitney U-test accepting significance at P < 0.05.

Results: Plasma lipase in control animals was 5 ± 3 (8–8) units/ml. In the AP group lipase was 10 ± 3 (7–16) units/ml (P = 0.01). Lipase was also elevated in xigris pre-treatment animals – 12 ± 8 (22) units/ml – and was not different from the AP group. There was no histologic injury in the control group. In contrast, the AP group exhibited pancreatic edema with patchy haemorrhage and necrosis. These parameters were ameliorated in animal pre-treated with xigris.

Conclusion: This study has evaluated xigris pre-treatment in an L-arginine-induced model of experimental acute pancreatitis. The results confirm that xigris ameliorates histologic features of pancreatic inflammation. A novel finding is the demonstration that pre-treatment with xigris does not lead to pancreatic parenchymal haemorrhage during the course of this 48-hour experimental model of acute pancreatitis.

Basic science 0750

De novo generation of hepatic and biliary cells in vitro from a pancreatic adult cell population

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University of Glasgow, Glasgow

Background: Limited availability of donors for OLT and hepatocyte transplantation has stimulated interest in cells from alternative sources. We have previously isolated a stem cell population (PDPCs) from adult rat pancreatic ductal tissue. In vitro differentiation, in media containing nicotinamide, results in the production of functional, insulin secreting islets. We have assessed the plasticity of Thy-1+ and Thy-1- PDPC sub-populations to determine their potential to differentiate into a functional hepatic/biliary lineage, given that during embryonic development liver and pancreas both originate from the ventral foregut.

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Methods: Thy-1+ and Thy-1-subb-populations of PDPCs were differentiated in serum free media with FGF-4. Hepatic differentiation in vitro was assessed by RT-PCR analysis for Albumin, CK19, AFP, CK18, cytochrome P450(2B1), and hepatocyte transcription factors HNF 1-alpha, HNF 1-beta, GATA 4 on days 7, 14, 21 and 28. ICC using antibodies to albumin, CK7, CK19 and vimentin was performed. Periodic – Acid Schiff staining was undertaken to assess glycogen storage, a functional characteristic of hepatocytes.

Results: Thy-1+ PDPCs cultured with FGF-4 demonstrated a phenotypic change from fibroblastoid to epithelioid cell type. Thy-1- PDPCs demonstrated no expression of mature hepatic genes. Undifferentiated Thy-1+ PDPCs expressed early endoderm markers HNF3 beta, GATA 4 and AFP, and expressed later markers of hepatocyte differentiation, HNF 1-alpha and Albumin by day 14. Albumin production was confirmed by western blot. CK19 expression, a biliary marker, was also induced (Day 7–28). Differentiated Thy-1+ PDPCs demonstrated staining indicative of production and storage of glycogen.

Conclusion: We have derived from adult rat pancreas, a Thy-1+ cell population that demonstrates potency of differentiation into functional pancreatic, hepatic and biliary lineages. This provides insight into the potential identification of a common precursor cell for liver and pancreas and demonstrates a method for enrichment of such a population in culture. Significantly, it provides a candidate cell population for transplantation studies.

Basic science 0360
Attenuation of liver ischaemia reperfusion injury by the thiol antioxidant Bucillamine
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Background: Liver transplantation and resection surgery involve a period of ischaemia and reperfusion to the liver which initiates an inflammatory cascade resulting in liver and remote organ injury. Bucillamine is a low molecular weight thiol antioxidant that is capable of rapidly entering cells. Its effect in liver warm ischaemia reperfusion injury has not been studied. It was hypothesized that Bucillamine would protect against warm ischaemia reperfusion injury through its antioxidant and anti-inflammatory effects. The aim was to use a well described model of liver ischaemia reperfusion to determine the effect of Bucillamine administration on liver function, microcirculation and cytokine production.

Methods: Effect of bucillamine was studied in a rat model of liver ischaemia-reperfusion injury with 45 minutes partial 70% ischaemia and 3 hours reperfusion. Liver injury was assessed by serum transaminases (AST and ALT) and propidium iodide staining of apoptotic hepatocytes intravital microscopy, liver microcirculation sinusoidal perfusion and leukocyte adhesions. Cytokine response was assessed by measuring serum CINC-1 levels.

Results: The model produced a significant liver injury with elevated Transaminases and an acute inflammatory response. Bucillamine reduced the liver injury as indicated by a reduced AST(932 ± 200 μU vs 2072 ± 5 ± 111 μU, p < 0.05) and ALT (861 ± 262 μU vs 2079.25 ± 322.33, p < 0.05). The number of apoptotic cells at the end of 3 hours of reperfusion was also significantly lesser in the Bucillamine group (p > 0.001). Serum CINC-1 levels were found to be lesser in animals given Bucillamine with a very significant difference at 24 hours post reperfusion (p < 0.001). There also was better perfusion of sinusoids in the Bucillamine group at the end of 3 hours of reperfusion.

Conclusion: Bucillamine therapy reduces the deranging effects of warm ischaemia reperfusion injury.

Basic science 0458
Effects of carbon monoxide releasing molecule (CORM-3) on reperfusion in a controlled non-heart beating donor (NHBD), haemoperfused porcine kidney model
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Background: CORM-3, a transitional metal carbonyl possesses the ability to liberate CO under appropriate conditions and function as CO-releasing molecule in biological systems and thereby have a direct ability to influence intracellular pathways that involve apoptosis and inflammation, hence I/R (Ischaemia/Reperfusion) injury. This study investigated the effects of CORM-3 administered in blood at the time of reperfusion in a model of controlled NHBD kidneys.

Methods: Porcine kidneys (n = 6) were subjected to 10 min warm ischaemia and reperfused after 18 hr Cold storage (CS) as follows:

Group 1: CORM-3 (tricarbonylchloro(glycinato) ruthenium)(II) Group 2: iCORM-3 (Inactive CO-releasing molecule) Group 3: Control

Renal haemodynamics and function were then measured during 3 hr reperfusion with autologous blood.

Results: The total urine output was significantly better in Group 1 (793 ± 212 vs Group 2 (668 ± 72) and Group 3 (302 ± 21) [p = 0.01]. Renal blood flow improved from Group 1 versus Group 2 & 3 (774 ± 19 vs 488 ± 88 versus 121 ± 79, P = 0.002). AUC of creatinine clearance was significantly better in Group 1 versus Group 2 & 3 (14 ± 6 versus 3 ± 0.1 versus 2.2 ± 2, p = 0.006).

While the fractional excretion of sodium was significantly lower for Group 1 versus Group 2 & 3 (50.7 ± 27 vs 105 + 6 versus 117 ± 38, p = 0.04).

Conclusion: CORM-3 as a manipulating agent significantly ameliorates the effects of reperfusion in a controlled NHBD Kidney.

Basic science 0671
The role of mitogen activated protein kinase in limb ischaemia-reperfusion injury; c-Jun N-terminal kinase knockout mice have attenuated acute lung injury
R. Arnold1, C. Marron1, M. Hooper1, D. McAuley1, B. Rubin2, D. Harkin1
1Department of Surgery, Queens University, Belfast, 2Division of Vascular Surgery, Toronto University, Toronto, Canada

Background: Lower limb ischaemia-reperfusion injury (IRI) results in a neutrophil mediated remote acute lung injury (ALI). c-Jun N-terminal kinase (JNK), is a key intracellular mediator implicated in the regulation of the cellular stress response in ALI. We hypothesised that JNK-2 gene deletion would attenuate ALI, in experimental hindlimb IRI.

Methods: Anaesthetised adult male C57/BL6 and transgenic JNK-2 knockout mice were subjected to hindlimb IRI. Neutrophil accumulation was assessed in the lung. Neutrophils were isolated from the lung and stained for neutrophil granulocyte marker. Neutrophil infiltration into the lung was assessed.

Results: Muscle Wet/Dry ratios were significantly increased in the injured group (5 ± 22 ± 0.3), compared with control animals (1 ± 0.5, p < 0.05). Lung histological injury score was significantly increased in the injured group (9 ± 1.03), compared with control animals (5 ± 1.1, p < 0.05). Lung myeloperoxidase levels were significantly increased in the injured group.
(0.290 ± 0.055 units/mg protein), compared with control animals (0.119 ± 0.016, p < 0.05), and this was significantly attenuated in JNK-2 KO mice (0.051 ± 0.017, p < 0.05). BAL protein levels were also reduced in JNK-2 KO mice (0.395 ± 0.025 mg/ml), when compared with injured animals (0.468 ± 0.028, p = 0.071), although this did not reach significance. Data represents mean ± standard error mean, students t-test.

**Conclusion:** Hindlimb Ischaemia-reperfusion Injury induces a neutrophil mediated acute lung injury in mice. Genetic deletion of JNK-2 significantly attenuates this injury and may offer a new therapeutic target for this potentially lethal complication.
Surgical pot pourri 0043

Noise pollution on an acute surgical ward
E. L. McLaren, C. A. Maxwell-Armstrong
University Hospital Nottingham, Queen’s Campus, Nottingham

Background: This study was undertaken to measure and analyse noise levels over a 24-hour period on five General Surgical wards.

Methods: Noise levels were measured on three wards with four bays of six beds each (wards A, B & C), one ward of siderooms only (ward D) and a surgical high dependency unit (ward E) of eight beds. Noise levels were measured for 15 minutes at 4-hourly intervals over a period of 24 hours midweek. The Maximum Sound Pressure Level, Baseline Sound Pressure Level and the Equivalent Continuous Level (Leq) were recorded. Peak levels and Leq were compared with WHO Guidelines for Community Noise. Control measurements were taken elsewhere in the hospital and at a variety of public places for comparison.

Results: The highest peak noise level recorded was 95.6 dB on ward E, a level comparable to a heavy truck. This exceeded all control peak readings except that recorded at the bus stop. Peak readings frequently exceeded 80 dB during the day on all wards. Each ward had at least one measurement which exceeded the peak sound level of 82.5 dB recorded in the supermarket. The highest peak measurements on wards A, B, C and E also exceeded peak readings at the hospital main entrance (81.4 dB) and coffee shop (83.4 dB). Ward E has the highest mean peak reading during the day and at night – 83.45 dB and 81.0 dB respectively. Ward D, the ward of siderooms, has the lowest daytime mean Leq (55.9 dB). Analysis of the Leq results shows that readings on ward E were significantly higher than readings on wards A, B and C as a group (p = 0.001). Leq Readings on ward E were also significantly higher than readings on ward D (p < 0.001). Day and night levels differ significantly, but least so on the high dependency unit.

Conclusion: The World Health Organisation (WHO) guidelines state that noise levels on wards should not exceed 30 dB Leq [day and night] and that peak noise levels at night should not exceed 40 dB. Our results exceed these guidelines at all times. It is likely that these findings will translate to other hospitals. Urgent measures are needed to rectify this.

Surgical pot pourri 0518

Elective definitive operations for inflammatory benign breast diseases should not be performed in smokers
N. R. Krovvidi, J. Walls
North Manchester General Hospital, Manchester

Background: Cigarette smoking is one of the etiological factors for Inflammatory Benign Breast Disease (IBBD). The mechanism by which it causes inflammation is not known. The strength of association of cigarette smoking and recurrent IIBBD is verified in this study.

Methods: Women, treated surgically for IIBBD (n = 53), were studied retrieving their case notes in a single institute over a period of 8 years. Their patterns of smoking, multiplicity of recurrence of IIBBD and the treatment patterns were compared in two groups of smokers (n = 27) and non-smokers (n = 26).

Results: Women who continued to smoke despite advice to stop smoking (n = 27) had recurrence of IIBBD in 14 cases (p < 0.0001) either in the form of recurrent breast abscesses or mammary fistulae and had to undergo multiple operations for complications whereas non-smokers/who stopped smoking in the past (n = 26) had no recurrence of IIBBD at all. The types of operations included Hadfield’s procedure, microdochectomy, excision of mammary fistula and incision and drainage: they were uniformly distributed between smokers and non-smokers. 36% of those recurrences had ≥3 operations. In 9 patients who had incision and drainage for breast abscess (smokers, n = 6; non-smokers, n = 3), all smokers had recurrences in the form of either breast abscesses or mammary fistulae, and had to undergo multiple operations whereas none of the non-smokers had recurrence.

Conclusion: Cigarette smoking is an important etiological factor, which is strongly associated with recurrence of IIBBD and outcome of the treatment. Incision and drainage should not be the first line of treatment for breast abscesses. Much work needs to be done to make the patients aware of the detrimental complications of smoking. Effective definitive operations for IIBBD should not be undertaken in women who continue to smoke.

Surgical pot pourri 0833

Prognostic analysis of previously unidentified gists treated before the advent of c-kit immunostaining and tyrosine kinase inhibitors
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1Department of GI Surgery, Charing Cross Hospital, London, 2Department of Histopathology, Charing Cross Hospital, London

Background: Tyrosine kinase inhibitors (imatinib) have revolutionised the treatment of gastrointestinal stromal tumours (GISTs) and recently developed immunohistochemical markers have facilitated their diagnosis. We have reviewed the clinicopathological features of previously resected mesenchymal tumours of the gastrointestinal tract in our institution and performed prognostic analyses of these patients.

Methods: Clinicopathological records of patients treated between May 1992 and July 2003 were reviewed retrospectively. Patient, tumour and treatment factors were assessed using a univariate log-rank test and a multivariate Cox proportional hazard model to identify factors affecting survival.

Results: 26 patients were reanalysed (15 male: 11 female, median age 65 years; range: 30–92 years). Before revision a correct diagnosis of GIST was made in 9 cases. The remaining 17 previously unidentified mesenchymal tumours were all reclassified as GISTS. 22 (85%) underwent complete surgical resection. 18 (70%) were upper GI tumours, 4 (15%) lower GI, and 4 (15%) retroperitoneal tumours. 4 (15%) presented with metastasis of which 2 received conventional chemotherapy. A further 4 (15%) had a separate primary tumour at presentation. 1 patients (12%) who underwent complete resection of a GIST went on to develop further primary tumours. At last follow up 16 (61%) had died. The overall 5 year survival was 37%; 45% in patients who underwent resection. The median survival without resection was 10.5 months; range 0–42 months. Multivariate analysis revealed that female sex was a predictor of long-term favourable outcome with a median survival of 74 months compared to 36 months in males.

Conclusion: Most GISTS are resectable with survival is principally dependent upon completeness of resection. Males with high risk tumours may benefit from adjuvant imatinib treatment. Patients in whom previously unidentified GISTS have been diagnosed may benefit from recall and further investigation.

Surgical pot pourri 0752

The effect of feeding on glycaemic control in critically ill patients
J. M. J. Richards, G. Suntharalingam
Northwick Park Hospital, Middlesex

Background: Strict normoglycaemia has been shown to reduce mortality and the incidence of complications in surgical intensive care patients. Additionally, enteral feeding avoids the complications associated with parenteral feeding. The aim of this study was to assess the effect of different feeding regimens on glycaemic control.

www.bjs.co.uk British Journal of Surgery 2007; 94(S2): 1–74
Methods: Thirty consecutive patients (20 surgical, 10 medical) admitted to the Intensive Care Unit for >24 hours were identified and their daily charts were reviewed. The standard unit policy for feeding and glycaemic control was employed. Glycaemic control was described as hypoglycaemic (<4 ± 4 mmol/L), stringent (4 ± 4 – 6 mmol/L), normal (6 ± 1 – 8 ± 0 mmol/L), intermediate (8 ± 1 – 10 mmol/L), liberal (10 ± 1 – 11 mmol/L) and hyperglycaemic (>11 mmol/L). In order that the results were not skewed by increased frequency of measurement in patients with extreme blood sugar readings, a time-weighting was applied by taking the mean blood sugar in each 4-hour period.

Results: 928 time periods were analysed. Enteral feeding took place in 303 time periods, no feeding in 448 time periods, and parenteral feeding in 177. Crude, mean blood sugar was similar in the different groups:

<table>
<thead>
<tr>
<th></th>
<th>NG +/- insulin</th>
<th>No feed +/- insulin</th>
<th>TPN +/- insulin</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>8.34</td>
<td>6.76</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>range</td>
<td>1.4–18.4</td>
<td>2.4–17.5</td>
<td>3.6–12.6</td>
<td></td>
</tr>
</tbody>
</table>

However, by time-segmented analysis, enteral feeding is associated with a lower % time spent within an acceptable glucose range, whether acceptability is defined by either traditional or aggressive glycaemic limits:

<table>
<thead>
<tr>
<th></th>
<th>NG +/- insulin</th>
<th>No feed +/- insulin</th>
<th>TPN +/- insulin</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BM 4–8</td>
<td>49.8%</td>
<td>71.7%</td>
<td>66.7%</td>
<td>0.0001</td>
</tr>
<tr>
<td>BM 4–11</td>
<td>75.2%</td>
<td>84.6%</td>
<td>98.3%</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Conclusion: Enteral feeding is associated with poorer glycaemic control. This might be because the reliance upon gut motility and absorption results in erratic delivery. Close attention should be paid to glycaemic control in these patients to avoid jeopardising outcome.

Surgical pot pourri 0848

IgG4-responses in Crohn’s disease: A new therapeutic tool for gastroenterologists?

N. Rajendran, F. Casunuran, D. Kumar
St George’s Hospital, London

Background: Diet has been implicated as a target for treatment in Crohn’s disease for several years. Several studies have shown that various parenteral and elemental diets play a role in bringing about remission (Jones et al., 1982) of disease. Previous work by our group (Zar et al., 2005) has shown that IgG4 responses to certain food antigens are raised in patients with irritable bowel syndrome (IBS). We aim to investigate whether patients with Crohn’s disease exhibit a greater IgG4 response compared to controls and also whether IgG4 led diets may bring about remission or reduce symptom scores in patients with Crohn’s disease.

Methods: 15 patients were recruited from outpatient clinics with a diagnosis of Crohn’s disease. Previously obtained control samples (n = 43) and IBS patient (n = 108) samples were also analysed. Serum was separated and tested in an Immunocap. The Immunocap utilises caps containing food antigens that are mixed with serum. The stained complexes that result are quantified by fluorescence. IgG4 titres to 17 common foods including eggs, cheese, wheat, rice, potatoes, chicken, beef, pork, lamb, soya bean, yeast, tomatoes, milk proteins and peanuts were measured. Titres from the Crohn’s patients were compared to the previous control samples and IBS group using unpaired t tests.

Results: Egg white (p = 0.012), wheat (p < 0.001), lamb (p = 0.045) and soya (p = 0.009) titres were significantly higher in Crohn’s patients compared to controls and egg white (p = 0.024) and soya (p = 0.008) compared to IBS patients.

Conclusion: There is a significant difference in the IgG4 response to certain food antigens between Crohn’s disease and those with IBS and controls. This data may enable us to tailor diets, which may decrease symptom severity and induce remission in patients with Crohn’s disease.

Surgical pot pourri 0747

Neo-adjuvant chemotherapy does not affect markers of nutritional status in patients undergoing subtotal oesophagectomy


1Northern Gastro-Intestinal Cancer Unit, Newcastle-Upon-Tyne. 2James Cook University Hospital, Middlesbrough

Background: There is a high incidence of malnutrition in patients with oesophageal cancer. The effects of neo-adjuvant chemotherapy on nutritional status is unknown to date. Our aim was to investigate these effects prior to surgery in 2 groups of patients: those diagnosed with node positive malignancy at staging, undergoing either unimodality subtotal oesophagectomy or neo-adjuvant treatment.

Methods: Prospective data was collected from patients undergoing planned Subtotal Oesophagectomy between April 2003 and April 2006 in two specialised centres. Weight, body mass index (BMI), haemoglobin, total protein and albumin were all measured at the staging clinic at the time of diagnosis, and 1 day pre-operatively.

Results: A total of 96 patients had node positive oesophageal or junctional tumours. Groups were matched for sex, co-morbidity, malnutrition, BMI and percentage weight loss over 3 months. The median days to surgery from staging differed significantly (surgery alone = 38 days versus neo-adjuvant = 88 days, p < 0.01). The mean nutritional parameters are shown in the table below:

<table>
<thead>
<tr>
<th></th>
<th>Surgery alone</th>
<th>Neo-adjuvant chemotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 29</td>
<td>n = 67</td>
</tr>
<tr>
<td>Staging Weight (Kg)</td>
<td>75.8 ± 11.5 Kg</td>
<td>75.8 ± 11.5 Kg</td>
</tr>
<tr>
<td>Pre-operative</td>
<td>73.8 ± 11.5 Kg</td>
<td>76.4 ± 15.7 Kg</td>
</tr>
<tr>
<td>Staging Hb (g/dL)</td>
<td>13.2 ± 1.2 g/dL</td>
<td>14.2 ± 1.8 g/dL</td>
</tr>
<tr>
<td>Pre-operative</td>
<td>13.1 ± 1.0 g/dL</td>
<td>14.2 ± 1.8 g/dL</td>
</tr>
<tr>
<td>Staging Albumin (g/L)</td>
<td>39.2 ± 3.6 g/L</td>
<td>42.8 ± 3.0 g/L</td>
</tr>
<tr>
<td>Pre-operative</td>
<td>39.2 ± 3.6 g/L</td>
<td>42.8 ± 3.0 g/L</td>
</tr>
<tr>
<td>Staging Total Protein (g/L)</td>
<td>67.4 ± 3.9 g/L</td>
<td>68.7 ± 5.2 g/L</td>
</tr>
<tr>
<td>Pre-operative</td>
<td>71.0 ± 4.3 g/L</td>
<td>68.7 ± 5.2 g/L</td>
</tr>
</tbody>
</table>

*S*Repeated measures analysis on SPSS version 12.

The table above shows that body weight and blood parameters were not significantly different between the two groups.

Conclusion: Despite a delay in surgery and after matching influencing variables, neo-adjuvant chemotherapy does not have a deleterious effect on nutritional status compared to unimodality treatment prior to surgery.
Manometric data is obtained using closely spaced recording channels from the pharynx to the stomach; this allows a more accurate detection of clinically relevant oesophageal dysfunction not assessed by other conventional investigations. The aim of this study is to assess the clinical value of HRM in a series of patients with persistent or recurrent dysphagia following oesophageal myotomy, in whom conventional investigations had been non-diagnostic.

**Methods:** Three patients with persistent or recurrent dysphagia following oesophageal myotomy in whom barium swallow studies were non-diagnostic underwent HRM. Both spatiotemporal and conventional line plots of the pressure data were analysed and compared to conventional manometry readings.

**Results:** In two patients, HRM was able to identify a residual, localised high pressure segment in the middle third of the oesophagus above the proximal extent of the myotomy. In both cases, HRM spatiotemporal plots were able to provide exact measurements of both the length of the affected segment and its distance from the pharynx and the lower oesophageal sphincter. This allowed a targeted surgical approach towards repeat myotomy. In the third patient, HRM demonstrated persistent high pressure of the lower oesophageal sphincter, suggesting an incomplete myotomy and again allowing a targeted approach to revisional surgery.

**Conclusion:** In patients with persistent or recurrent symptoms after oesophageal myotomy, HRM is a new technique, not yet widely available, enabling the identification and anatomical localisation of residual high pressure zones within the oesophagus. This allows a targeted approach to revisional surgery.

**Surgical pot pourri 1183**

**The relevance of urgent referral guidelines in elderly patients with oesophago-gastric cancer**

**R. S. Nijjar, A. S. Parnham, M. S. Wardle, C. S. Robertson**

*Worcestershire Royal Hospital, Worcester*

**Background:** The urgent referral of suspected oesophago-gastric cancer (OG) to specialist units is based on guidelines with no specified upper age limit. We assess the outcome of patients 80 years and over with OG cancer.

**Methods:** A prospecive database of all oesophago-gastric (OG) cancers at a single institution was collated by an independent nurse, from 1st January 2003 to 31st December 2005. The database included details of patient demographics, route of referral and survival data. Patients were considered operable if their tumours were locally resectable and if they were medically fit with no evidence of metastatic disease.

**Results:** Two hundred and fifty eight patients were diagnosed with OG cancer in the study period and 95 patients (37%) underwent resection. Fifty nine patients ≥ 80 years (23%) were considered operable. The overall median survival of patients ≥ 80 years was 8 months (range 0–43 months) versus 15 months for patients < 80 years. Serious debate is needed as to the inclusion of an upper age limit within these guidelines.

**Surgical pot pourri 0139**

**The 2-week-wait system is poorly utilised and fails to expedite the time to treatment for upper gastro-intestinal malignancies**

**S. R. Smith, A. Wong, M. Harvey, C. Wright**

*Broomfield Hospital, Court Road, Chelmsford*

**Background:** Over 14,000 people die from oesophago-gastric cancer is in the UK each year. The 2-week-wait system, aimed at reducing the time to diagnosis and ultimately survival, is poorly utilised. We reviewed 96 upper gastro-intestinal malignancies for their mode of presentation in a UK district general hospital.

**Methods:** 103 patients with upper gastrointestinal malignancy were retrospectively identified from a histopathological database in a district general hospital in 2003. 96 patients had notes available for review. Patient demographics, referral method, symptoms, diagnosis, time to see a consultant, time to decision to treat, treatment and time to first treatment were recorded.

**Results:** 53 patients had an oesophageal carcinoma, 23 had a gastric malignancy, 10 had a pancreatic malignancy, 8 had metastases to upper GIT and 2 had duodenal tumours. All A&E referrals saw a consultant within 1 day, but not necessarily a gastroenterologist or upper GI surgeon. Table below shows time to decision to treat for all referrals:

<table>
<thead>
<tr>
<th>Mode of Presentation</th>
<th>Mean time to see consultant (days)</th>
<th>Mean time to decision from referral (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;E</td>
<td>32</td>
<td>1 (0–2)</td>
</tr>
<tr>
<td>Direct to endoscopy</td>
<td>12</td>
<td>9 (3–13)</td>
</tr>
<tr>
<td>Direct to Consultant</td>
<td>20</td>
<td>38 (4–175)</td>
</tr>
<tr>
<td>Consultant-to-</td>
<td>14</td>
<td>24 (1–49)</td>
</tr>
<tr>
<td>Consultant</td>
<td>7</td>
<td>24 (1–73)</td>
</tr>
<tr>
<td>Follow-up or info.</td>
<td>12</td>
<td>n/a</td>
</tr>
<tr>
<td>not available (eg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>private pt.)</td>
<td></td>
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</tr>
</tbody>
</table>

The patients who waited 258 and 256 days for a decision to treat had gastric ulcers with initial negative biopsy results. The fastest time to a decision to treat was for patients referred by A&E and directly from another consultant. 2-week-wait referrals waited an average of 51 days.

**Conclusion:** Small numbers of patients are referred by the 2-week-wait system. Although this system if beneficial in reducing the time patients with suspicious symptoms wait to see a consultant, it has not appreciably hastened the time to a decision to treat.
Breast cancer

Breast cancer 0132
Do we need to investigate women referred with breast pain?
R. Singhal, D. Wai, G. Browne, S. J. Parker, H. Al-Omishy, J. L. Taylor,
M. J. R. Lee
University Hospitals Coventry and Warwickshire, Coventry

Background: Contrary to NICE referral guidelines for suspected cancer, women with breast pain are frequently, sometimes urgently, referred for formal assessment.

Methods: Data was studied from our fast track clinic set up in 1999 and prospectively audited from 2002.

Results: Of 10218 patients seen in 4 years, 1179 (11.5%) were referred with breast pain only; 47% were premenopausal and 53% peri- or post menopausal. Only 6 were diagnosed with cancer, representing 5.1 per 1000 women referred with breast pain and 0.96% of the total cancers diagnosed over that period. In 4 there were significant physical signs, and the remaining 2 were diagnosed incidentally on imaging of the non-symptomatic breast. One third of breast pain referrals were “urgent”, and of these 4 had breast cancer (10.2 per 1000 women).

Conclusion: Our study supports NICE guidance, and demonstrates that the prevalence of breast cancer in women referred with breast pain alone is of the same order as that found in routine population mammographic screening. We conclude that referral and investigation is an unnecessary and inappropriate use of resource.

Breast cancer 0466
6 years after introducing the ‘2-week wait’ for breast cancer: Are patients any better off?
S. Potter, S. Govindarajulu, M. Shere, F. Braddon, G. Carran,
A. K. Sahu, S. J. Cawthorn
Frenchay Hospital, Bristol

Background: The much criticised 2-week wait was introduced for breast cancer in 1999 in an attempt to improve cancer mortality by improving access to care. Concerns have been raised regarding the low malignant yield in the 2-week wait population, the high proportion of cancers diagnosed outside the scheme and consequently, the impact of the directive on waiting times for non-urgent referrals. The aim of the study was to investigate the 6 year impact of the 2-week wait rule on referral patterns, cancer diagnoses and waiting times in a specialist breast clinic setting.

Methods: Data regarding the number, route and outcome of primary care referrals from 1999–2005 was collected prospectively using standard data collection sheets and the Hospital Patient Administration System. Referrals were categorised as ‘urgent’ or ‘routine’. Waiting times were also analysed.

Results: The total number of referrals increased by 9% over the 6 year period. Routine referrals decreased by 24% (n = 417), but 2-week wait referrals increased by 42% (n = 739) during this time. The percentage of patients diagnosed with cancer in the 2-week wait group decreased from 12.8% in 1999 to 7.7% in 2005 whilst the number of cancers detected in the ‘routine’ group increased from 2.5% to 5.3% over the same period. 27% of cancers are currently referred in the non-urgent group. Waiting times for routine referrals have increased.

Conclusion: The 2-week cancer wait rule is failing patients. If breast cancer services are to be improved, all patients with breast symptoms should be seen within 2 weeks of referral.

Breast cancer 0376
The use of radiofrequency ablation in breast cancer, and assessment of ablation zone: a feasibility study
K. F. Pope, E. L. S. Leen, E. Mallon, T. G. Cooke
University Department of Surgery, Glasgow Royal Infirmary, Glasgow

Background: A feasibility study was undertaken to explore the potential use of Radiofrequency ablation (RFA) for the treatment of breast cancer. Primary objectives were: 1) to assess the effectiveness of the treatment, as confirmed through pathological analysis, and 2) to determine the safety of this technique. A secondary objective was to determine whether ultrasound assessment of perfusion could determine the effective ablation zone immediately following the procedure.

Methods: Radiofrequency ablation using ultrasound guidance was performed in nine (n = 9) patients with a diagnosis of primary breast cancer. This was carried out under GA, immediately prior to definitive surgery (mastectomy or WLE, plus axillary procedure). Contrast enhanced ultrasound (CEUS) was performed prior to, and immediately following RFA to assess perfusion. Specimens obtained were then analysed pathologically using H&E staining, and representative tissue was snap frozen for cell vitality staining (NADH-diaphorase), to assess the effect of the thermal ablation.

Results: Pathology revealed a heterogeneous pattern of apparently viable cells, interspersed with non-viable cells within the zone of ablation. NADH-diaphorase cell vitality testing revealed no viable cells within the ablated regions of all specimens processed to date. CEUS used prior to RFA showed increase in perfusion at the tumour periphery, compared to normal breast. Following ablation, there was absence of perfusion in the ablation zone and hyperaemia of the overlying skin and subcutaneous layers. The only complications observed were development of seroma in five (5) patients, and a solitary wound infection: it is uncertain whether these were related solely to RFA, or the definitive surgery itself.

Conclusion: RFA is a relatively safe technique, which has been proven to produce tumour cell death. CEUS may be a feasible method of assessing effective ablation zone at the time of RFA. Further studies are required to assess whether this may be an effective alternative to surgery, assessing both tolerability under sedation, and long term effects.

Breast cancer 0265
The role of Chemokine production by primary breast cancer stromal cells in tumour progression
S. M. Potter-Beirne, R. M. Dwyer, M. J. Kerin
Department of Surgery, National University Of Ireland, Galway

Background: The vast majority of breast cancer research employs commercially available cell lines, which are epithelial in origin. Whilst research up to now has focused primarily on epithelial cells, recent studies have highlighted the role of the whole tumour microenvironment in disease progression. Supportive stromal cells play a paracrine role in controlling neoplastic epithelial cells through secretion of a variety of chemokines. The specific chemokines involved & their method of action remains to be defined. The aim of this study was to identify the chemokines produced by primary breast cancer stromal cells & to elucidate their influence on epithelial cell characteristics & functions.

Methods: Human breast cancer primary tumour specimens harvested at surgery were digested and separated into organoids, epithelial & stromal fractions & cultured in selective media. Transwell inserts were used to assess migration of breast cancer epithelial cell lines (MDA-MB-231, MCF-7 and SKBR-3) in response to primary tumour stromal cells. Chemokines secreted by the stromal cells were identified using ChemiConverters & FLISA. Specific mediators of
Breast cancer 0712

ER expression level influences response to tamoxifen

F. J. Campbell, S. Tovey, E. Mallon, J. Edwards, T. G. Cooke
Glasgow Royal Infirmary, Glasgow

Background: In clinical practise the assessment of tumour oestrogen receptor (ER) status is an essential component in the evaluation of all newly diagnosed breast cancer patients and used to guide endocrine therapy. In ER positive disease there is no cut off level defining response to hormonal therapy. This study aims to determine the effect of ER protein expression level on response to tamoxifen therapy and define a level of ER expression that will guide hormonal therapy in clinical practise.

Methods: Follow up data is available for 1671 woman diagnosed with breast cancer in the Greater Glasgow area between October 1995 and September 1998. Tumour samples had previously been scored for ER expression levels (0–100%) by the clinical pathologist at time of definitive surgery. Kaplan Meier curves were constructed and log rank test were performed.

Results: Between 1995 and 1998, 1316 patients received 5 years adjuvant tamoxifen therapy. 198 patients had 0% ER expression, 1075 patients had ER expression between 1% and 100% No data was available for 43 patients.

Risk of disease recurrence and overall survival was significantly associated with the level of ER expression (p < 0.0005). ER expression between 80–100% (high expression, n = 815) had lowest levels of recurrence and improved survival. Patients with <10% (poor or no expression, n = 213) had the poorest survival and higher recurrence rates on tamoxifen therapy. Patients with ER expression between 10–75% (intermediate expressers, n = 231) received some benefit from hormonal therapy but had lower survival rates and higher recurrence rates than the high expressers.

Conclusion: We propose that ER expression of 80% and above should define ER positivity in clinical practise and guide tamoxifen therapy. Intermediate expressers may represent a population of patients that will benefit from aromatase inhibitors and further work is required to determine this.

Breast cancer 0701

Local recurrence following conservative surgery for screen detected ductal carcinoma in situ: Radiotherapy can be held in reserve

B. C. Knight, Q. Humayan, J. Winstanley, H. Bishop
Royal Bolton Breast Unit, Bolton

Background: Controversy exists over the use of radiotherapy following conservative surgery (CS) for screen detected (SD) Ductal Carcinoma in Situ (DCIS). Our current practice is to hold radiotherapy (RT) in reserve. The primary aim of the study was to analyse the local recurrence rate of SD DCIS following CS surgery alone and compare them against nationally reported local recurrences (LR). Secondary outcomes included mortality from DCIS and invasive disease. Predictors of LR were also analysed.

Methods: The notes of all women with SD DCIS diagnosed between 1 April 1998 and 31 March 2004 were sought. The type of surgery, number of operations and whether or not RT was given were collected. Histological data included size, grade and margin of excision width. The number of LRs, time to LR, and subsequent therapy and survival were recorded.

Results: 131 women were treated for SD DCIS and met the inclusion criteria. 127 women were enrolled. 4 notes were unavailable) No patient developed metastatic disease or died. Mean Follow-up (FU) = 51.1 months. 49 (38.6%) women underwent a mastectomy (Ms). In 28 (22.1%) this was a primary procedure. 14 (11.0%) women had CS with RT and 64 (50.4%) women had CS alone. There have been five LRs in this group (7.8%). All recurrences were detected mammographically. 4 of the 5 patients with LR (80%), had clear histological margins with a mean margin clearance in this group of 3mm. No patient having a Ms or CS + RT has developed LR.

Conclusion: For the majority of women having CS for DCIS, RT can safely be held in reserve. The judicious use of radiotherapy does not influence disease free survival in our experience. The presence of clear resection margins following CS does not exclude the risk of LR.
Breast cancer 0311

Recurrence type in the first 5 yrs following diagnosis of ER+ early stage breast cancer in postmenopausal women

Western Infirmary, Glasgow

Background: An initial peak at 2 yrs in the rate of recurrence has been demonstrated in women diagnosed with early stage breast cancer. Recent trials have shown that aromatase inhibitors reduce this initial peak compared with tamoxifen in postmenopausal women with ER+ breast cancer. Data regarding the type of recurrence that this initial peak represents will help clinicians make an informed choice regarding aromatase inhibitor treatment strategy. We aim to map the hazard rates of recurrence types over the initial 5 yrs following diagnosis of ER+ breast cancer in postmenopausal women.

Methods: Data from consecutive postmenopausal patients from 5 UK centres, diagnosed with operable ER+ breast cancer between 1995 and 2004, were examined. Recurrence was defined as loco-regional, contralateral or distant. Those patients who died of breast cancer with no record of recurrence were classified as distant recurrence. Cumulative rates of recurrence types were calculated using Kaplan-Meier survival analysis and annual hazard rates of overall recurrence and each type of recurrence were plotted over 5 yrs. Annual hazard rates of recurrence for standard prognostic variables were also plotted.

Results: A total of 4245 patients were studied. Cumulative rates of recurrence type (with 95% confidence intervals) were as follows: Distant 2·5 yrs 4·5% (3·8–5·1), 5 yrs 9·8% (8·8–10·9); loco-regional 2·5 yrs 1·0% (0·7–1·3), 5 yrs 2·7 (2·1–3·3); contralateral 2·5 yrs 0·5% (0·3–0·8), 5 yrs 1·3% (0·9–1·7). An initial peak in overall recurrence rates of 4·2% was seen at 2 yrs. The annual hazard rates for loco-regional and contralateral recurrence never exceeded 1% over the 5 yr period following diagnosis and no initial peak at 2 yrs was evident. The annual recurrence rates of distant recurrence peaked at 3·2% at 2 yrs. Larger tumours, higher grade, more advanced nodal status and ER poor tumours were associated with a more obvious peak in annual recurrence rates at 2 yrs.

Conclusion: The initial peak in recurrence seen at 2 yrs is directly related to the occurrence of distant relapse. Systemic treatment aims to reduce distant recurrence. Patients with more adverse pathological variables should be considered for upfront aromatase inhibitor.

Breast cancer 0309

Changing pattern of the detection of loco-regional relapse in breast cancer: The Edinburgh experience

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Background: Guidelines exist for follow up of breast cancer patients. Typically, follow up is concentrated on the first three to five years, with either reduced frequency of visits (ASCO, Steering committee) or discharge (NICE at 3 yrs, BASO at 5 yrs) after this time. While all the guidelines recommend regular mammography, there is no evidence to inform the frequency with which this should be undertaken. We analyse the pattern of treatable relapse in our unit to assess the appropriateness of the various guidelines.

Methods: An analysis of all treatable relapses amongst a cohort of 1132 patients with early stage breast cancer treated by breast conserving surgery (BCS) and post-operative radiotherapy between 1991 and 1998.

Results: 110 treatable relapses were identified and analysed. Treatable relapses developed at a constant rate of 1·15% of those at risk per year throughout the follow up period. 48 relapses were in the ipsilateral breast, 25 the ipsilateral axilla, 35 the contralateral breast and 2 patients had relapse in both breasts simultaneously. 37 relapses (33·5%) were symptomatic, 56 (51%) mammographically detected, 15 (13·5%) clinically detected and 2 (2%) were diagnosed incidentally. Mammography detected 5·37 treatable relapses per 1000 mammograms under an annual protocol.

Conclusions: In patients with symptomatic or mammographically detected ipsilateral breast relapse, survival was significantly longer overall (p = 0·0002) and from time of recurrence (p = 0·0034) compared with clinically detected relapses. Auxillary relapse events were too few to allow analysis, as were contralateral events diagnosed by methods other than mammography.

Conclusion: In this analysis, treatable relapse occurs at a constant rate over time with the majority of relapses occurring after three years. Clinical examination is responsible for a minority of diagnoses (15%) and patients with clinically detected relapse have a poorer outcome compared with relapse detected by other means. Long term follow up based on regular mammography is warranted for all patients treated by BCS.
Gastro-intestinal cancer

Gastro-intestinal cancer 1068

Analysis of serum using novel proteomic technologies reveals discriminatory proteins that may be of use in screening

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University of Dundee, Dundee

Background: The test commonly used for screening in colorectal cancer is the Guaiac Faecal Occult Blood Test (FOB). However, this lacks high sensitivity and specificity and more accurate tests are needed. We have used surface-enhanced laser desorption/ionization time-of-flight mass spectrometry (SELDI-TOF MS) and iTRAQ proteomic technologies to facilitate the discovery of biomarkers for early colorectal cancer. The aim was to identify in serum from colorectal cancer patients novel proteins that can sensitively and specifically detect colorectal cancer.

Methods: Serum from 86 cancer and 120 normal controls has been collected. The Ciphergen ProteomChip Reader (model PBSII) has been used to identify the optimum conditions for serum analysis and for differentiating between cancer serum and control serum. In addition the cancer group was subanalysed by stage. Statistical analysis was carried out using the Biomarker Wizard programme.

Results: Optimum conditions have been identified for the efficient proteomic analysis of serum. Analysis of the serum of cancer patients has revealed a difference between the two; there are nine proteins in the cancer serum that are present in significantly different amounts compared to the normal samples. There is a pattern of four proteins within this that can separate cancer from non-cancer with a high degree of sensitivity (88%) and specificity. Furthermore, there is a distinct pattern of proteins common to advanced cancers (Dukes C) compared to earlier node negative cancers (Dukes A and B) and this pattern can discriminate between early and advanced cancer with a sensitivity of 86% and a specificity of 87%.

Conclusion: These results show promise and this may lead to identification of a clinically applicable biomarker. The proteins have been identified by iTRAQ technology and may well represent a future screening or staging tool to replace the FOB.

Gastro-intestinal cancer 0746

Endoscopic ultrasound (EUS) versus laparoscopy and laparoscopic ultrasound (LUS) to predict unresectability in the staging of pancreatic head cancers

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1 Bristol Royal Infirmary, Bristol, 2 North Bristol Trust, Bristol

Background: The aim of this study was to compare the ability of endoscopic ultrasound (EUS) against staging laparoscopy with laparoscopic ultrasound (LUS) to predict unresectability in pancreatic head cancers (CaHOP) following a multidisc photographic computed tomography (CT) scan which predicted potentially resectable cancer.

Methods: This includes 2 studies. All patients with a CaHOP deemed potentially resectable on CT scan were referred for further staging by the Multidisciplinary team meeting (MDT). Study I – Retrospective review over the last 5 years (2001–2005) of patients who either had a EUS or LUS or both. Patients identified via the MDT archive. Study II – A prospective blinded cohort study which compared the 2 investigations from January through August 2006. Both Investigators (sonographers) were blinded to the findings of the other investigation (EUS or LUS). However, they were aware of the CT scan findings. All patients in this study had a multidose CT scan. The findings were confirmed on histology, laparotomy or a clinical follow up for more than 6 months.

The following were the criteria for unresectability: Liver metastases, peritoneal metastases/positive cytology from peritoneal washings, hepatic artery lymph node (area 8a) metastasis and vascular involvement that precluded resection.

Results: Study I – A total of 79 patients were referred for further staging 65 patients had LUS, 29 had EUS and 27 had both. Sensitivity, negative predictive value (NPV) and accuracy of individual investigation and for patients who had both investigations are outlined in Tables 1 and 2.

Table 1

<table>
<thead>
<tr>
<th>Unresectability (UnR) all patients</th>
<th>LUS for UnR (n = 65)</th>
<th>EUS for UnR (n = 29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>74%</td>
<td>55%</td>
</tr>
<tr>
<td>NPV</td>
<td>72%</td>
<td>50%</td>
</tr>
<tr>
<td>Accuracy</td>
<td>83%</td>
<td>69%</td>
</tr>
</tbody>
</table>

Study II: 13 patients were enrolled in the prospective study comparing the two investigations. 1/13 had a duodenal perforation following the EUS and went straight to a laparotomy. 5 patients were unresectable after both the staging procedures. EUS picked up unresectability based on vascular invasion in 2 patients. LUS predicted unresectability in 4 patients (Liver metastases-2, peritoneal metastases-1, vascular invasion-1). 9 patients went for a laparotomy with intent to cure. 6/9 patients had a pancreatico-duodenectomy, whereas 3/9 patients were deemed unresectable (Lymph node metastasis-2, vascular invasion-1). The positive predictive value for unresectabilty was 100% for both the investigations. Table 3 outlines the sensitivity, NPV and accuracy for this comparative study.

Table 2

| Unresectability (UnR) in patients who had both investigations (n = 27) |
|--------------------------|--------------------------|
| LUS for UnR              | EUS for UnR              |
| Sensitivity              | 78%                      |
| NPV                      | 69%                      |
| Accuracy                 | 85%                      |

Conclusion: As compared to EUS, LUS was more sensitive and accurate in the overall staging of pancreatic head cancers. It was rare to pick up vascular unresectability based on EUS and not on LUS. In our unit EUS is now selectively used to aid the staging of pancreas cancer only after LUS.

In summary, both investigations were similar in diagnosing the tumour size, vascular invasion and nodal status; however, laparoscopy and LUS diagnosed more patients with liver and peritoneal metastases.
Gastro-intestinal cancer 0754

Endoscopic ultrasound guided fine needle aspiration cytology: Factors affecting adequacy

Bristol Royal Infirmary, Bristol

Background: EUS-FNA has become a valuable tool for evaluation of gastrointestinal lesions and mediastinal lymph nodes. However, sample adequacy may vary and many centres advocate on-site cytopathology, although this is not always available. The aim of this study was to assess the impact of site, size, consistency of lesion and operator experience on adequacy of EUS-FNA specimen.

Methods: During 36 month period (2003–2005), 205 EUS-FNAs in 169 consecutive patients were studied. Data was collected on sample adequacy, site, size and consistency of lesion. Two endosonographers performed all procedures. A standard technique using Wilson-Cook 19–22 gauge needle with 10–20 ml suction was employed. On-site cytopathologist was not present to assess specimen adequacy.

Results: Operator experience: Adequacy rate increased from 65.5% (19/29) in 2003, 80.3% (86/107) in 2004 (p = 0.09) and 82.6% (57/69) in 2005 (p = 0.7). Site of FNA: There was significant difference in adequacy rate between lymph node samples obtained from mediastinum and abdomen (p = 0.04) and also between pancreas and other organs like gastric wall/oesophagus (p = 0.2). Size of lesion: Adequate samples were obtained in 26/29 patients with mediastinal lymph nodes >1 cm and 31/38 cases with lymph node <1 cm in size (p = 0.12). For abdominal lymph nodes, adequate sample was obtained in 27/30 cases with size ≥1 cm and 4/18 cases with size <1 cm (p = 0.001). Probability of obtaining adequate sample with mediastinal lymph node <1 cm is higher 31/38 compared to abdominal lymph node 4/18 (p = 0.001). EUS-FNA adequacy rate was same for pancreatic lesions >1 cm 83.3% (10/36) and small lesions <1 cm 83.3% (10/24). Consistency: Adequacy rate was 80% (24/30) for solid pancreatic lesions, 86.3% (19/22) for cystic lesions and 87.5% (7/8) for mixed lesions (p = 0.88).

Conclusion: Adequate samples are significantly more likely to be obtained from mediastinal nodes than abdominal nodes (irrespective of size). Contrary to previous reports, yield from pancreatic FNA was not significantly different from lymph node FNA. Similarly, size and consistency of pancreatic lesion did not influence adequacy rate. Although, overall adequacy rate increased with operator experience, it did not reach statistical significance.

<table>
<thead>
<tr>
<th>Site of EUS-FNA</th>
<th>Total no. of cases</th>
<th>Adequate specimen obtained</th>
<th>Overall adequacy rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lymph node-mediastinal</td>
<td>67</td>
<td>59</td>
<td>88%</td>
</tr>
<tr>
<td>Lymph node-abdominal</td>
<td>48</td>
<td>31</td>
<td>64.5%</td>
</tr>
<tr>
<td>Pancreas</td>
<td>60</td>
<td>50</td>
<td>83.3%</td>
</tr>
<tr>
<td>Gastric</td>
<td>12</td>
<td>8</td>
<td>66.6%</td>
</tr>
<tr>
<td>Oesophagus</td>
<td>5</td>
<td>5</td>
<td>71.4%</td>
</tr>
<tr>
<td>Miscellaneous (mediastinal mass, adrenal, ampulla, liver, ascitic fluid)</td>
<td>11</td>
<td>9</td>
<td>81.8%</td>
</tr>
</tbody>
</table>

Gastro-intestinal cancer 0117

Prospective stage for stage comparison of definitive chemoradiation, surgery alone and neoadjuvant chemotherapy for oesophageal carcinoma

South East Wales Upper GI Cancer Network, Cardiff

Background: Definitive chemoradiation (CRT) has been championed as alternative therapy for selected patients diagnosed with oesophageal cancer. The aim of this study was to determine the relative outcomes of definitive CRT, surgery alone (S) and neoadjuvant chemotherapy for oesophageal cancer (CS) in patients diagnosed with oesophageal cancer of any cell type, related to stage.

Methods: Four hundred and eleven consecutive patients diagnosed with oesophageal cancer and managed by a regional multidisciplinary team (MDT) underwent stage investigation by both CT and endoluminal ultrasound. One hundred and seventy-one patients deemed unsuitable for surgery by the MDT were staged by both CT and endoluminal ultrasound. One hundred and seventy-one patients deemed unsuitable for surgery by the MDT underwent surgery alone (S) and neoadjuvant chemotherapy for oesophageal cancer.

Overall survival related to cell type was similar, log rank 0.117, DF 1, P = 0.6834.

Conclusion: Overall, definitive CRT was as effective as S alone and neoadjuvant CS, and in patients with advanced stage III and IVa disease was associated with a modest though insignificant survival benefit. These findings support the need for a randomised control trial of definitive CRT versus neoadjuvant chemotherapy in patients with advanced but resectable oesophageal cancer.

Gastro-intestinal cancer 1005

The incremental value of peritoneal lavage and cytology during laparoscopy in the management of gastroesophageal cancers

Upper Gastrointestinal Unit, University Hospital Birmingham NHS Trust, Birmingham

Background: Patients with peritoneal metastases from gastroesophageal cancer have a poor prognosis. The role of peritoneal cytology in conjunction with staging laparoscopy is unclear. The aim of this study was to determine the value of adding peritoneal cytology to staging laparoscopy in patients with potentially resectable gastroesophageal cancer.

Methods: All patients with resectable gastroesophageal cancer on spiral CT and/or EUS underwent staging laparoscopy with pelvic peritoneal lavage using a standardised technique in the period between Jan 2003–Nov 2006. Lavage fluid was sent for cytological examination. Patients were divided into three groups, resectable tumours with normal staging laparoscopy and negative cytology (P-C–), macroscopic peritoneal metastases (P+) and those with no macroscopic peritoneal disease but positive cytology (P-C+).

Results: 255 staging laparoscopy procedures were performed. 82 oesophageal, 48 junctional, 125 gastric. 63 of 255 (24.4%) patients had irresectable disease based on staging laparoscopy and peritoneal cytology (13 oesophageal, 7 junctional, 41 gastric). 48 were P+ (9 oesophageal, 3 junctional, 36 gastric) and 15 were P- C+ (4 oesophageal, 4 junctional, 7 gastric).

Conclusion: Peritoneal cytology avoided unnecessary surgery in 15 of 207 (7.2%) patients. This justifies its routine use in the management of gastroesophageal cancer.

Figures are percentages, * P = 0.0237, n/a = not applicable.

Overall survival related to cell type was similar, log rank 0.117, DF 1, P = 0.6834.

Conclusion: Overall, definitive CRT was as effective as S alone and neoadjuvant CS, and in patients with advanced stage III and IVa disease was associated with a modest though insignificant survival benefit. These findings support the need for a randomised control trial of definitive CRT versus neoadjuvant chemotherapy in patients with advanced but resectable oesophageal cancer.
Gastro-intestinal cancer 0844

The increasing use of palliative chemotherapy for recurrent oesophageal-gastric cancer is not evidence based

Northern Oesophago-Gastric Cancer Unit, Newcastle Upon-Tyne

**Background:** Palliative chemotherapy is now often recommended in the treatment of recurrent Oesophago-Gastric (OG) cancer. There is scant evidence of the benefit it confers. The aim of this study was to define the use and benefit of this treatment in a large cohort of OG cancer patients.

**Methods:** Patients with recurrent disease diagnosed between 1991 and 2006 following surgery with curative intent were identified from our database.

**Results:** 336 patients were studied: 240 male, median age at recurrence: 67.1 (31.6–91.6) years. Median time to disease recurrence was 13.4 (1.25–118) months. Median survival from recurrence was 2.7 (0–93.2) months (6 patients are currently alive). Dividing this population into 2 cohorts showed a significant increase in the use of chemotherapy. Prior to 1999 (n = 100), 10% of patients had chemotherapy, while from 1999 (n = 236) this rose to 23%. For patients having chemotherapy (n = 64), median survival was 10.6 (1.5–75.7) months, patients having non-chemotherapy palliative treatment (n = 142), median survival was 2.85 (0–93.2) months, and for patients having only symptomatic treatment of recurrence (n = 130) median survival was 1.3 (0–16.2) months. Chemotherapy patients were significantly younger (p < 0.001). Median duration of chemotherapy was 1.1 (0.5–9.2) months. Median survival for these patients outside their chemotherapy treatment was 6.6 (0.4–19.5) months; this increased survival was still statistically significant (p < 0.001). 28 patients (44%) experienced considerable side effects, 10 requiring chemotherapy to be delayed, modified or stopped and 2 patients died during chemotherapy.

**Conclusion:** There is a significant increase in the use of palliative chemotherapy for recurrent OG cancer. Whilst survival is significantly improved, a substantial proportion of this time was spent receiving chemotherapy with many patients experiencing significant co-morbidity. Further studies that assess both quality and quantity of life are needed to fully evaluate the use of palliative chemotherapy and to identify those patients most likely to benefit.

Gastro-intestinal cancer 0656

Prognostic significance of involved circumferential resection margin in resected oesophageal cancer

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Nottingham City Hospital, Nottingham

**Background:** There are conflicting reports on the prognostic role of involved circumferential resection margin (CRM) in oesophageal cancer. We evaluated the prognostic value of involved CRM in resected oesophageal cancer.

**Methods:** A total of 310 consecutive patients who underwent potentially curative resection for oesophageal cancer between January 2002 and December 2004 were reviewed. Excluded from final analysis were all cases of deaths at or within 1 mm of the inked resection margin. Univariate and multivariate survival analyses were performed using the Kaplan-Meier survival function and Cox proportional hazard model.

**Results:** A total of 272 were included with 206 adenocarcinomas and 66 squamous cell carcinomas. The median age was 67 (40–89) years and male to female ratio was 3.2:1. Circumferential resection margin was involved in 84 patients (all T3) and 50% of all the patients developed recurrences after a median follow up of 23.5 (1–61) months with 80% recurring within the first two years after surgery. The median time to recurrence was 13 (1–35) months and recurrences were haematogenous in 32.4%, locoregional in 28.3% and peritoneal in 5.7%. The overall median survival was 2.3 years. Median survival in CRM positive patients was 1.5 (95% CI, 1.1–2.0) years and 2.2 (95% CI, 1.7–3.6) years in the CRM negative patients (p = 0.0001). Subgroup analysis of patients with T3 tumours alone showed that CRM positive T3 have a tendency to earlier tumour recurrence (0.92 cvar 1.5 years, p = 0.0001) and a worse median survival (1.5 cvar 2.0 years, p = 0.048) than the CRM negative patients. The significant predictors of recurrence and poor long term survival were nodal involvement, tumour stage, grade of differentiation, CRM involvement on univariate analysis. Independent prognostic factors on Cox proportional hazard model were CRM involvement, tumour grade, T-stage and N-stage.

**Conclusion:** CRM involvement is an independent predictor of both cancer recurrence and long-term survival in oesophageal cancer.

Gastro-intestinal cancer 0853

Variations in lymph node retrieval in rectal cancer surgery reflect the biology of the tumour and not surgical technique

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Lanarkshire Colorectal Study Group, Lanarkshire

**Background:** Interest has focused on lymph node retrieval rates as a quality indicator in rectal cancer surgery and indicative of accurate pathological staging. It seems intuitive that total mesorectal excision (TME) would yield more nodes/node positive tumours than high anterior resection (HAR). However, in clinical practice, it is not clear what impact the biology of the tumour itself might have on lymph node count and positivity. We examined the lymph node retrieval rate for our region for patients undergoing curative rectal cancer surgery.

**Methods:** Data was collected on all cases of rectal cancer undergoing curative resection from January 2002 to date, on a designated database. Following surgery, all rectal specimens were processed using the Quirke technique. Information on Dukes’ Stage, T-stage, TME/HAR (transaction of mesorectum ≥ cm below the distal border of the tumour) surgery and node retrieval/positivity for 9 colorectal surgeons was recorded. Data (median/interquartile range) was assessed using ANOVA for comparative individual data, the Mann Whitney U test for grouped data and the Wilcoxon test for paired data with p < 0.05 significant.

**Results:** 216 cases underwent curative surgery (TME = 188) during the time period. Within the group of surgeons, node negative tumours generated fewer nodes than node positive cancers, 9(5–14) versus 11(8–18) p < 0.0001. T3 T1 tumours generated fewer nodes than T1 T4 tumours, 9(5–13) versus 12(8–18) p < 0.0001. Later T stage tumours generated both more positive nodes than early T stage tumours p < 0.001. Within the group of colorectal surgeons patients undergoing TME had similar node retrieval counts and node positivity compared to those undergoing HAR, 11(6–14) versus 10(5–14), p < 0.34 (retrospective) and p < 0.841 (positivity count). There was a significant difference in lymph node retrieval between surgeons for TME but not HAR, p < 0.01 and p < 0.12 respectively. Interestingly, even after several years, there was still a significant difference in the distribution of node positive cancers between surgeons for both TME and HAR, P < 0.008 and p < 0.048.

**Conclusion:** These results suggest that there is no difference in lymph node retrieval between TME and HAR for curative rectal cancer surgery. Early cancers and node negative cancers generate fewer nodes than late stage/node positive cancers. Importantly, the distribution of early/late tumours between surgeons even after several years is uneven. Now that rectal cancer surgery has been standardised, variations in lymph node retrieval may have more to do with tumour biology than surgical expertise/pathology processing. Care should be taken in over-interpreting comparative lymph node counts between surgeons.

Gastro-intestinal cancer 0542

Prospective multidisciplinary (MDT) audit of colorectal cancer death – lessons to learn

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Royal Bournemouth Hospital, Bournemouth

**Background:** Colorectal cancer patients who have died are routinely discussed in the weekly MDT meeting in this secondary care centre. The MDT considers
all aspects of the patients’ journey from clinical presentation to death using a validated proforma. We analyse salient features of the audit.

**Methods:** Eighty-nine patients who died in the last 11 months were discussed prospectively at the MDT meeting and are presented here. A validated proforma was completed and details entered into a database and analysed using SPSS v-12. Fisher exact test used as appropriate.

**Results:** Male patients predominated in this audit (56%). While the majority of patients (54%) are dying in secondary care, less than 14% die at home and 24% in the Macmillan unit. The majority (44%, 39 patients) had metastases as the primary cause of death. Significant numbers of patients had problems with medical co-morbidity and old age (26%) leading to death. 63% (56 patients) of deaths were due to cancer; however nine patients died as a consequence of acute treatment in secondary care. Fifty-two patients (58%) were considered to be expected deaths and this positively correlated to involvement of the palliative care team in the last stages of life in 36 patients ($p = 0.000$, Fisher Exact test, two tailed).

While there was a trend for patients expected to die of cancer ($n = 52$) to be palliated in non-acute setting (Home-6, Macmillan unit-17, Nursing home-2, hospice-0, rehabilitation centre-2), a major proportion still continued to have their last phase of life in hospital ($n = 23$). As consequence of treatment related death, two major policy changes have been made, relating to avoidance of central lines (line sepsis) and preoperative cardiology work up.

**Conclusion:** There is an increasing trend for patients with advanced cancer to be managed in a non-acute setting. Prospective discussion of colorectal cancer deaths has improved the decision making process in terminal patients and has precipitated significant changes in policy affecting colorectal cancer patient care.
Venous disease

Venous disease 0372
Thrombophlebitis: Not a benign condition
S. Kumar, P. Capozzi, U. Kirkpatrick, P. Edwards, L. de Cossart, S. Dimitri
Countess of Chester Hospital, Chester

Background: To assess the overall management of thrombophlebitis in our institution.

Methods: Data of patients who had a clinical diagnosis of superficial thrombophlebitis confirmed with duplex scanning were collected from our prospective vascular data base. All aspects of patient’s management were retrieved from their case notes.

Results: 73 had superficial thrombophlebitis. There were 30 females and 43 males in the age group of 31–93 yrs (mean-64 yrs). The distribution of superficial thrombophlebitis was along the long saphenous vein (LSV) in 50 patients, along the short saphenous vein (SSV) in 19 and along SSV and LSV in 4. Group 1 consisted of 45 patients who had medical management with different combinations of tinzaparin, NSAIDs, stockings and warfarin. There were 23 deep vein thromboses (DVT) of which 10 were occlusive and 13 non-occlusive. There were 6 cases of pulmonary embolism (PE) and these were equally distributed in the occlusive and the non-occlusive group. Group 2 consisted of 28 patients who had surgical management. 22 patients had sapheno-femoral junction disconnection and 6 patients had disconnection of sapheno-popliteal junction. Post operatively there was 1 PE and 1 DVT.

Conclusion: A multidisciplinary approach to treatment is required and in selected patients early surgical intervention may reduce the risk of deep vein thrombosis.

Venous disease 0405
Deep vein thrombosis in general surgical patients – an audit based on THRIFT guidelines. We need to do better!
D. K. Bilku, V. Menon
University Hospital, Coventry

Background: A recent study in the UK found that 9% of patients admitted to a general hospital died and that 10% of these deaths were due to Pulmonary Embolism (PE) and most fatal emboli arise from Deep Vein Thrombosis (DVT) in the lower limbs. The most efficient way to prevent both fatal and non-fatal venous thromboembolism is to use routine prophylaxis for moderate to high risk patients. But studies in the UK suggest that effective prophylaxis is only routinely used by a minority of surgeons (Thrift, 1992). We therefore assessed the adherence to the guideline to determine if patients are receiving correct prophylaxis.

Methods: This was a prospective audit in which 86 patients who underwent surgery between January to March 2006 were reviewed. Data was collected from health records, treatment sheets and anaesthesia notes. Guidelines were based on the THRIFT Consensus Group (1992) statement published in BMJ 1992;305:567–74.

Results: Moderate Risk Patients: 69% of moderate risk patients did not receive the correct regimen of Clexane prior to surgery and of these 60% did not receive any Clexane prior to surgery and 81% did not receive the correct regimen of Clexane post-operatively. 41% did not receive any Clexane post-operatively.

High Risk Patients: 89% of patients did not receive the correct regimen of Clexane prior to surgery, and of these 52% did not receive any Clexane prior to surgery and 83% did not receive the correct regimen of Clexane post-operatively. Of these patients, 28% did not receive any Clexane post-operatively.

Conclusion: Our study highlights the urgent need for all surgical patients to be assessed for clinical risk factors for DVT by improved education. A local guideline has been developed, approved, and published on the pathfinder on the trust and county wide intranet.

Venous disease 1050
Management of Paget-Schroetter syndrome: A case series of 60 patients
R. J. Winterborn1, N. Kakani2, A. F. Waterkinson2, D. C. Kinsella2, J. F. Thompson2
1 North Bristol NHS Trust, Bristol, 2 Royal Devon and Exeter Hospital, Bristol

Background: The management of effort thrombosis of the subclavian vein-Paget-Schroetter syndrome (PSS) - is controversial. Following anticoagulation, some patients develop collateral veins and are asymptomatic, however, up to 46% have disabling venous hypertension, with serious implications for athletes and manual workers.

Methods: Patients presenting with PSS between 1995–2006 were stratified according to age, aspirations, diagnostic delay and patency on duplex and venography. All were counselled about treatment options, complications and outcomes. Patients with fresh thrombus were offered thrombolysis and surgery. Patients with patent veins were offered surgical decompression (rib resection) +/- venolysis. Surgery was selectively offered to those presenting late, usually for arterial or neurological symptoms. Anticoagulation was suggested for those with sedentary occupations or older clue.

Results: There were 60 patients (61 arms), median age, 31 years (range: 17–60), 60% were female and the dominant arm was affected in 79%. Median follow up was 29 months (range: 2–108). Sixteen patients presented within 2 months with patent veins. All underwent decompression (complications: 2 temporary neuropraxias). No patients had postphlebitic limbs and all returned to normal activity including competitive sport.

Twenty three patients presented within 2 months with occluded veins and had thrombolysis (complications: 1 pericardial bleed, 1 haemothorax, 1 back pain) followed by decompression (complications: 5 haemothoraces, 1 re-thrombosis, 2 neuropraxias, 1 winged scapula). At follow up 1 patient had mild and 1 had severe venous hypertension. Two patients underwent thrombolysis only.

Nine of 19 late presenters were operated upon. One was mildly symptomatic after swimming 1500 m at 2 year follow up.

Conclusion: Thrombolysis and surgical decompression are durable and safe options for PSS. Careful patient selection and treatment tailored to an individuals’ presentation and lifestyle results in a good outcome, including the ability to play competitive sport.

Venous disease 1077
A novel method for the objective grading of the severity of venous reflux
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The General Infirmary at Leeds, Leeds

Background: Routine Duplex ultrasonography (DUS) to investigate venous disease does not provide an objective assessment of reflux severity. This study describes a novel method for assessing this using the Doppler spectral trace (DST).

Methods: A laboratory model was developed to assess correlations between flow and the area under the graph (AUG) of the DST. Three new variables, reflux fraction (RF: retrograde/antegrade flow volume), net reflux volume (NRV: retrograde – antegrade flow volume) and reflux velocity index (RVI: peak retrograde/peak antegrade velocity), were derived. Reproducibility (duplicate
measurement) and validity (compared to air-plethysmography derived venous filling index: APG-VFI) of these variables for assessing reflux severity were examined in 21 normal limbs (Group A) and 3 groups with primary great saphenous reflux (B: 11 asymptomatic, 16 symptomatic (CEAP = C2) and 13 complicated (CEAP = C3-6) during a calf squeeze followed by sudden release.

**Results:** The model confirmed a correlation between AUG and flow volume (r = 0.94, p < 0.01) and calculation of the new parameters (all study limbs, n = 61) was reproducible (r: RF = 0.89, NRV = 0.69, RVI = 0.91, p < 0.01) Correlations with APG-VFI were: RF 0.62, NRV 0.42, and RVI 0.58, p < 0.01 for all. Finally, an ordinal logistic regression model confirmed a significant relationship between these parameters and the clinical severity of venous disease for all.

**Conclusion:** RVI, RF and vein diameter are reproducible measurements providing an objective assessment of reflux severity. They are easily derived following routine DUS which, unlike APG, is widely available. They have a potential role in research and in selecting patients for definitive therapy for superficial venous incompetence, particularly if this is rationed by the NHS.

**Venous disease 0321**

**Superficial venous disease in the Asian population – a prospective study**

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Mayday University Hospital, Croydon

**Background:** The Asian population of our hospital catchment area represents 6.2% of the total, which is 3.2% higher than the national average, compared to the Caucasian population which comprises 70-2% and is 21.9% lower than the national average. This study aimed to analyse the prevalence and presentation of superficial venous disease (SVD) in the Asian population of our hospital catchment area.

**Methods:** A prospectively gathered database of 461 patients referred by local general practitioners to the varicose veins nurse specialist nurse over a 24 month period was analyzed. Information was collected on demographics, presenting features, clinical signs and whether surgical referral was made.

**Results:** Asians presented significantly younger than Caucasians (p < 0.001; unpaired t-test). Caucasians had a significantly higher positive family history than Asians (p ≤ 0.05; chi square test). SVD severity was graded using the CEAP (clinical, etiological, anatomical, pathophysiological) classification. Asians had significantly more severe disease than Caucasians (p = 0.01; chi-square test). There were no differences in sex distribution.

**Conclusion:** Asians presented younger with more severe disease than their Caucasian counterparts. The reasons for these findings are unclear, but probably represent a combination of genetic, environmental and social factors. Further research is in progress to investigate this.

**Venous disease 0889**

**Pelvic vein reflux in female patients with varicose veins – comparison of incidence between a specialist private vein clinic and an NHS vascular unit**

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**Background:** There is mounting evidence that pelvic vein reflux is an important contributing factor to lower limb varicose veins and post-operative recurrence. It has been suggested that we see an elevated incidence due to our local referral base.

**Methods:** In both units, all patients who present with symptoms or signs of lower limb superficial venous reflux have routine lower limb duplex ultrasound scans (DUS) performed to the same protocol. The results of all lower limb DUS performed between 1/3/05 and 28/2/06 were retrospectively reviewed.

**Results:** In unit A with DUS evidence of refluxing veins emanating from the pelvis, and evidence of previous surgery. All patients in unit A with DUS evidence of refluxing veins emanating from the pelvis routinely have transvaginal duplex ultrasonography (TVUS), as do those in unit B for whom funding is obtained. Results of TVUS were reviewed for the presence of truncal reflux in internal iliac or ovarian veins.

**Conclusion:** In unit A, 462 females had lower limb DUS, 100 of which were found to have DUS evidence of refluxing veins emanating from the pelvis (21.6%) and underwent TVUS. In 85% of these, TVUS confirmed reflux in internal iliac or ovarian veins (incidence 18.4%). In unit B, 61 of 279 females who had lower limb DUS were found to have evidence of refluxing veins emanating from the pelvis (21.9%). In these, 75% of TVUS were positive for reflux in a truncal pelvic vein. If all patients in unit B had undergone TVUS, then the incidence of reflux in internal iliac or ovarian veins was extrapolated to have been 16.4%.

**Conclusion:** We have found that approximately 18% of female patients presenting with varicose veins have truncal pelvic vein reflux, which communicates to varicose veins in their legs. We have shown this to be the case in a specialist unit with a wide referral base and a particular interest in the area, and also in a vascular unit with a local referral base. This suggests that it represents a true incidence of the condition.
Venous disease 0369

Vascularisation of the haematoma tract following great saphenous vein stripping: a new cause of recurrent varicose veins

Countess of Chester Hospital, Chester

**Background:** Varicose veins recurrence following varicose vein surgery occurs in about 15%–20% of the patients. Operations for recurrent veins account for up to 20% of superficial vein operations performed in the NHS. The causes for recurrence are poorly understood but are thought to be associated with inadequate surgery and neovascularisation.

**Methods:** Following local ethical approval, 80 patients were recruited to undergo saphenofemoral ligation, proximal inversion stripping and multiple avulsions. Colour flow duplex scanning was used preoperatively to assess the presence of reflux, anatomy of the great saphenous vein (GSV) and the presence of thigh perforators. Follow up duplex was performed at 2 weeks, 6 months, 1 year and 2 years.

**Results:** In the high tie and stripping group at 6 months flow in the haematoma tract was seen in 6 patients (7.5%) and groin neovascularization seen in 3 patients (3.8%). At 1 year there were 14 patients (17.5%) who had flow in the haematoma tract and 5 patients (6.3%) had groin neovascularization. At 2 years 20 patients (25%) were noticed to have flow in the tract and groin neovascularization seen in 7 patients (8.9%). This tract was seen to fill from a thigh perforator in 12 patients. In this group the flow was into the distal tract in 8 patients and proximally towards the groin in 4 patients of which one had connected to the femoral vein. In 8 patients the flow in the tract originated from the groin neovascularization.

**Conclusion:** Vascularization of the haematoma tract following stripping of the GSV is a cause of varicose vein recurrence. Alternative methods for eradicating GSV such as LASER, VNUS and Foam sclerotherapy may prevent this and needs to be investigated.

Venous disease 0453

Quality assurance following saphenopopliteal ligation for varicose vein surgery

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**Background:** High recurrence rates following surgery for short saphenous varicose veins have been reported. The majority of recurrences are secondary to failure to correctly identify the saphenopopliteal junction (SPJ) peri-operatively. The aim of this study was to evaluate the effectiveness of consultant led surgery in ligation of the saphenopopliteal junction.

**Methods:** We performed a prospective study of patients referred to two consultants at a single vascular unit, with symptomatic primary varicose veins and proven SPJ reflux on duplex scanning. Patients underwent pre-operative duplex marking prior to day-case surgery and a diagram of the junction was provided. Both consultant used the same technique to perform SPJ ligation. Subsequently patients were followed up in outpatients and duplex scanning was repeated. All scans were performed by one consultant vascular radiologist.

**Results:** 91 procedures were performed in 89 patients included in the study. 31 were men and 58 were women with a median age of 48 (range 19–79 years). The SPJ was successfully ligated in 88 (96.7%) cases. Reflux was completely abolished in 52 (57.1%) cases but persisted solely in the short saphenous vein (SSV) in almost one third of cases (n = 28), despite radiological evidence of a ligated SPJ. The most frequent cause of isolated reflux in the SSV was collateral formation. There were 3 cases of failure to ligate the SPJ and there were no major complications.

**Conclusion:** This study demonstrates that employment of preoperative duplex marking coupled with direct visualisation of the SPJ results in a high percentage of successful ligation. Given that despite technical success the SSV remained patent in almost one third of cases, we propose that in addition to pre-operative duplex marking, stripping of the SSV should be routinely undertaken.
Radiology for surgeons 0743

Accuracy of MRI in the diagnosis of fistula in ano is good, and could be improved

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Background: Magnetic Resonance Imaging (MRI) has been advocated as an accurate means of assessing fistula in ano. We set out to document the accuracy of MRI in our colorectal unit.

Methods: Between August 2004 and September 2006, 92 consecutive MRI were undertaken in 85 patients with recurrent or complex perianal sepsis. Outcome data were not available in 6 patients and these have been excluded from our analysis, leaving 86 MRI in 79 patients for study. MRI reports were retrospectively reviewed and compared with an outcome derived reference standard (ODRS). The ODRS was defined by a review of MRI reports, examination under anaesthetic (EUA) findings and clinical follow-up. If EUA and MRI disagreed, and sepsis subsequently occurred at a location previously suggested by MRI, then the MRI report was presumed to have been correct.

Subgroup analysis was used to identify common features in inaccurate reports.

Results: In the 79 patients, the male: female ratio was 4:1 and the median age was 46 years (range 11 to 83 years). Thirty-two (41%) had primary fistula, 29 (37%) recurrent fistula, and 18 (23%) patients had Crohn’s-associated fistula. Median follow up was 14 months (range 2 to 27 months). Of the 86 scans, sensitivity of MRI in diagnosing fistula in ano was 62/64 (95%), with specificity of 90/4%. Of the 86 scans, MRI correctly identified fistula in ano and located the primary tract in 78% (Cohen’s non-weighted kappa 0.69). MRI correctly located the quadrant of the internal opening of the fistula in 90% where it was reported (although this information was not included in 14% of MRI reports). MRI correctly noted the presence and site of extensions, horseshoes and abscesses, which was good. We have implemented the use of a unified classification system was associated with less accurate MRI. We set out to document the accuracy of MRI in the diagnosis of fistula in ano.

Conclusion: MRI correctly identifies the presence of complicated sepsis associated with fistula in ano in over 90% of cases. Based on kappa values accuracy of MRI in very good except for the location of the primary track and abscesses, which was good. We have implemented the use of a unified classification system in the hope that this will further increase the accuracy of MRI in the diagnosis of fistula in ano.

Radiology for surgeons 0237

Magnetic resonance imaging in rectal cancer downstaged using neoadjuvant chemoradiation: accuracy of prediction of tumour stage and circumferential resection margin status

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Glen Chyld Hospital, North Wales

Background: The aim was to examine the accuracy of magnetic resonance imaging (MRI) in predicting circumferential resection margin (CRM) involvement, T and N stage in patients with locally advanced carcinoma of the rectum, who had undergone long-course downstaging chemoradiation.

Methods: Patients with rectal cancer were selected for long-course downstaging chemoradiation if their tumour was considered to threaten (≤ 1 mm) or involve the CRM on MRI. Eighty such patients had a repeat MRI at a median of six weeks post chemoradiation followed by surgical excision soon thereafter. The findings on the post-chemoradiation MRI were compared with histological examination of the surgical specimen.

Results: For CRM involvement, post-chemoradiotherapy restaging MRI had an accuracy of 83% a sensitivity of 58%, a specificity of 87%, a positive predictive value of 44% and a negative predictive value of 92%. Accuracy for T and N staging was 43% and 78% respectively. 38% of T stages were overstaged and 20% underestimated. 4% of N stages were overstaged and 19% understaged.

Conclusion: MRI has good specificity and negative predictive value for unrivaled CRM though sensitivity and positive predictive value for involved CRM were unsatisfactory. The shortcomings of MRI stem from poor differentiation of viable tumour from post treatment changes and inability to identify small nodal and tumour deposits.

Radiology for surgeons 0341

Early water-soluble contrast studies may identify patients that require pyloric dilatation after oesophagectomy

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Background: Delayed gastric emptying (DGE) after oesophagectomy occurs in a significant number of patients and is associated with an increased risk of aspiration and prolonged hospital stay. Routine intraoperative pyloroplasty may prevent DGE, but is not without risk. Postoperative radiological pyloric dilatation is an effective alternative but is often delayed until patients exhibit clinical features of DGE. The aim of this study was to evaluate the relationship between radiological signs of DGE in the early phase after oesophagectomy before commencing oral intake (on sixth postoperative day) with subsequent development of symptomatic DGE requiring pyloric dilatation.

Methods: 10 patients who developed symptomatic delayed gastric emptying after oesophagectomy (requiring pyloric dilatation) were identified from an upper GI cancer database (group A). 13 age and sex-matched controls without DGE after oesophagectomy during the same period were also identified (group B). Routine day 6 water-soluble contrast swallows in all 23 patients were evaluated for radiological features of delayed gastric emptying by a consultant radiologist blinded to patient details and clinical outcome. The presence of early radiological features of DGE was compared between groups using Pearson Chi-squared test.

Results: There was significant correlation between early radiological features of DGE and symptomatic DGE (group A 80% vs. group B 38%, chi-squared test: p = 0.05). Positive and negative predictive values were 62% and 80%, respectively. Length of hospital stay was prolonged in patients in group A (24 ± 14 vs. 12 ± 2 days, paired t test: p = 0.01), despite similar rates of non-DGE-related complications (group A 23% vs. 20%; p = 0.6). Conclusion: Routine early water-soluble contrast swallow predicts subsequent symptomatic delayed gastric emptying in patients undergoing oesophagectomy. Early pyloric dilatation in this group before oral intake is introduced may shorten hospital stay and reduce associated complications. Prospective studies are needed to compare intraoperative (pyloroplasty or balloon dilatation) with postoperative intervention (balloon dilatation).

Radiology for surgeons 0964

HIDA imaging and the use of laparoscopic cholecystectomy in the absence of gallstones

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Wirral NHS Trust, Wirral

Background: The incidence of biliary abdominal pain in the absence of gallstones is estimated to be as high as 20-7% in women and 7.6% in men and can be indicative of Gall Bladder (GB) dysfunction. This can be demonstrated...
Radiology for surgeons 0650

Identifying vulnerable atherosclerotic plaques – Magnetic Resonance Imaging-based stress analysis of carotid atheroma

Cambridge University Hospitals NHS Foundation Trust, Cambridge

Background: The clinical determination of carotid plaque vulnerability is currently based solely on luminal stenosis. It is, however, now well accepted that luminal stenosis alone may be an inadequate predictor of risk and other factors, such as plaque morphology and biomechanical stress should be considered. We used finite element analysis (FEA) based on in vivo magnetic resonance imaging (MRI) to simulate the stress distributions of the atheromatous plaques. We compared asymptomatic with symptomatic individuals.

Methods: 15 symptomatic and 15 asymptomatic patients underwent high – resolution multi-sequence in vivo MR imaging of their carotid arteries. Plaque stress analysis was performed based on the geometry derived from in vivo MRI of the carotid artery at the point of maximal stenosis. Parametric statistical analysis was used to compare the maximal stress within the plaques in the symptomatic and asymptomatic groups.

Results: High stress concentrations were found at the shoulder regions of symptomatic plaques and the peak stresses in this group were significantly higher than those of the asymptomatic group (508±193 kPa versus 270±108 kPa, p = 0.004).

Conclusion: Stresses within symptomatic plaques were higher than in asymptomatic plaques, suggesting that these plaques are more prone to rupture. Biomechanical stress analysis based on the geometry obtained from high resolution in-vivo MR imaging may potentially act as a useful tool for risk assessment of stroke in patients with carotid stenosis in the future.

Radiology for surgeons 0868

Magnetic resonance imaging detected carotid intraplaque haemorrhage predicts embolization during carotid endarterectomy

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Queen’s Medical Centre, Nottingham

Background: Microembolization detected during the dissection phase of carotid endarterectomy is associated with plaque instability and is associated with perioperative morbidity. Intraoperative hemorrhage (IPH) is found in unstable plaques and is detectable using magnetic resonance imaging. We aimed to ascertain whether IPH as seen on carotid MRI predicts particulate embolization in the dissection phase of carotid endarterectomy (CEA).

Methods: Patients with high grade symptomatic carotid stenosis undergoing CEA were prospectively enrolled. All underwent preoperative MRI assessment of the carotid arteries for IPH and transcranial Doppler during the dissection phase of the CEA to assess the presence of micro-embolic signal (MES). Associations between IPH and intraoperative MES were studied.

Results: Analysis was undertaken on 60 participants, 36 (60%) of whom showed intraplaque carotid magnetic resonance IPH and 24 (40%) did not. MES were detected during the dissection phase in 23 (38.3%) participants, 19 of whom had MR IPH. The association between carotid IPH and the presence of dissection phase MES was significant (Odds ratio = 5.6, 95% C.I. 1.6–19.7, P = 0.007) even after controlling for age, sex, degree of stenosis and delay from symptom to CEA (adjusted OR = 4.9, 95% C.I. 1.2–18.9, P = 0.02).

Conclusion: Intraoperative haemorrhage as detected by carotid MRI predicts particulate embolization during the dissection phase of CEA. This imaging technique can be used to forewarn surgeons of the increased intraoperative risk in patients with carotid IPH that may warrant dedicated preventative strategies.

Radiology for surgeons 1103

Can magnetic resonance angiography be used as an alternative imaging modality to digital subtraction angiography for peripheral arterial disease?

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Background: Development of three-dimensional magnetic resonance angiography (MRA) in the last decade may offer an alternative non-invasive imaging modality to the gold standard digital subtraction angiography (DSA). There is limited published evidence to validate MRA against DSA. We therefore seek to audit the accuracy of MRA compared to DSA in our clinical practice.

Methods: Consecutive patients undergoing MRA and DSA imaging between April 2004 and March 2006 inclusive were identified from our prospectively collected peripheral arterial disease database. A single consultant vascular interventional radiologist reported all investigations. Significant symptomatic stenosis or occlusions were classified using the original Trans-Atlantic Inter-Society Classification (TASC) system for all iliac and femoro-popliteal segments imaged with MRA and DSA. MRA accuracy was calculated as a proportion compared to the gold standard DSA, a Kappa value was calculated to determine the degree of concordance.

Results: Twenty-six patients underwent both MRA and DSA imaging (within six months). Patients all complained of claudication (Fontaine class II n = 23, class III n = 2 & class IV n = 1). Median ankle-brachial pressure index was 0.59 (range 0.36–0.87). Fifty-one iliac or femoral-popliteal segments were imaged with both modalities, one patient had a limited iliac DSA. Concordance between MRA and DSA was 94% (CI 79.1–97.4), Kappa value 0.88. In one case of non-concordance MRA suggested bilateral common iliac stenosis with subsequent DSA demonstrating only a unilateral stenosis, in the second MRA demonstrated a 3–5 cm superficial femoral artery stenosis which DSA demonstrated as a > 5 cm occlusion and in the third case DSA demonstrated a unilateral common iliac stenosis not detected by MRA. Management to date has been: endoluminal n = 20, combined endoluminal and surgical n = 3, surgical n = 1 and conservative n = 2.

Conclusion: MRA in our centre demonstrates a 94.1% concordance with DSA in determining the presence and TASC categorisation of significant iliac or femoral-popliteal stenosis in claudicants. It may be used to plan endoluminal procedures in this group.

Radiology for surgeons 0900

Three dimensional optical tomography of the breast

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University College London, London

Background: Optical Tomography is a technique, which involves the use of near infra-red light to produce images of the breast. The images display the
characteristic absorbing and scattering properties of different types of tissue within the breast. A unique multichannel time-resolved imaging system, which uses specific wavelengths that are sensitive to absorption by haemoglobin, has been developed at University College London. The aim of this study was to evaluate three-dimensional optical tomography in women with breast disease.

**Methods:** Women with a discrete breast lesion and healthy volunteers were recruited to undergo non-invasive optical tomography. All optical images were assessed qualitatively using a visibility scoring system. Quantitative analysis was performed to assess the maximal absorption coefficient and the optical contrast within a region of interest on the optical images. Results were compared with contrast-enhancement characteristics in women who had pre-operative magnetic resonance imaging of the breast. The size of the lesion on the optical image was compared to histopathological data.

**Results:** Forty-seven images of optical absorption were reconstructed from 37 women, 26 of whom had a discrete breast lump. Ten (90.9%) benign and nine (90%) malignant lesions were correctly identified. Qualitative analysis of images from diseased breasts showed a significant positive correlation between two independent observers ($p = 0.007$). Images acquired at both wavelengths showed good correlation ($p = 0.082$ benign; $p = 0.005$ malignant). Maximum absorption coefficients and optical contrast showed no correlation with enhancement intensity on dynamic contrast-enhanced magnetic resonance imaging.

**Conclusion:** Optical imaging is a novel non-invasive functional imaging modality, which can detect benign and malignant breast lumps. Further work is required to validate existing and formulate new methods of analysis to determine sensitivity and specificity of this system in women with breast disease.

**Radiology for surgeons 1130**

**The effect of pre-operative magnetic resonance imaging on rates of breast conserving surgery and re-operation for patients with invasive lobular carcinoma of the breast**

N. Hopper, K. Erasmus, M. Jones, S. Sinha, K. Gower-Thomas, R. Williams, E. Vaughan-Williams  
Royal Glamorgan Hospital, Llantrisant

**Background:** The use of conventional mammography and ultrasonography for the selection of patients with invasive lobular carcinoma (ILC) for breast-conserving therapy remains controversial. Magnetic resonance imaging (MRI) has been shown to more readily determine the extent of ILC when compared to conventional radiology. The aim was to determine whether a policy of pre-operative MRI affects the relative number of patients undergoing breast-conserving surgery, mastectomy and re-operation for ILC of the breast.

<table>
<thead>
<tr>
<th>No MRI</th>
<th>MRI</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>64</td>
<td>37</td>
</tr>
<tr>
<td>Median age in years (range)</td>
<td>64 (39–86)</td>
<td>60 (47–85)</td>
</tr>
<tr>
<td>Conventional radiology – median tumour size in mm (range)</td>
<td>14.5 (4–80)</td>
<td>13 (4–74)</td>
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<tr>
<td>Histopathology – median tumour size in mm (range)</td>
<td>18 (1–85)</td>
<td>20.5 (1–90)</td>
</tr>
<tr>
<td>Breast-conserving surgery n(%)</td>
<td>39 (61)</td>
<td>19 (51)</td>
</tr>
<tr>
<td>Mastectomy n(%)</td>
<td>25 (39)</td>
<td>18 (49)</td>
</tr>
<tr>
<td>Re-operation n(%)</td>
<td>17 (44)</td>
<td>3 (16)</td>
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Tumour size as determined by MRI correlated most accurately to histopathological size ($r = 0.588$, $P = 0.001$) when compared to mammography ($r = 0.318$, $P = 0.099$) and ultrasound ($r = 0.119$, $P = 0.353$).

**Conclusion:** MRI is more accurate than conventional radiology at pre-operatively determining tumour extent. MRI significantly decreases the chance of re-operation by two-thirds without significantly increasing the radicality of surgery for invasive lobular carcinoma of the breast.

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Education and training 0374

The role of surgical societies in supporting undergraduate education
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Background: Due to the ever-evolving nature of the undergraduate curriculum, it has frequently been said that surgical sciences, such as anatomy and pathology, are no longer taught thoroughly. In addition to this, it is becoming increasingly difficult for students interested in pursuing a career in surgery to gain any form of surgical experience. With changes to the postgraduate curriculum (MMC), decisions regarding careers must now be made within 18 months of graduation. We aim to identify which areas of the curriculum highly relevant to surgical training are under-taught, how much of this shortfall is being met by student run surgical societies, and whether undergraduates are receiving adequate careers advice regarding the surgical specialties.

Methods: A questionnaire was sent to the president of each student surgical society registered with the Royal College of Surgeons of England (27), asking detailed questions about the teaching received in the undergraduate curriculum on a variety of topics from anatomy to basic and advanced surgical skills. We also attempted to quantify the input which undergraduates are receiving from their student surgical societies, and access to careers advice through the normal curriculum.

Results: Questionnaires were received from 14 of the 27 medical school registered (52%). All of these agreed that medical schools provide inadequate teaching on areas of the curriculum relevant to surgical training, including anatomy, pathology, basic surgical skills, radiology, wound healing and trauma. All surgical societies offer training in basic surgical skills, however they are limited by facilities (e.g., access to dissecting rooms) or the availability of surgeons to help deliver training. All of the replying medical schools deny access to careers advice on surgical training, including ISCP, through the normal curriculum.

Conclusion: It has been shown that there is a significant gap in undergraduate education, and that the current curriculum is not equipping newly qualified doctors with the knowledge and skills they require to succeed in surgical training. In addition, there is an absence of careers advice for surgery. For this reason, the student run surgical societies which exist are essential in supporting the undergraduate curriculum, however are struggling to meet the demands and requirements of students. We would therefore urge all institutions to support the surgical specialties, and whether undergraduates are receiving adequate careers advice regarding the surgical specialties.

Education and training 1188

The era of laparoscopic surgery: who is training the future workforce?
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Background: In recent years, minimally invasive surgery has become increasingly common in the UK and with advances in technology and techniques more complex cases are being undertaken laparoscopically. With the loss of hours from the impact of EWTD and MMC, training in all aspect of surgery is a worrying issue. The NHS deficit is an added component when laparoscopic procedures are undertaken along with the need for training. We aim to assess the current state of laparoscopic training in the UK over the last three years.

Methods: The Intercollegiate Surgical Curriculum Project (ISCP) is used by the majority of trainees for data collection. We reviewed the ISCP logbook entries for all laparoscopic procedures by registered trainees over a three year period between Aug 2003 – 2006.

Results: 1046 surgical trainee are registered with for the ISCP logbook and of these 907 have been involved with some form of laparoscopic procedure. The overall number of laparoscopic procedure perform in the UK is rapidly increasing. Established procedures such as laparoscopic cholecystectomy have seen trainees over the last three years performing a uniform number of cases. However, for more advance laparoscopic procedures, exposure is limited to a few centres with trainees, even those in their senior years, acting only as assistants and very few procedures being performed by trainees.

Conclusion: Laparoscopic surgery is increasing significantly in the UK with complex cases being undertaken. However the majority of trainees despite their seniority perform limited numbers of resections themselves. Until the number of experienced trainers increases many trainees will have to undertake dedicated fellowships to gain the required experience for independent practice.

Education and training 0349

Provision of supervised training in carotid endarterectomy - does it alter the patient outcome
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Background: There is a constant increase in the incidence of Carotid Endarterectomy since the publication of the ACST trial. According to the 4th National Vascular database report only 13% of CEAs are performed by SpRs which is lower than the expected. We therefore looked at the clinical outcome of CEAs performed by SpRs and compared with a Consultant Vascular surgeon.

Methods: All patients who underwent CEA from 2002 to 2005 under a single consultant were chosen for the study. We collected data prospectively from the denderite systems and analysed the results in an Excel format. P value was calculated using the Fisher’s exact test unless otherwise specified.

Results: 206 patients underwent CEA under a single consultant. 165 CEAs were performed by the consultant and 41 by his registrars as first operating surgeon, with consultant supervision. There was no major difference in the patient characteristics. There was no statistical difference between the two groups in terms of duration of surgery, incidence of nerve injury, stroke rate and return to theatre. There was a statistically significant greater blood loss in the consultant group (P = 0.001).

Conclusion: Surgical registrars can safely perform CEA under supervision and should be provided with adequate opportunities to gain experience in performing CEA.

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Education and training 0193

The need for more structured training in stoma formation: a survey of General Surgery trainees

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**Background:** The formation of a stoma, whether elective or emergency, is frequently designated to a junior member of the surgical team. There are ideals to follow for the placement of stomas; if these are compromised the risk of complications increase along with mounting inconvenience to the patient. A study was undertaken to ascertain the experience, training received and the desired training requirements amongst General Surgery trainees from a regional Training Programme.

**Methods:** A questionnaire survey, via email and post, was sent to all trainees within the South East Thames (General Surgery) Training Programme. Each was asked to indicate on 4 sample patient images, by marking on a superimposed grid display, where they would place the ideal ileostomy (I), end colostomy (EC) and transverse colostomy (TC). An indication as to the level of formal training they had received was requested, as well as whether they felt they would benefit from more structured training in stoma formation.

**Results:** 48 of 74 trainees responded (65% positive response rate). Most felt confident to site and perform a stoma formation alone: I; 94%, EC; 96%, TC; 92%. In practice 52% of trainees were supervised 'rarely or never' when siting and forming elective stomas and 80% of trainees supervised 'rarely or never' when siting and forming emergency stomas. Analysis of the marked grid displays, of 4 sample patient images, indicates that ileostomy (I) placement was correct in 46% (range 27–67), end colostomy (EC) 28% (range 6–50) and transverse colostomy (TC) 16% (range 6–21). 26 trainees (54%) had received formal stoma training. Three-quarters of trainees felt they would benefit from more structured training in stoma siting and formation.

**Conclusion:** This study highlights the limited training received by General Surgery trainees and the consequent poor placement of stomas. These factors compound the recognised complications of stoma formation to create additional difficulties with management for the patient and stomatherapist. An increased awareness and training would help to reduce this. The majority of general surgery trainees support more structured training.

Education and training 0664

In-house colorectal laparoscopic preceptorship programme: A model for changing a unit’s practice safely and efficiently

Bradford Royal Infirmary, Bradford

**Background:** Laparoscopic colorectal surgery has become accepted and desirable as reports emerge of reduced patient stay and faster recovery time when compared with open surgery. Many coloproctologists are finding it difficult to learn colorectal laparoscopic techniques due to heavy clinical commitments. We sought to implement a safe and effective in-house preceptorship programme, which would lead to a significant increase in our laparoscopic colorectal practice over a relatively short period.

**Methods:** Having performed 100 colorectal laparoscopic cases, one of the coloproctologists within the unit was put in place as a preceptor to the other three. Analysis was undertaken of all elective colorectal resections in the seven month period following the start of the programme with regard to patient demographics, indication for operation, intra-operative complications, operative time, conversion rates, post-operative complications, hospital stay and re-admission rates.

**Results:** There were a total of 106 elective colorectal resections in the period studied. In January, 20% of all resections were performed laparoscopically, by June, this figure had risen to 80%. This has had a significant impact on hospital stay. For anterior resections, the median post operative stay dropped from 14 to 4 days (p = < 0.0050). Both the post-operative complication rate (6%) and conversion rates (10.5%) were acceptably low.

**Conclusion:** In-house preceptoring is an effective way to safely and rapidly increase a colorectal unit’s laparoscopic caseload. Surgeons are able to advance their training with minimum disruption to their service commitment and without detriment to patients. As a result, 80% of all colorectal elective resections are now performed laparoscopically in our unit.

Education and training 1120

The Endovascular Fellowship: A new training paradigm

Freeman Hospital, Newcastle-Upon-Tyne

**Background:** Endovascular therapy has revolutionised treatment of vascular disease. Whilst the Royal Colleges of Radiology (RCR) and Surgery agree on a vision for future common training, the acquisition of interventional radiological (IR) skills by vascular trainees remains elusive. This study presents the experience of two vascular trainees undertaking successive Endovascular Fellowships in a Regional Vascular Unit.

**Methods:** The objectives of the Fellowship were to provide the vascular trainee with the skills and experience necessary to allow them to incorporate IR techniques into their independent practice. A prospective Access database was devised to record all radiological activity. Open surgical experience was recorded on the ASGBI electronic logbook.

**Results:** The weekly program included 4 dedicated IR sessions, an all day operating list and 2 out-patient clinics, thereby achieving SAC recognition. Both fellows completed the year and gained the CCT. 95% of interventional radiological procedures were performed as first operator and each trainee gained similar overall experience. The mean number of procedures are summarised in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Diagnostic</th>
<th>Plasty</th>
<th>Stent</th>
<th>Alternative access</th>
<th>Venous line</th>
<th>EVAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>202</td>
<td>126</td>
<td>49</td>
<td>17</td>
<td>14</td>
<td>25</td>
</tr>
</tbody>
</table>

Open surgical experience, as primary operator, is summarised in Table 2.

<table>
<thead>
<tr>
<th></th>
<th>Aneurysm</th>
<th>Carotid</th>
<th>Bypass</th>
<th>Amputation</th>
<th>Veins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fellow A</td>
<td>27</td>
<td>11</td>
<td>15</td>
<td>18</td>
<td>&gt; 50</td>
</tr>
<tr>
<td>Fellow B</td>
<td>22</td>
<td>15</td>
<td>15</td>
<td>13</td>
<td>21</td>
</tr>
</tbody>
</table>

Fellow A subsequently secured consultancy with 2 interventional radiology sessions a week, whilst Fellow B is actively involved in a tertiary referral endovascular program. These roles are fully supported by their radiology colleagues.

**Conclusion:** This Fellowship demonstrates that Interventional Radiologists, working together with their surgical colleagues, can generate excellent training opportunities. Such training may provide a pivotal role in the development of a future “Vascular Specialist”.

Education and training 0800

Re-audit of obstetric anal sphincter injuries (OASI) following obstetric registrar training

M. Masood, W. Dowie, R. Freeman, C. Oppong
Derriiford Hospital, Plymouth

**Background:** In 2003 an audit of patients with third and fourth degree obstetric anal sphincter injuries, from 1999–2003, showed a persistent defect rate following OASI repair in this hospital was 54%. As a result bi-annual anal sphincter repair workshops were set up for obstetric registrars. This re-audit
Education and training 0253

Description and reporting of surgical data – scope for improvement?

P. Robinson, S. Menakuru, M. W. Reed, S. P. Balasubramanian
Academic Unit of Surgical Oncology, University of Sheffield, Sheffield

Background: Surgical research articles utilise a variety of descriptive and inferential methods to present and analyse data. The aim of this study was to determine the appropriateness of descriptive methods (e.g. mean, median, SD, range etc.) and survey the use of inferential methods (statistical tests) in key general surgical journals.

Methods: Articles were retrieved from the first three issues of four general surgical journals (Annals of Surgery, British Journal of Surgery, The Surgeon and the Annals of the Royal College of Surgeons of England) in the year 2005. Only original articles were included. Study characteristics, use and appropriateness of descriptive statistics and the number and types of statistical methods employed were evaluated.

Results: Of the 144 articles analysed, 119 made use of continuous data. Of these, 109 (92%) made use of normal distribution assumptions (parametric tests). There were 68 articles that used the Chi-squared test, 51 that used Fisher’s exact test, 47 that used the Student’s t-test, 33 used the Mann Whitney U-test, 29 used the Pearson’s correlation coefficient and 15 used the Spearman’s rank correlation coefficient. No statistical methods were described in 23% of the articles. The six most common tests used (Pearson’s chi-square, Fisher’s exact test, Unpaired t test, Mann Whitney test, Log rank and the Cox proportional hazards) accounted for the majority (69%) of the statistical methods employed.

Conclusion: These results highlight the need for surgical researchers to be aware of the changing landscape of statistical methods in surgical research.

Education and training 0221

Patients’ perception of doctors’ appearance and attire – scope for improvement?

S. Hindocha, W. Thiryayi, R. Aghamohammadzadeh, M. Madan
North Manchester General Hospital, Manchester

Background: Traditionally, doctors have been identified by their white coats and formal attire, which has been accepted as part of a dress code and a marker of professionalism. However, the place for such a uniform is questionable due to the potential transmission of infection. Abandoning such attire may impact upon a patient’s perception of quality of care received. We aim to investigate the patient’s perception of a doctor’s appearance and attire and to assess whether a doctor’s appearance and bedside manner influences a patient’s opinion of care received.

Methods: A cross sectional ethically approved questionnaire and interview study was conducted exploring two main themes; patient’s perception of (i) doctor’s bedside manner and (ii) doctor’s attire were utilised to assess whether these factors influenced patients’ opinion of the care they received.

Results: Two hundred and fifty patients (age range 16–90 years) in a large district general hospital were interviewed evaluating their opinion on a doctor’s bedside manner and formal attire. One hundred and eighty (47.2%) males and 132 (52.8%) females were interviewed. Patients were interviewed in the out-patients department (n = 125), as medical inpatients (n = 78) and surgical (n = 47) inpatients. Patient’s perception on the influence of care received is significantly dependent upon the doctor’s appearance (p < 0.0001) and attire (p < 0.0001). Perception of care received is significantly dependent upon patient age (p < 0.0001) and patient gender (p < 0.0001).

Conclusion: Patients’ perception of doctors’ bedside manner and formal attire are significant factors that influence a patient’s perception of quality of care. This may affect the doctor-patient relationship and may be detrimental.
Two week wait for CRC 0207

The two-week wait policy for colorectal cancer: assessing the accuracy of referral criteria

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Background: The Cancer Plan, introduced in 2001, ruled that patients referred with suspected colorectal malignancies should be assessed within two weeks. We aim to describe the accuracy in cancer prediction for the referral criteria and to look at the pattern of investigations undertaken.

Methods: All patients referred to our Trust under the two-week standard for suspected colorectal cancer between July 2006 and September 2006 were identified. Referral criteria, investigations and results were recorded. Univariate and multivariate regression analysis was performed to identify significant predictive symptoms for cancer.

Results: Three hundred and fifty-eight patients were studied (median age 67 years, range 31–96) of whom 21 (7%) had colorectal cancer. Two hundred and eighty-four patients (79%) were referred for investigations; 171 received radiological imaging (133 had a barium enema, 38 had a CT) and 113 had a colonoscopy.

The following results were obtained:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>No. (%)</th>
<th>Cancers</th>
<th>Multivariate analysis (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal bleeding and persistent change in bowel habit &gt; 6/52</td>
<td>63 (17 6)</td>
<td>9</td>
<td>0.010</td>
</tr>
<tr>
<td>Loose/more frequent stools &gt; 6/52</td>
<td>150 (41 9)</td>
<td>3</td>
<td>0.211</td>
</tr>
<tr>
<td>Iron deficiency anemia</td>
<td>13 (3 6)</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>Abdominal Mass</td>
<td>11 (3 1)</td>
<td>1</td>
<td>0.095</td>
</tr>
<tr>
<td>Rectal Mass</td>
<td>14 (3 9)</td>
<td>5</td>
<td>0.001</td>
</tr>
<tr>
<td>Persistent bleeding + no anal symptoms</td>
<td>19 (5 3)</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>Any combination of ≥ 2 symptoms</td>
<td>88 (24 6)</td>
<td>7</td>
<td>0.223</td>
</tr>
</tbody>
</table>

Weight loss was present in 77 patients, of whom 4 had cancer (p=0.925).

Conclusion: The two-week wait policy for suspected colorectal malignancy resulted in over 100 new urgent referrals per month to a single NHS Trust; only 7% of referrals had a diagnosis of cancer. The suspicion of a rectal mass and ‘rectal bleeding with a persistent change in bowel habit’ are significant in the prediction of cancer.

Two week wait for CRC 0322

Reducing the routine wait for new colorectal patients

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Whittington Hospital, London

Background: It is difficult to distinguish in primary care between patients with trivial or significant colorectal symptoms without using invasive tests. A minority of patients who have colorectal cancer (CRC) present via the Two Week Wait system, and there is a perception that others are at a disadvantage.

This study was designed in response to a challenge from the Cancer Services Collaborative Improvement Partnership (CSCIP) to try to reduce the routine wait to be seen in secondary care to two weeks for all new colorectal patients.

Methods: The routine waiting time for new colorectal patients was measured in one hospital before and after the implementation of three tools designed to reduce this wait. This was a whole systems approach that included: (1) an education programme for general practitioners in autumn 2006 comprising three separate events and written information on how to manage piles and anal fissure in primary care, delivered by a consultant coloproctologist, (2) active clinic management by all colorectal consultants to minimise the use of routine follow-up appointments, (3) introduction of ‘straight to test’ for new Two Week Wait colorectal patients.

Data was collected on routine waiting times, number of GP referrals, new to follow-up ratios, conversion rates from clinic to operation, and waiting times for diagnostic tests.

Results: In the initial study period, April 2006, the routine wait for a new colorectal appointment was seven weeks. In that month 92 new and 148 follow-up colorectal patients were seen (a ratio of 0.62). After the introduction of the three interventions the routine wait fell to three weeks by November 2006. This was associated with a 4% drop in GP referrals to the colorectal clinic. An analysis of the colorectal clinic attendances in December 2006 will be presented and compared with the first study period.

Conclusion: The project has been successful in reducing routine waits for new colorectal patients. Feedback from GPs was very positive. It should be possible to use these techniques to shorten routine waits for colorectal patients and thus provide a service that will meet the 18 week target for 2008 and enable all colorectal patients to be seen promptly.

Note: this study was supported by the Cancer Services Collaborative Improvement Partnership.

Two week wait for CRC 0512

Help or hindrance? Urgent referral guidelines fail to identify patients with colorectal cancer effectively

S. Wakelin, F. Darroch, J. Dreyer

Dumfries & Galloway Royal Infirmary, Dumfries

Background: To aid the referral of patients suspected of having colorectal cancer, national urgent referral guidelines were issued to identify patients most at risk. This study evaluated whether the guidelines were helpful in identifying such patients.

Methods: A single triage point for referral for colorectal patients was established in September 2005. All patients referred to this service between then and August 2006 were included. Urgent appointments were allocated to all patients when the GP requested an urgent appointment, irrespective of meeting urgent criteria, and to all non-urgent referrals that met the urgent criteria.

Results: Over one year 1313 new patients were referred to the colorectal triage service. There were 359 (27.3%) urgent referrals of whom only 218 (60.7%) met urgent referral criteria and 141 (39.3%) failed to meet the criteria. Of non-urgent referrals, 105 (11.0%) met the criteria for urgent referral. In the same period 91 patients were diagnosed with colorectal cancer. Emergency admissions, medical admissions and cancers detected on surveillance colonoscopy were excluded from analysis. Of the remaining 46 patients, 33 (71.7%) were referred and seen urgently. Only 16 (48.5%) of these met the criteria for urgent referral. Thirteen patients (28.3%) with cancer were referred non-urgently. Six were seen urgently because of concerning features but only 5 of the 13 (38.5%) met urgent referral criteria.

Conclusion: National urgent referral guidelines identified less than half of patients with bowel cancer in this study. GP concerns were at least as effective in identifying patients with cancer.
Two week wait for CRC 0549

Decision support pathway in “choose and book” for colorectal referrals- a way forward

S. K. P. John, A. Lister, R. D. Howell, R. J. Lawrance, J. B. J. Fozard
Royal Bournemouth Hospital, Bournemouth

Background: Appropriate prioritisation of colorectal referrals from primary care is a critical factor for timely diagnosis of colorectal cancers (CRC) and other conditions. With the National Choose and Book programme (C&B) primary care is able to access a range of providers and able to book an appointment slot at the time of referral. It is a concern that patients with serious pathology will be lost in this system. This study describes the development of a new approach that endeavours to improve safe referral practice.

Methods: An electronic decision support pathway (DSP) was developed for general practitioners to use at the time of referral. This can be run alongside the new C&B programme. It has been designed to address the twin aims of determining patient referral urgency and optimum referral destination.

Results: An electronic DSP was developed using symptoms and clinical signs. This was developed such that linking of various symptom pathways, clustering of symptoms was given greater weighting than an individual symptom. A total of 8 primary symptom fields were involved. As well as determining referral priority, it also determined whether referral should be surgical or gastroenterology outpatient, or whether direct referral to flexible sigmoidoscopy, colonoscopy or barium enema would be most appropriate. After validation study of the protocol on 300 colorectal referrals including 100 CRC, the protocol was modified. It was found that inappropriate weighting was given to symptoms of weight loss, rectal bleeding and abdominal pain. The final version of the protocol on choose and book takes approximately 2 minutes for GPs to complete on-line. This stratifies patients into two-week wait, urgent or routine referrals and four destinations.

Conclusion: C&B provides a unique opportunity to standardize referral protocols to a unit by bolting on a DSP. This has the potential to ensure that patients with pathology ranging from colorectal cancer to irritable bowel etc are seen at an appropriate time and in an appropriate clinic setting. A pilot study is being carried out for two primary health care trust to compare this new DSP to conventional referral.

Two week wait for CRC 0552

Targeted education and option to use a Decision Support Protocol (DSP) within primary care - Possible solution to earlier diagnosis of colorectal cancer

S. K. P. John, R. D. Howell, A. Arya, J. B. J. Fozard
Royal Bournemouth Hospital, Bournemouth

Background: Only 20% to 28% of colorectal cancers (CRC) are referred as two-week wait referrals (TWW) to this single secondary care centre. We analyse the benefit of targeted feedback of GP referral performance and early use of an electronic DSP in referral of CRC.

Methods: Previous individual performance in terms of number of TWW referrals made, colorectal cancers referred to secondary care and percentage of CRC as TWW were sent out to 228 GPs with their position highlighted with other sites anonymised. This was accompanied by questionnaire to assess awareness about CRC referral pathways. Targeted sessions on use of a DSP were carried out in twenty pilot general practices as well.

Results: The proportion of CRC coming through the TWW route, has dramatically improved without compromising the yield from the TWW referral system (14%).

Two week wait for CRC 0554

Inter-general practice variability in referral of patients suspected of having colorectal cancer – a huge education gap

S. K. P. John1, O. M. Jones1, P. Thomas2, R. D. Howell1, J. B. J. Fozard2
1Royal Bournemouth Hospital, Bournemouth, 2Bournemouth University, Bournemouth

Background: Existing referral system has a low yield for colorectal cancer (CRC). To examine this issue, we assessed referral pattern of 228 general practitioners from 49 general practices within four primary care trusts to our hospital, looking at variability of yield of CRC, use of Two-week wait (TWW) referral pathway and assessed reasons for variability.

Methods: A prospectively collected database of all colorectal cancers was examined for new cases diagnosed in the 12 months from April 1st 2004. Patients were cross-referenced via general practitioner (GP) codes to identify referral origin. Reasons for the variability in referral patterns from each general practice were assessed in relation to TWW referrals, population demographics and through postal questionnaire of GPs.

Results: 175 patients diagnosed with CRC and 534 TWW referrals were referred by 228 GPs from 49 general practices. Whilst there was a positive correlation between the number of TWW referrals and CRC per 1000-practice population (p = 0.001; Spearman correlation coefficient r_s = 0·447, two-tailed), there was a big discrepancy between referrals and cancers diagnosed in many general practices. Twenty-six general practices (35%) had no CRC diagnosed via the TWW route and these practices had significantly lower utilisation of the TWW referral pathway (p = 0.001, Z = −3·313, Mann Whitney U test). Percentage of practice population aged over 60 poorly correlated to yield of CRC & age of GP poorly correlated with use of TWW referral pathway. However increasing age of GP was associated with more CRC patients referred through all routes (p = 0.002, r_s = 0·216). In the postal survey of GPs (57% response rate), while 78% claimed to know the TWW clinics, only 8% of GPs knew the number of referral criteria. Ninety-one GPs (71%) mentioned that they had not received any training on colorectal referral guidelines and over 60% expressed a wish for this to be rectified.

Conclusion: This study demonstrates wide variability within primary care, in the correct use of the TWW system. Variability significantly compromises effectiveness of the TWW pathway. General practices should be targeted for education.

Two week wait for CRC 1086

Triaging for Straight-to-Test (STT) for 2 week Colorectal Cancer (CRC) Referrals – Is it practicable and safe?

M. Javed, S. E. Green, J. S. Varma, I. M. Bain
University Hospital of North Durham, Durham

Results:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total CRC</th>
<th>CRC TWW</th>
<th>%CRC (TWW)</th>
<th>TWW referrals</th>
<th>Yield of TWW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>177</td>
<td>48</td>
<td>27.1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2002</td>
<td>173</td>
<td>35</td>
<td>20.2</td>
<td>244</td>
<td>14%</td>
</tr>
<tr>
<td>2003</td>
<td>190</td>
<td>46</td>
<td>24.2</td>
<td>383</td>
<td>12%</td>
</tr>
<tr>
<td>2004</td>
<td>172</td>
<td>49</td>
<td>28.4</td>
<td>426</td>
<td>12%</td>
</tr>
<tr>
<td>2005</td>
<td>212</td>
<td>59</td>
<td>27.8</td>
<td>560</td>
<td>10.53%</td>
</tr>
<tr>
<td>11 Month</td>
<td>186</td>
<td>82</td>
<td>44</td>
<td>605</td>
<td>14.40%</td>
</tr>
</tbody>
</table>
Background: The ideal pathway for patients with colorectal carcinoma (CRC) is early assessment by experienced clinicians to determine the most appropriate first line investigation followed by prompt initiation of treatment. However seeing patients in the outpatient clinic to decide about further diagnostic tests can be time consuming, delays treatment and increases anxiety. Sending patients straight-to-test (STT) has recently been advocated as a fast track and effective way of early cancer detection. We attempted to look at the feasibility and safety of triaging cancer referrals by STT, on the basis of information provided in the GP referral letter.

Methods: Two hundred cancer 2 week wait referrals to our colorectal department were selected and then divided into two equal groups. Hundred patients were seen in out patients within two weeks (pre group). Hundred patients (post group) were triaged either for STT or our patient clinics (OPC) depending on the information in GP referral letter. Main outcome measures were various diagnostic tests, ASA grade of patients and cancer pick up rate.

Results: There were 100 patients in pre group, 59 in STT and 41 in OPC group. 36% patients in pre group, 24% in STT and 46% in OPC had high ASA grade (3 & 4). 35(35%) patients underwent colonoscopy in pre group, 41(70%) in STT and 17(41%) in OPC groups. CRC was confirmed in 22(22%) patients in pre group, 23(6%) in STT and 2(5%) in OPC groups. There was one laparotomy each in STT and OPC group following bowel perforation and bleeding respectively. No significant complications were noted in post group. There were no breeches in the 62 days target in any of the groups.

Conclusion: Triaging for STT results in a significant increase in number of colonoscopies performed that increases workload on endoscopy services. This also leads to increased chances of high risk patients being triaged to STT and therefore increased possibility of complications. The limitations of referral letters are another area of concern. Despite all this there is no rise in cancer pick up rate. STT does not reflect a practicable and safe system of triage and potential benefits to patients remain questionable.

Two week wait for CRC 0835

The ‘two week wait’ for colorectal cancer- is it worth it? No survival benefit at three years

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1Warford General Hospital, Hertfordshire, 2London School of Economics, London

Background: This study was performed to determine the effectiveness of the “two week wait” in improving survival of patients presenting with colorectal cancer (CRC) to a district general hospital.

Methods: A prospective 6-year audit was performed in a hospital serving a population of 500,000. All patients diagnosed with CRC between 2000 and 2006 were studied. Patients diagnosed with CRC during emergency admission (or operation) or in whom mode of referral was not available were excluded from analysis. Patient demographics, mode of referral, Dukes staging and survival data were collected. Survival at 1 and 3 years was analysed.

Results: A total of 1197 CRC patients were treated, 216 were excluded because of emergency admission and 398 because of incomplete data. Five hundred and eighty three patients were eligible for inclusion, 264 patients (M: F 146: 118, median age 73 years) were standard out patient referrals and 319 (M: F 189: 130, median age 73 years) were referred as a 2-week-wait. There were more Dukes B patients in the two-week-wait referral group (37% versus 26%). There was no significant difference in other Dukes stages between the groups. Lymph node yield were similar for each group (11.5 versus 11.95). At 1 year, there was no significant difference in survival between the two groups (Z test p = 0.6). At three years survival in the two-week-wait group was significantly worse (Z test p = 0.003). This was found to be due to a difference in survival of Dukes C patients (Mantel – Haenszel Test p = 0.001).

Conclusion: The two-week-wait group had a poorer prognosis, perhaps due to the two-week guidelines selecting more aggressive tumours despite similar Dukes’ staging.

Two week wait for CRC 0616

The two week wait system does not work – there is a better way

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1University Hospitals of Leicester, Leicester, 2Mid Cheshire Hospitals, Crewe

Background: The UK government’s fast-track Two Week Wait (2ww) rule and colorectal cancer (CRC) guidelines, introduced in year 2000, aimed to detect patients at high risk of having CRC. The yield of CRC from the 2ww referral route has been consistently poor in most centres in the UK. The guidelines are insufficiently specific resulting in an ever-increasing number of fast-track referrals being processed to pick up a small number of CRCs. A Patient Consultation Questionnaire (PCQ) based numerical scoring system has recently been shown to be an effective tool for identifying high risk patients and prioritising colorectal referrals. The aim of our study was to validate this system in a large and ethnically diverse population and specifically compare it with the 2ww referral system.

Methods: Over a one-year period, all colorectal referrals (2 ww and traditional letters) from General Practitioners (GPs), made to consultant colorectal surgeons and gastroenterologists at the 3 hospitals at our centre, were sent a PCQ to complete and return. The questionnaire asks a detailed symptom history and is linked to a software program to calculate a Weighted Numerical Score (WNS), which reflects the patient’s risk of having CRC. Higher the score, greater is the risk. A WNS was calculated for all patients who returned a completed questionnaire and all such patients were followed through their investigations and diagnosis at the hospital.

Results: A total of 1422 PCQs were returned, of these 83 patients were diagnosed with CRC. The 2ww referrals constituted 35% of all referrals. The WNS score of cancer patients was significantly higher than non-cancers. For similar cancer detection rates (or sensitivity), the specificity of the WNS cut-off of 70 was significantly better than that of the 2ww system. Therefore, significantly fewer fast-track referrals needed to be seen with the PCQ-WNS system than with the 2ww system (Table).

Conclusion: Our study has shown that the PCQ-WNS system improves specificity resulting in improved CRC detection rate in a significantly smaller urgently referred population. Using a WNS of > 70, 225 fewer patients needed to be seen for detecting the same number of CRCs. The PCQ-WNS system can therefore help make better use of limited resources without compromising patient care. We propose a pilot study to evaluate use of the PCQ-WNS system as an alternative to the current 2ww referral system to prioritise colorectal referrals.
Randomised clinical trials 0476

Adhesive intestinal obstruction and incisional herniation following laparoscopic-assisted and open colorectal cancer surgery: a supplementary analysis of the MRC CLASICC trial

1St James’s University Hospital, Leeds, 2University of Leeds, Leeds

**Background:** Adhesive intestinal obstruction (AIO) is a source of morbidity in up to 33% of patients following lower abdominal surgery, with a cost to the NHS estimated as £500 million over 10 years. This study aimed to investigate the influence of laparoscopic (LAP) and open (OPEN) surgery on rates of AIO and incisional herniation (IH) for patients previously recruited to the CLASICC trial.

**Methods:** MREC approval was obtained for the study. Selection criteria were as for the CLASICC trial. Data was captured by case-note review for AIO and IH events and combined with pre-existing data in the CLASICC database. AIO was defined as clinical and/or radiological evidence of small bowel obstruction in the absence of other disease. IH was defined as herniation within a CLASICC related wound or port-site (excluding parastomal herniation). The primary endpoint was AIO readmission rates within 3 years of surgery. Secondary endpoints included AIO readmission rates within 5 years and IH rates within 3 and 5 years. 794 patients were randomised to the CLASICC trial in a 2:1 ratio LAP:OPEN, therefore this study had at least 80% power to detect a difference in AIO readmission rates of at least 3%, from 5% (OPEN) to 1% (LAP). Rates of AIO and IH were calculated as proportions of total operations and events/patient-years at risk. Logistic regression compared proportions, adjusting for tumour site and pre-operative radiotherapy. Preliminary analysis is of data collected to Oct 2006.

**Results:** Permission was obtained for 468 patients to be studied. Complete data was obtained for 359/468 (76.7%) patients: 244 LAP and 115 OPEN. The only difference between the OPEN and LAP groups in terms of patient demographics, premorbid history, and tumour characteristics was an increased incidence of previous abdominal/pelvic surgery in the LAP (87.9%) compared to the OPEN (63.5%) group. More patients with rectal cancer underwent TME resection in the LAP (57.7%) compared to the OPEN (66.0%) group. The median incision length was 210mm (range 70,450) and 98 (range 20,550) in the OPEN and LAP groups. 96 (83.5%) of OPEN procedures used a midline wound compared to 59 (24.2%) of LAP. Regarding the primary end-point, 10 readmissions for AIO occurred within 3 years: 4/115 (3.5%) OPEN versus 6/244 (2.5%) LAP (difference 1%, 95% CI: −2.9, 4.9). This translated into admissions/person-years of 0.012 (OPEN) and 0.008 (LAP). Readmission was more frequent following open colorectal surgery (OPEN 0.015 versus LAP 0.002), but less frequent following open rectal surgery (OPEN 0.007 versus LAP 0.016). The operative technique (OPEN versus LAP) did not significantly impact on rates of AIO or multivariate testing. 31 patients developed IH within 3 years of surgery: 10/115 (8.7%) OPEN versus 21/244 (8.6%) LAP (difference 0.1%, 95% CI: −6.1, 6.3). Multivariate testing revealed wound infection as the sole predictor for IH (Odds Ratio: 5.87, 95% CI: 2.27, 15.19).

**Conclusion:** Compared to lower abdominal/pelvic surgery as a whole, the rates of AIO and IH were low, but similar to other reports in colorectal cancer surgery. LAP surgery was associated with lower rates of both AIO and IH compared to OPEN. Results of the final analysis will be presented at this meeting.

Randomised clinical trials 0543

Randomised controlled trial of patient controlled sedation for colonoscopy

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**Background:** Intravenous sedation for colonoscopy is accompanied by cardio-respiratory complications and prolonged drowsiness and we have previously shown that Entonox is superior to intravenous sedation. Moreover, patient controlled sedation has shown to be effective for various procedures. We aimed to compare patient controlled Entonox inhalation (50% nitrous oxide: 50% oxygen) with patient maintained target controlled Propofol infusion for colonoscopy in terms of analgesic efficacy, psychomotor recovery, patient and endoscopist satisfaction.

**Methods:** All patients undergoing elective colonoscopy except those with colon resection were included. Ethics committee approval was obtained and patients were randomized (with adequate allocation concealment) to receive either Entonox or target-controlled infusion of propofol. Patients in the entonox groups inhaled the gas for 60 seconds before the procedure and then as and when required throughout procedure Patients in propofol group were administered the drug with a target value of 1 μg/ml loading dose and then allowed to sedate themselves using the handset. Sedation scoring was done every 5 minutes during the procedure and every 10 minutes during recovery. Patients completed anxiety score (HAD questionnaire), baseline letter-cancellation test and pain score on 100 mm visual analogue scale (VAS) before procedure. Patients then completed letter-cancellation tests and marked pain assessment on VAS immediately after procedure and at discharge. All patients completed satisfaction survey at discharge and 24-hours post-procedure, when they also marked pain assessment. Secondary end-points measured were completion rates, nurse and endoscopist satisfaction and complication rates. An anesthetist was present throughout the procedure.

**Results:** 100 patients were randomised to receive Entonox (n = 50) or Propofol (n = 50). The median dose of propofol was 174 mg and the median time required to reach the target concentration was 1 minutes. There was no difference in the two groups in terms of pain recorded (Entonox group mean score 20 versus 15, p = 0.3; Mann Whitney U Test) with similar pre-procedure anxiety scores (p = 0.1). Further, there was no difference between the two groups in terms of completion rates, time to coecium, total colonoscopy time and endoscopist and nurse satisfaction. Patient satisfaction was also similar in both groups (mean 98 versus 96). The depth of sedation was higher in the propofol group (median 3/5 compared to 1/5 in the entonox group), with more patients needing assistance for change of position during the procedure as compared to Entonox group (6 versus none; p < 0.05). Psychomotor recovery and hence discharge was faster in the entonox group, though the differences were not statistically significant.

**Conclusion:** There were no complications in both groups.

**Conclusion:** Patient controlled sedation using target controlled Propofol provides greater depth of sedation as compared to entonox; however both techniques are safe and effective for colonoscopy, providing good patient satisfaction and facilitating early discharge. We believe that Entonox should be used for sedation in all patients undergoing colonoscopy with propofol reserved for those requiring higher sedation.

Randomised clinical trials 0328

Bascom’s operation versus cleft closure for the treatment of chronic pilonidal sinus: A prospective 2 centre randomised controlled trial

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**Background:** Bascomb’s operation and cleft closure are still performed widely as first line surgical options for chronic pilonidal sinus. Both have reported comparable clinical outcomes but each has a high rate of recurrence. A prospective 2 centre randomised controlled trial was conducted to compare Bascomb’s operation (n = 50) versus cleft closure (n = 50) for patients with chronic pilonidal sinus. Patients were randomised using sealed envelopes and were stratified by hospital and modified American Society of Anaesthesiologists (ASA) score.

**Methods:** All patients were classified according to modified ASA score, and those with poor wound healing were excluded. Bascomb’s operation was performed as described by Bascomb (1944) and the patients were taught to rotate the cleft closure incision every 10 minutes during the procedure to improve wound healing. Patients were discharged on the day of surgery and follow-up was 3 months. The primary outcome was the rate of recurrence at 3 months and secondary outcomes were patient satisfaction, hospital stay, cost and complication rates.

**Results:** 100 patients were recruited into the trial with 50 in each group. Bascomb’s operation was associated with a lower rate of recurrence (p < 0.05). There was no difference in patient satisfaction, hospital stay or complication rates between the two groups.

**Conclusion:** Bascomb’s operation is an effective and safe surgical option for the treatment of chronic pilonidal sinus and should be the first line treatment option in this group of patients.

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Randomised clinical trials 0531
A randomised trial of one-week triple v quadruple therapy for helicobacter pylori in a rural district general hospital

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Background: Though many surgical treatments are described for chronic pyloroduodenal sinus, each is complicated by failures in primary healing and disease recurrence. Bascom’s operation (BO) has reduced healing failure but recurrent disease remains a problem; Cleft Closure (CC) is aimed at reducing recurrence but at the expense of a more major procedure. We sought to determine which of these procedures was preferred in the management of this condition with severity of disease treatable by either approach.

Methods: 35 patients (17 M, median age 26.8, range 17–51 years) with chronic pyloroduodenal disease were randomly assigned to BO (n = 29) under local anaesthesia, or CC (n = 16) under general anaesthesia. Note was taken of the time to full healing (or healing failure) and the duration of time away from work. All patients were followed up at a mean interval of 2 years (range 3.3–0.7) to assess disease recurrence.

Results: Following BO 5 of 29 did not heal and proceeded to CC at a later stage. The remainder healed at a median of 4, range 3–15 weeks. Following CC 21 of 26 wounds had healed primarily on removal of sutures at 10–13 days. The remaining 5 had healed at a median of 4.5, range 2–5 weeks. Time spent away from work was similar for both operations; BO median 2, range 1–6 weeks; CC median 2, range 0.5–4 weeks. 40/55 (73%) patients were contacted for follow up, disease recurrence occurred in 2/21 (10%) following BO and 0/19 (0%) following CC.

Conclusion: Each operation has been shown to be successful in treatment of this disease and both are done under day surgery conditions. The BO is simpler and may more readily be done using local anaesthesia but healing is more protracted and requires self dressings; healing failure is more common and further surgery may be needed. CC offers more certain healing, a similar time to full healing in those who fail to heal primarily and less frequent need for reoperation. Disease recurrence is more prevalent following BO, which corresponds with previously published series. Judged by these criteria, Cleft Closure is preferred to Bascom’s operation in the management of Chronic Pyloroduodenal Sinus Disease.

Randomised clinical trials 0737
The place of minimal access surgery amongst people with gastro-oesophageal reflux disease – a UK collaborative study. The REFLUX Trial

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Background: The aim of the REFLUX Trial, a large UK multicentre randomised trial (with parallel non-randomised patient preference groups), was to identify the optimal place within the NHS for minimal access surgery amongst people with gastro-oesophageal reflux disease (GORD), whose symptoms would otherwise be managed with long-term medical therapy.

Methods: The study, carried out in 21 hospitals across the UK, was based on a partnership between a local surgeon(s) and gastroenterologist(s) who were uncertain about the best method of treatment for people with GORD. Participants were identified retrospectively or prospectively, and had both documented evidence of GORD (endoscopy and/or manometry/24h pH monitoring) and symptoms for over 12 months. Of the 910 eligible patients who participated, 357 were recruited to the randomised part of the trial (178 allocated to surgery, 179 allocated to continued, but optimised, medical management) and 453 were recruited to the parallel non-randomised preference part (261 chose surgery, 192 chose to continue with best medical management). The type of fundoplication was left to the discretion of the surgeon. The clinical and cost-effectiveness of either early laparoscopic surgery or continued medical management were evaluated by postal questionnaires, sent out at participant-specific time intervals after joining the trial.

Results: Of 178 randomised to surgery, 111 (62%) actually had fundoplication. There was a mixture of clinical and personal reasons for those not having surgery, sometimes related to long waiting times. A total or partial wrap procedure was performed depending on surgeon preference. Complications were uncommon and none were life threatening. Twelve months after surgery, 38% in the randomised surgical group (14% amongst those who had surgery) were taking reflux medication compared with 90% in the randomised medical group. There were substantial differences favouring the randomised surgical group across the health status measures.

Conclusion: In conclusion, surgical management significantly increases general and reflux-specific quality of life measures at least up to 12 months after surgery. Complications of surgery were rare. A surgical policy is, however, more costly than continued medical management. Extending the use of laparoscopic fundoplication to people whose GORD symptoms require long-term medication would provide health gain. However, it is more costly and so judgements are required about cost-effectiveness. The more troublesome the symptoms, the greater the potential benefit from surgery. Uncertainty about cost-effectiveness would be greatly reduced by more reliable information about relative longer-term costs and benefits of surgical and medical policies. This could be through extended follow-up of the REFLUX trial cohorts or of other cohorts of fundoplication patients.
**Methods:** This prospective randomised study compared perioperative feeding with either an O-3 FA (Arm 1) or an isocaloric isonitrogenous (Arm 2) formula. A control group (Arm 3) was managed with no intention to offer supplementary feed. Patients undergoing OGGCS were fed for seven days preoperatively and for seven days postoperatively. HLA-DR expression from venous blood was measured by flow cytometry. T lymphocytes were activated in vitro with phorbol-myristate-acetate for 48 hours. Measurements were performed on days $-7$ ($T_1$), $-1$ ($T_2$), and $+8$ days ($T_3$). Analysis of variance and multiple comparison $t$-test were used for statistical analysis.

**Results:** 16 patients were randomised to arm 1, 14 to arm 2 and 15 to arm 3. In arm 1, mean HLA-DR expression on monocytes increased from 18109 molecules of equivalent soluble fluorochrome (MESF) at $T_1$ to 27995 MESF at $T_2$ ($P = 0.040$), but it fell to 10555 MESF at $T_3$ ($P < 0.001$). In arm 2, it decreased marginally from 26853 MESF at $T_1$ to 25154 MESF at $T_2$ ($P = 0.640$), and it fell to 13605 MESF at $T_3$ ($P < 0.001$). In arm 3, there was a marginal fall during the perioperative period (23588, 20756 and 17679 MESF at $T_1$, $T_2$ and $T_3$ respectively) ($P = 0.160$). The percentage of activated T lymphocytes expressing HLA-DR showed a trend to be up regulated in arm 1. This was 32.3%, 37.7%, and 40.1% at $T_1$, $T_2$ and $T_3$ respectively ($P = 0.140$). In arm 2, there was a marginal fall between $T_1$ (38.1%) and $T_3$ (36.6%), whereas this was more consistent at $T_1$ (29.2%) ($P = 0.100$). There were marginal changes in arm 3 (37.3%, 15.8% and 18% at $T_1$, $T_2$ and $T_3$ respectively ($P = 0.800$).

**Conclusion:** O-3 FA appears to up regulate HLA-DR expression on monocytes prior to surgery. Even if a decreased HLA-DR expression on monocytes was observed postoperatively, there was a trend for up regulation in the ability of these cells to activate T lymphocytes in vitro after OGGCS.

**Randomised clinical trials 0553**

A randomised controlled trial comparing endoscopic sphincterotomy and subsequent laparoscopic cholecystectomy with primary bile duct exploration during cholecystectomy in higher risk patients with cholecodocholithiasis

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**Background:** To compare endoscopic sphincterotomy (ES) and laparoscopic cholecystectomy (LC) with laparoscopic cholecystectomy and bile duct exploration (LCBDE) in patients with higher medical risk. 92 higher risk patients (age > 70, age > 60 with co-morbidity or BMI > 40) with good evidence of bile duct stones were randomised to receive ES followed by LC or LCBDE during LC. Exclusions were emergency ERCP, previous gastrectomy or unfit for general anaesthesia. Primary outcome measure was duct clearance. Secondary measures were complications, number of procedures per patient, conversion and post-operative stay (POS).

**Methods:** 92 higher risk patients (age > 70, age > 60 with co-morbidity or BMI > 40) with good evidence of bile duct stones were randomised to receive ES followed by LC or LCBDE during LC. Exclusions were emergency ERCP, previous gastrectomy or unfit for general anaesthesia. Primary outcome measure was duct clearance. Secondary measures were complications, number of procedures per patient, conversion and post-operative stay (POS).

**Results:** 47 patients were randomised to ES/LC. The mean age was 74 years and 59% were female. There were no significant differences in age, sex, liver function, weight, co-morbidity or maximal ductal stone size between groups though more patients in the ES/LC group presented with colic, 21/47 versus 10/45 ($p = 0.02$). Duodenal stones were found in 83% of patients. Ductal clearance was successful via ERCP in 20/18 patients in the ES/LC group and 18/38 in the LCBDE group ($p < 0.001$). Clavien grade II–V complications occurred in 7/47 and 8/45 patients respectively ($p = 0.708$). The median number of procedures was 2 (1–4) and 1 (1–1), $p < 0.001$, 2/41 and 4/45 required conversion ($p = 0.49$) and the median POS was 3 (1–35) and 5 (1–18) days respectively ($p = 0.304$).

**Conclusion:** The laparoscopic approach to ductal clearance is more effective with fewer procedures than endoscopic sphincterotomy. Postoperative stay, complications and conversion rates are comparable.

**Randomised clinical trials 0577**

Infiltration of wounds and extraperitoneal space with local anaesthetic in patients undergoing laparoscopic totally extraperitoneal repair of unilateral inguinal hernias: a randomised double-blind placebo-controlled trial

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**Background:** The potential benefit of infiltration of the wounds and extraperitoneal space with local anaesthetic in patients undergoing laparoscopic totally extraperitoneal repair (TEP) repair of inguinal hernias remains unclear.

**Methods:** Consenting adults scheduled to undergo laparoscopic TEP repair of unilateral inguinal hernias were recruited to this randomised double-blind placebo-controlled clinical trial of 0.25% bupivacaine (Group I) versus saline (Group II) infiltration of abdominal wounds and the extraperitoneal space. Patients received standardised intraoperative and postoperative analgesia. Pain scores were assessed at 2, 4 and 24 hours postoperatively using the short-form McGill pain questionnaire (SF-MPQ), the McGill Present Pain Index (MPPI) score and the visual analogue scale (VAS), and the analgesic requirements were recorded.

**Results:** Some 39 patients were randomised (Group I, n = 20; Group II, n = 19). The two groups were comparable for age, gender, body mass index, and operating time. Minor complications occurred in one patient in each group. There were no significant differences in the postoperative SF-MPQ scores, MPPI and VAS at 2 hours ($p = 0.244$, $p = 0.527$, $p = 0.454$ respectively), 4 hours ($p = 0.372$, $p = 0.415$, $p = 0.471$ respectively) and 24 hours ($p = 0.109$, $p = 0.068$, $p = 0.064$ respectively) postoperatively. The oral analgesics consumed at 7 days post-surgery were comparable ($p = 0.543$).

**Conclusion:** Infiltration of abdominal wounds and extraperitoneal space with bupivacaine in patients undergoing laparoscopic TEP repair of unilateral inguinal hernias does not offer analgesic benefits.

**Randomised clinical trials 0749**

Randomised clinical trial of bilateral inguinal hernia repair comparing the Stoppa technique with the Lichtenstein method

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**Background:** This study compares the rate of recovery in 2 groups of men undergoing bilateral inguinal herniorrhaphy. In one group bilateral repairs were performed using the Lichtenstein technique. The other group underwent repair with pre-peritoneal mesh inserted via a Pfannenstiel incision (Stoppa technique).

**Methods:** 68 patients with a total of 136 hernias were randomised to either bilateral Lichtenstein repair ($N = 33$) or Stoppa repair ($N = 35$). All operations were performed under general anaesthesia by the same surgeon. Data collected included operative time, length of hospital stay, time to return to daily living (ADL) and return to normal social activities. Pain was assessed using a postal questionnaire. Data are presented as median (range). Statistical analyses were performed using the Mann-Whitney U test. Significance was accepted at the $P < 0.05$ level.
Results:

Table 1: Early outcome measures (* = significant difference)

<table>
<thead>
<tr>
<th></th>
<th>Stoppa</th>
<th>Lichtenstein</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative time (minutes)</td>
<td>40 (26–80)</td>
<td>60 (50–95)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Length of hospital stay (Days)</td>
<td>1 (0–4)</td>
<td>1 (0–5)</td>
<td>0.79</td>
</tr>
<tr>
<td>Return to ADL (Days)</td>
<td>2 (1–28)</td>
<td>2.5 (1–10)</td>
<td>0.95</td>
</tr>
<tr>
<td>Return to normal social activities (Day)</td>
<td>7 (1–20)</td>
<td>7 (1–20)</td>
<td>0.81</td>
</tr>
<tr>
<td>VAS Day 1</td>
<td>5 (1–9)</td>
<td>5 (3–10)</td>
<td>0.45</td>
</tr>
<tr>
<td>VAS Day 7</td>
<td>2 (0–7)</td>
<td>3 (1–8)</td>
<td>0.09</td>
</tr>
<tr>
<td>VAS Day 28</td>
<td>0 (0–3)</td>
<td>1 (0–3)</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Table 2: One year follow-up

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Stoppa (%)</th>
<th>Lichtenstein (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groin Pain</td>
<td>25</td>
<td>46</td>
<td>0.19</td>
</tr>
<tr>
<td>Numbness</td>
<td>14</td>
<td>38</td>
<td>0.11</td>
</tr>
<tr>
<td>Restriction of ADL</td>
<td>18</td>
<td>21</td>
<td>0.77</td>
</tr>
</tbody>
</table>

Conclusion: The Stoppa repair involved a shorter operation. There was no difference in the short-term recovery between the two groups. A high incidence of symptoms was reported at one year in both groups. There was a trend towards a lower incidence of symptoms at one year following a Stoppa repair but it did not achieve statistical significance.
Advanced/metastatic colorectal cancer 0343

Does multi-slice computed chest tomography (CCT) improve detection of pulmonary metastases (Pms) over chest X-ray (CXR) in patients with potentially resectable colorectal liver metastases (PRCLM)?

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Background: The 2006 UK guidelines for PRCLM recommend CCT to exclude PMs, but positive CCT yield following normal CXR is ≤ 5%. PRCLM patients are increasingly referred for pneumonectomy. It is unclear whether this strategy influences PRCLM referral. We reviewed outcomes with regard to detection methods of co-existing PMs, subsequent development of PMs, and long-term outcome among PRCLM patients undergoing hepatectomy.

Methods: Retrospective analysis of a prospectively collected consecutive cohort of 268 PRCLM patients, referred between 01/01/2004 and 31/12/2005, all with 12 month post-hepatectomy follow up. 52 were deemed unresectable, 9 of 28 given chemotherapy became resectable with curative intent. The 188 deemed resectable at time of referral are the subject of this study. All patients had CXR and CT lung bases (included in CT abdomen). CCT was only performed following suspicious CXR or CT lung bases. Post-hepatectomy, CCT was performed at six monthly intervals for a minimum of 12 months.

Results: 13/188 (6.9%) CXRs were suspicious for PMs, confirmed in 12/188 (6.4%). 12/13 were among 18/188 (9.6%) abdominal CTs suspicious for PMs. 14/188 (7.4%) confirmed; 4/188 (2.1%) lesions radiologically benign. Of 170 with both negative CXR and abdominal CT, 23/188 (13.5%) developed PMs within 12 months of hepatectomy. Overall 37/188 (19.7%) presented with, or developed developed PMs. 28/37 (77%) had unresectable chest disease; 9 (23%) of all PMs, 48% overall of patients undergoing hepatectomy underwent pneumonectomy.

Conclusion: The purpose of chest investigations of PRCLMs is to exclude hepatectomy because on the basis of unresectable PMs, or detect potentially resectable PMs. Despite advances in CT technology over the last decade, our CCT yield (4/188 (7.1%)) over CXR (12/188 (6.4%)) was <1% overall, and detection of resectable PMs <5%, no better than a decade ago. Our data suggest that the yield of CCT over CXR to detect potentially curable PMs may not be clinically significant.

Advanced/metastatic colorectal cancer 0697

Can a colorectal multi-disciplinary team appropriately select patients for treatment of hepatic metastases?

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United Bristol Healthcare Trust, Bristol

Background: The liver is the only site of spread in 30–40% of colorectal cancer cases, and of these 20–30% are resectable. National guidelines state that the decision to resect should be made by the regional hepatobiliary unit multi-disciplinary team (MDT). In practice, the colorectal MDT decides which patients to refer for resection. The aim of this study was to audit whether colorectal cancer patients with liver metastases are being correctly referred to the hepatobiliary MDT for liver resection or radio-frequency ablation (RFA).

Methods: This was a consecutive, retrospective audit of all colorectal cancer patients with hepatic metastases between July 2005 and July 2006. Patients excluded from the study were those who had been referred to the hepatobiliary MDT, patients with unresectable local recurrence or extra-hepatic disease, those with an unknown primary or those with liver replacement and abnormal liver function. The casenotes and scans of the remaining patients were discussed with the hepatobiliary surgeon and radiologist to ascertain whether they would agree with the original decision not to refer.

Results: 98 colorectal cancer patients with hepatic metastases were identified. 21 were excluded as their primary was either not colorectal or suspected liver metastases were later disproved with further investigation. Of the remaining 77 patients, 27 had already been referred to the hepatobiliary MDT; 16 had multiple pulmonary metastases; 8 had extra-hepatic disease; 2 had pulmonary and extra-hepatic disease, 1 had liver replacement and 12 were unfit for surgery. The remaining 11 cases were reviewed by hepatobiliary surgeon and radiologist. 7 cases were rejected in agreement with the colorectal MDT because of extensive disease leaving 3 that the hepatobiliary team would have liked to discuss. The type of cases identified were those with synchronous metastases who should have been referred prior to chemotherapy, those with a borderline burden of disease and patients who declined surgery but who could have been considered for RFA.

Conclusion: 94% (72/77) of our colorectal cancer patients with liver metastases are being managed in accordance to national guidelines. However, a small percentage, best described as borderline cases may have benefited from referral. In identifying the characteristics of these patients we have been able to refine our criteria for referral.

Advanced/metastatic colorectal cancer 0340

Are UK colorectal liver metastasis (CRLM) patients with bilobar (BLD) and/or concomitant potentially resectable extra-hepatic disease (CREHD) less likely than their European counterparts to be referred for hepatectomy (HPX)?

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on behalf of the members of LiverMetSurvey, the European colorectal liver metastasis resection registry

Background: HPX offers long-term survival for CRLM patients including those with BLD and CREHD. No comparative prospective data exist to facilitate benchmarking activity of individual centres against peer groups. This study compares CRLM patient demographic data referred to our centre to 35 other European centres using LiverMetSurvey, the European CRLM resection registry.

Methods: Prospective analysis (1991–2006) comparing demographic patient data (365 pts) referred for HPX to our centre with those to the other 35 (3618 pts). Comparing: primary tumour localisation sites; synchronous versus metachronous CRLM detection, unilateral versus BLD, synchronous CREHD; number(s) of metastases; metastasis maximum size (mm); major (≥ 4 segments) versus minor resections performed. Statistical comparison: Fishers Exact Test.

Results:

<table>
<thead>
<tr>
<th>Primary site</th>
<th>R colon</th>
<th>Transverse</th>
<th>L+ S colon</th>
<th>Rectum</th>
<th>Multiple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ours</td>
<td>73 (20%)</td>
<td>13 (3.6%)</td>
<td>122 (33.4%)</td>
<td>157 (43%)</td>
<td>0</td>
</tr>
<tr>
<td>Other 35</td>
<td>546 (15.4%)</td>
<td>110 (3.1%)</td>
<td>1520 (42.9%)</td>
<td>1327 (37%)</td>
<td>41</td>
</tr>
</tbody>
</table>

Our pts. versus others: 154 (42%) detected synchronously versus 1788 (47%) (p < 0.05), BLD 104 (27%) versus 1615 (17.8%) (p < 0.05), CREHD 10 (1.9%) versus 475 (5.3%) (p < 0.05), Major HPX 113 (17.4%) versus 1646 (31%) (p < 0.05).

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Advanced/metastatic colorectal cancer 0464

Long term outcome of portal vein embolisation prior to major hepatectomy for colorectal cancer liver metastases

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**Background:** Preoperative portal vein embolisation (PVE) can be used to increase the remaining liver parenchyma volume before major liver resection. There are few reports on long term outcome of liver resection following preoperative PVE for colorectal cancer (CRC) liver metastases. The aim was to assess feasibility, risks and long term outcomes of preoperative portal vein embolisation prior to major hepatectomy for colorectal cancer liver metastases.

**Methods:** Over a period of seven years thirty six patients underwent preoperative PVE before resection of four or more liver segments for CRC liver metastases. PVE was performed when the future liver remnant (FLR) assessed by MRI scan volume was less than 30%.

**Results:** PVE was feasible in all patients. PVE significantly increased the FLR volume. The median FLR pre PVE was 295 ml (range – 110–588) and increased post PVE to 404 ml (range – 239–653) p < 0.001. Liver resection was performed after PVE in 22 patients (61%). The mortality and morbidity was 4.5% and 27% respectively. The 1, 3, and 5 year actuarial survival was 90%, 50%, and survival after liver resection was 95%, 80%, 50%

**Conclusion:** PVE allows patients with unresectable liver metastases to be considered for resection. Long-term survival comparable to that of resection without PVE can be achieved.

Advanced/metastatic colorectal cancer 0993

**Results of radiofrequency ablation in 264 patients with colorectal liver metastases**

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**Background:** Surgical resection can result in 5 year survival of 30–40% in selected patients. However, the majority of patients are inoperable often due to multiple medical co-morbidities. Rapid advances in chemotherapy have seen survival improve from >1 year to a median survival of 20–24 months. Radiofrequency ablation (rfa) is a locally destructive technique that has been successfully applied in primary hepatocellular carcinoma and is gaining acceptance as a therapeutic option in patients with inoperable liver metastases. We report our updated survival figures in 264 patients with colorectal liver secondaries.

**Methods:** Patients were treated with water-cooled single, triple or 2–3, simultaneously activated single electrodes in conjunction with a 200 W generator (Tyco Healthcare, Burlington, MA). Standard procedure was general anaesthesia, an overnight stay in hospital and US and CT image guidance and monitoring. Pre-procedural CT was used to define the number and size of liver lesions. Patient survival was obtained from primary care or referring physicians. Survival post rfa was stratified by disease extent at the time of treatment.

**Results:** 264 patients were treated, the mean number of metastases was 3.8, mean diameter of the largest lesion size 3.7 cm, 14% had extra-hepatic disease at the time of treatment. Reasons for inoperability included distribution of disease, medical co-morbidity, and predicted inadequate liver reserve post resection. Overall median, 3 and 5 year survival was 33 months, 46% and 18% and in 108 patients with five or fewer tumours, maximum diameter 5 cm and no extra-hepatic disease survival was 45 months, 67% and 32%. A small subgroup of 40 (15%) patients with > 5 cm, solitary lesions had median survival of 45 months, 76% and 48% from ablation and 63 months, 87%, and 58% from diagnosis.

**Conclusion:** RFA is an effective method for the local destruction of metastases and appears to offer survival benefit for patients with inoperable disease.
Advanced/metastatic colorectal cancer 0735

Peritoneal procedures for peritoneal carcinomatosis of colorectal origin

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Background: Colorectal cancer (CRC) occasionally (8–10%) gives rise to transcoelomic spread leading to peritoneal carcinomatosis (PC). Until recently, PC was considered a terminal condition palliated with systemic chemotherapy. More recently, NICE have recommended cytoreductive surgery with heated intraperitoneal chemotherapy (HIPEC) as a treatment option for PC of colorectal, gastric and ovarian cancer. A recent consensus revealed that 80% of experts recommend macroscopic peritonectomy as appropriate for PC. This report outlines the safety and outcome of patients with PC of CRC origin treated at a UK specialist centre and specific surgical techniques used.

Methods: Mortality and mortality was recorded in a prospectively collected database (2003 to 2006). Progression-free survival was calculated using Kaplan-Meier estimates.

Results: From the 48 patients (all pathologies) undergoing the Sugarbaker procedure in this period, 8 patients had PC of colorectal origin. All 8 patients had at least one peritonectomy procedure combined with colonic resection. Two patients had more than one peritonectomy procedure. There were no perioperative deaths. There were no major complications but minor complications occurred in 3 patients. The median progression free survival was 11.6 months.

Conclusion: Peritoneal surface malignancies represent a group of secondary malignancies, which if untreated, are associated with very poor survival. There is an urgent need to invest in training and the accreditation of units to offer this treatment safely in the UK.

Advanced/metastatic colorectal cancer 0710

The apical node: time for a change in policy?

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Background: Adjuvant chemotherapy is standard management for node-positive colorectal tumours. Involvement of the apical node, ApN, has been reported to have a poor prognosis and the benefits of adjuvant chemotherapy in this group remain unproven. We compared 5-year survival of patients with N2 tumours, (≥4 positive nodes or involvement of apical node) and those with distant metastases at presentation.

Methods: We analysed 352 patients who underwent resection of a left-sided colorectal cancer between 1999 and 2003. Patients with positive resection margins, 54/352 (15%) were excluded from the analysis. M:F 8:5, median age 70 years (39–99 years). Rectal cancers accounted for 54% (160/298). Patients with N2 tumours were identified from the histology report and were from other causes at 45 months. Median overall survival for all 18 RRM positive patients was 17 months (range 1–69).

Results: Of the 18 RRM positive patients, 11 (61%) had isolated local recurrence that might have benefited from radical local surgery may be of benefit in a small proportion of patients but the approach should be considered in the management of patients with a positive apical node.

Conclusion: Patients with a positive apical node have a significantly poorer overall survival than conventional N2 patients and an equivalent survival to patients with distant metastases at presentation. Conventional adjuvant therapy in this patient group does not appear to modify the dismal prognosis. A palliative approach should be considered in the management of patients with a positive apical node.

Advanced/metastatic colorectal cancer 0164

Retroperitoneal margin involvement in right sided colorectal cancer

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Background: Involvement of the circumferential resection margin is a prognostic indicator for local recurrence and survival following surgery for rectal cancer and forms the basis of patient selection for adjuvant therapies. The influence of margin involvement of the retroperitoneal surface of right sided cancers on local recurrence and survival is unknown.

Methods: Patients undergoing right hemicolectomy for colorectal cancer between 1998 and 2005 were identified from a prospective histopathology database. Histological details of the resected cancer were combined with clinical details and survival data obtained by case note review. Positive involvement of the retroperitonectomy section margin (RRM) was defined by tumour encroachment to ≥1 mm.

Results: A total of 228 patients underwent right hemicolectomy for colorectal adenocarcinoma. The cancer was situated in the caecum in 145 specimens and in the ascending colon in 83 specimens. Tumour involvement of the RRM was present in 19 (8.5%) of specimens. Clinical data was unavailable in 1 patient with a positive RRM. Of the remaining 18 RRM positive patients, distant disease was present in 9 (50%) at presentation (7 (38.8%) liver, 3 (16.7%) peritoneum, 4 (22.2%) lungs). None of the cancers was staged T1/T2, 5 (26.6%) were T1, and 14 (73%) were T4. 16 (88%) had node positive disease. 10 (55.6%) underwent adjuvant chemotherapy and 2 (11.1%) radiotherapy. Of the 9 patients with disease confined to the colon at presentation, 7 (89%) developed recurrent disease with 5 (55.6%) having distant dissemination and 2 (22.2%) isolated local recurrence. Thus, only 2 out of the 18 (11.1%) RRM positive patients developed isolated local recurrence that might have benefited from more aggressive initial surgery. The median disease-free survival was 24 months (range: 5–26). 2 patients remained disease-free, 1 alive at 38 months and 1 dead from other causes at 45 months. Median overall survival for all 18 RRM positive patients was 17 months (range 1–69).

Conclusion: Involvement of the RRM in right sided colorectal cancer is associated with a high rate of metastatic spread and a dismal prognosis. More radical local surgery may be of benefit in a small proportion of patients but the mainstay of treatment remains systemic chemotherapy.

<table>
<thead>
<tr>
<th>Status</th>
<th>Patient number</th>
<th>Median survival (months)</th>
<th>P value (Mantel-Cox)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2/ApN+</td>
<td>11</td>
<td>20</td>
<td>—</td>
</tr>
<tr>
<td>N2/ApN−</td>
<td>28</td>
<td>40</td>
<td>0.006</td>
</tr>
<tr>
<td>Metastases, M1</td>
<td>18</td>
<td>16</td>
<td>0.564</td>
</tr>
</tbody>
</table>

*Compared to survival for N2/Apical node positive patients
Laparoscopic surgery

Laparoscopic surgery 0355
Variation in surface marking of superior epigastric vessels. A guide to safe laparoscopic port insertion
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Background: Damaging superior epigastric artery (SEA) is not uncommon during laparoscopic trochar placement, drain insertion in cardiothoracic surgery or the percutaneous endoscopic gastrotomy. It may result in rectus abdominis haematoma formation, increased incidence of post-operative infection and may consequently lead to incisional hernia. Also damage to the SEA may lead to failure of the trans-rectus abdominus muscle (TRAM) flap, if needed at a later stage.

Current descriptions of the course of the SEA do not provide surface landmarks which would be of help to the surgeon. This study aimed to map surface markings for the SEA and identify the 'danger zone', which must be avoided during laparoscopic surgery.

Methods: The study was conducted in the anatomy department of the royal college of surgeons of Ireland. It involved dissection of 17 preserved cadavers. The posterior surfaces of the anterior abdominal walls of the cadavers were dissected. The surface anatomy of 34 SEAs and their branches was defined. The position of the right and left SEA was measured from the midline at the commonest sites of injury – at the level of the xiphoid process and midway between the xiphoid process and the umbilicus. The danger zone was identified by calculating the mean and standard deviation, and also considering the range.

Results: The mean distance of the SEA from the midline at the level of the xiphoid process was 4.3 cm (SD +/- 0.2 cm). The range was 3.9 cm to 4.8 cm. Thus the safe zones are the midline, midline to 3 cm (SD +/- 0.5 cm). The range was 3 cm to 4 cm from the midline. Thus the safe areas are either medial to 4 cm or lateral to 7.5 cm from the midline.

Conclusion: By avoiding these danger zones, the incidence of damage to major trunk of SEA and the associated complications can be significantly reduced.

Laparoscopic surgery 0411
Antireflux surgery in the West of Scotland: an audit of surgical experience during the introduction of laparoscopic surgery
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Background: This audit aims to describe our experience of the introduction of laparoscopic antireflux surgery in a West of Scotland population.

Methods: Between October 1996 and August 2002, 557 consecutive patients underwent anti reflux surgery in the West of Scotland. This was carried out in 9 hospitals by 12 surgeons. We prospectively recorded data for all patients undergoing antireflux surgery on: demographics, indications for surgery, operative details, peri-operative complications and mortality.

Results: 557 patients had antireflux surgery with a median age of 45 (range 16–83 years). The most common indication for antireflux surgery was failure of medical therapy (59%), followed by avoidance of long term proton pump inhibitor treatment (17%). 514 patients (92%) had a laparoscopic procedure with 10 conversions (0.2%) to open surgery. In the laparoscopic group 55% were Nissen fundoplications, 35% were Toupet (posterior partial fundoplication) and 5% were Watson (anterior partial fundoplication). 74% had a crural repair and short gastric arteries were divided in 4% of patients. Significant peri-operative complications were oesophageal perforation (0.4%), gastric perforation (0.2%), splenectomy (0.5%), and post operative bleeding (0.2%). Early post operative complications were chest infection (1.8%), wound infections (0.4%) urinary retention (1.1%) and cardiac complications (0.5%). Late complications were dysphagia requiring dilatation (4.3%), incisional hernia (0.7%) and patients requiring revisional surgery within the first year (1.8%). Mortality was 4/557 (0.7%). 2 in the laparoscopic group (MI, age 36 and 49 within 24hours post op) and 2 in the open group (1 gastric perforation age 34 and 1 with unknown cause age 52).

Conclusion: During the introduction of minimal access surgery we observed a low morbidity and mortality in our laparoscopic antireflux patients. There was a low conversion rate to open surgery. We conclude that laparoscopic antireflux surgery is a safe procedure with low morbidity and should be considered an alternative to medical therapy in the treatment of gastrooesophageal reflux disease.

Laparoscopic surgery 0707
Current practice and results from minimally invasive gastro-oesophageal cancer surgery in the UK
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Background: Minimally invasive resection is increasingly performed for cancer of the stomach and oesophagus. Few randomised controlled trial data are available, practice varies widely and the value of the techniques is controversial. We have therefore formed a co-operative group with the objectives of sharing data on procedures performed and moving towards agreement on a randomised trial design. We report here the results reported from centres already performing this surgery before the database was set up.

Methods: An online database was developed using a consensus meeting and expert discussion via e-mail. Centres with previous experience were invited to register data with the database. A research fellow visited centres and independently verified data from case records.

Results: 126 Cases have been recorded from 7 centres during 1996–2006. The conversion rate was 3.8% for gastrectomy (n=26) and 3.0% for oesophagectomy (n=100). The mean leak rates, R0 resection rates and nodal yields, median hospital stay and mortality are shown in the Table. Oesophagectomies were performed by thoracoscopic & laparoscopic (13), laparoscopic plus neck (11), laparoscopic and right thoracotomy (15), prone thoracoscopic and laparoscopic (38), laparoscopic transthoracic (32), 1 of 26 distal or subtotal gastrectomies was hand assisted.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Leaks</th>
<th>R0 resection</th>
<th>Node yield</th>
<th>Hospital stay</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oesophagectomy</td>
<td>4.0</td>
<td>77.9</td>
<td>16.1</td>
<td>15.0 days</td>
<td>6.0</td>
</tr>
<tr>
<td>Gastrectomy</td>
<td>4.0</td>
<td>87.5</td>
<td>10.3</td>
<td>6.5 days</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Conclusion: Minimally invasive resection appears feasible for both oesophageal and gastric cancer. Benefits, indications and optimal techniques have not yet been determined. Further prospective data collection, leading to randomised trials, is required.

Laparoscopic surgery 0412
Laparoscopic antireflux surgery in a West of Scotland population improves symptom score and has a high rate of patient satisfaction
J. Gray, C. Craig, A. Urie, G. Fullarton
Gartnavel General Hospital, Glasgow

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Laparoscopic surgery 1184

Laparoscopic assisted distal gastrectomy (LADG) for early gastric cancer: Is it an alternative to open approach (ODG)?

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Background: This study aimed to compare LADG versus ODG in the treatment of early gastric cancer patients.

Methods: Meta-analysis was used for analysis of data on 951 patients, extracted from twelve studies, including three RCTs, published between 2000 and 2006 comparing LADG (54.2%) versus ODG (45.7%) in early gastric cancer patients. Study end points were overall operative morbidity, mortality, number of lymph nodes harvested, operative time, blood loss, post-operative hospital stay, pain, fever, time to oral intake and flatus and post-operative adverse events.

Results: Overall morbidity rate was significantly reduced in the LADG versus ODG group (10.5% versus 20.1%, OR 0.52, P = 0.003) with 4.3 fewer lymph nodes harvested in the laparoscopic group (P < 0.001). LADG patients had 151 mls less operative blood loss (P < 0.001) and a shorter length of hospital stay by 5.7 days, P < 0.001). Operative time was significantly less in the ODG group by 53-48 minutes. Post-operative normalization of the WBC count and CRP was significantly faster in LADG group. There was no significant difference between the two groups in terms of postoperative anastomotic stricture, leakage rate or post-operative wound infection. Sub-group analysis of high quality studies (RCTs) revealed similar results but with no significant difference in terms of blood loss, time to oral intake, time to flatus, length of hospital stay, and post-operative intestinal obstruction.

Conclusion: Laparoscopic assisted distal gastrectomy has less overall postoperative morbidity and enhances post operative recovery when compared to open surgery. It may be an alternative to open surgery for early tumours when extensive lymphadenectomy may not be required. However, due to observed heterogeneity of some of the studies, there is a need for high quality randomised trials with long term follow up to evaluate late outcomes and to validate oncological efficiency of LADG.

Laparoscopic surgery 0455

Mid-term outcome of laparoscopic surgery for Crohn’s disease

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Background: Laparoscopic surgery has been reported to be feasible in selected patients with Crohn’s disease (CD) with favourable short-term outcome. However, its mid- or long-term outcome has not yet been clarified. The aim of this study was to clarify the mid-term outcome of laparoscopic surgery for CD.

Methods: Between September 1994 and December 2005, a total of 125 patients (98 male and 27 female) underwent 144 operations (98 laparoscopic and 46 open surgery), and these formed the basis of this study. Vienna classification was used to classify the CD according to the location and type of the disease (L1: Terminal ileum L2: Colon L3: Ileocolon L4: Upper GI B2: Strictureing B3: Penetrating). Mid-term outcome was evaluated by the recurrence of the disease requiring operation, and the cumulative recurrence rate was calculated using Kaplan–Meier method.

Results: The median age and the follow-up period were 32 years old and 55 months. There were no differences between the laparoscopic and open surgery groups in the patients’ background including age, gender, smoking history and the follow-up period. However, the incidence of terminal ileum disease (L1) was higher in the laparoscopic than open surgery group. The incidence of penetrating disease (B3) and recurrent CD was higher in the open surgery than laparoscopic surgery group. The cases of L1, B3, recurrent CD were not risk factors for reoperation. The 5-year cumulative reoperation rate in the total cases was 23.9% in the laparoscopic surgery and 18.4% in open surgery, without any significant differences (p = 0.905). There were no significant differences in the recurrence rate between the two groups within each subgroup of L1, B1, or recurrent CD.

Conclusion: There were no significant differences in the recurrence rate between the laparoscopic and open surgery groups. It was clarified that mid-term outcome of laparoscopic surgery for CD was favourable.

Laparoscopic surgery 0457

Impact of metabolic syndrome on short-term outcome of laparoscopic surgery for colorectal cancer

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Background: Metabolic syndrome (MS) is a constellation of cardiovascular and metabolic risk factors that includes visceral adiposity, hypertension, insulin resistance, and dyslipidemia. This study was conducted to clarify the association between the outcome of laparoscopic surgery for colorectal cancer and MS, comparing to body mass index (BMI).

Methods: Waist circumference (WC), which is one of the factors in the definition of MS, were preoperatively measured in consecutive patients with colorectal cancer undergoing laparoscopic surgery from June 2004 to February 2006. MS for the Japanese was defined as WC ≥ 85 cm for men or ≥ 90 cm for women, and two or more of the following risk factors: 1) diastolic hypertension; 2) hypertension, 3) fasting plasma glucose ≥ 110 mg/dl. Generally obese (GO) was defined as a BMI of 25 kg/m2 or more.

Results: A total of 98 patients (72 with colon and 26 with rectal cancer) with a median BMI of 23.2 kg/m2 were included and divided into the MS group (n = 19) and the non-MS group (n = 79), or the GO group (n = 30) and the non-GO (n = 68) group. The operating time was significantly longer in the MS group than in the non-MS group (224 min. versus 178 min.; P = 0.015). Overall

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and systemic complications were significantly more frequent in the MS group than in the non-MS group (63.2% (12/19) versus 29.1% (23/79); \( P = 0.008 \), 21.1% (4/19) versus 3.8% (3/79); \( P = 0.025 \)), but there was no significant difference for the rate of surgical complications between the MS group and the non-MS group (47.4% (9/19) versus 25.3% (20/79)). The length of hospital stay was significantly longer in the MS group than in the non-MS group (10 days; \( P = 0.05 \)). Univariate analysis for the overall complication identified two risk factors: regular smoking and MS. In the multivariate analysis, MS (odds ratio (OR) 3.8 (95 per cent confidence interval (c.i.) 1.3 to 11.3), \( P = 0.016 \) and smoking (OR 1.7 (95 per cent c.i. 1.1 to 10.0); \( P = 0.011 \)) were the independent risk factors for the development of postoperative overall complication. There were no significant differences between the GO and the non-GO groups.

**Conclusion:** Detection of MS in patients may be useful for risk stratification for laparoscopic surgery for colorectal cancer.

**Laparoscopic surgery 1176**

**Laparoscopic colorectal surgery: Does early discharge translate to early recovery?**

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**Background:** Laparoscopic colorectal surgery has consistently been shown to lead to a shorter hospital stay than conventional open surgery. We assessed the social and functional benefit of patients undergoing laparoscopic colorectal resections following their discharge from hospital.

**Methods:** Based of information from a prospectively maintained colorectal database, consecutive patients who underwent a colorectal procedure under a single surgeon were sent postal questionnaires, enquiring about their postoperative functional and social recovery following discharge from hospital. Quality of life was assessed using the validated Cleveland Global Quality of Life score (CGQL). This data was added to and correlated with previously stored information and analysed. Open and laparoscopic colorectal resections were thereby compared.

**Results:** 133 patients were identified. Excluding current inpatients and those that had died, 118 questionnaires were sent out, and a total of 87% were completed. There were 38 right sided resections, 23 left sided resections, 31 rectal procedures, 14 subtotal colectomies and 12 other colorectal operations performed. On an intention to treat basis, 14 under went an open procedure and 89 a laparoscopic approach (4 of whom were subsequently converted to an open procedure). The Cleveland Global quality of Life Score improved post operatively in all groups but there was no difference between the open and laparoscopic groups. The median times to normal diet, driving, ability to walk one mile, and return to work were 21 (\( p < 0.05 \)), 14 (\( p < 0.05 \)), 47 (\( p < 0.01 \)) and 33 (\( p < 0.05 \)) days longer in the open group (Mann-Whitney U Test).

**Conclusion:** Subjective recovery appeared similar to open cases when scored using the CGQL score. Patients undergoing a laparoscopic colorectal resection can expect to return to full work and social activity up to one month quicker than their open counterparts. This has major social and financial implications both for both patients and society alike.

**Laparoscopic surgery 0300**

A survey of inguinal hernia repair in Wales with special emphasis on laparoscopic repair

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Royal Glamorgan Hospital, Llantrisant

**Background:** The National Institute of Clinical Excellence (NICE) recently published its guidance on the use of laparoscopic repair for inguinal hernias. This study aimed to assess the likely uptake of laparoscopic surgery for inguinal hernias in Wales. In addition the current practice with regards to day case surgery, use of local anaesthesia (LA), antibiotic prophylaxis, thromboembolic (TE) prophylaxis and advice regarding convalescence was assessed.

**Methods:** A postal questionnaire survey of all consultant surgeons (\( n = 91 \)) in Wales was performed.

**Results:** There was a 70% (\( n = 67 \)) response to the questionnaire. 15% (\( n = 9 \)) of surgeons perform laparoscopic inguinal hernia repair in Wales. 10% of surgeons in Wales agreed with the NICE guidance. Lichtenstein repair was the most commonly used technique to repair primary inguinal hernias in Wales (82%). No surgeon currently is using a laparoscopic repair as the technique of choice for repair of primary inguinal hernias. 18% of surgeons perform all procedures as day cases. 15% perform > 90% of the procedures under LA. 44% of surgeons do not use any form of TE prophylaxis, while 78% used routine antibiotic prophylaxis. Postoperative advice regarding convalescence was highly variable.

**Conclusion:** The uptake of laparoscopic surgery for inguinal hernia repair in Wales is low. Only a minority of surgeons agree with the NICE guidance. Similarly the uptake of day case repair and the use of LA are minimal. The use of antibiotic and TE prophylaxis is empirical and inconsistent. There is a need for evidence based guidelines to standardise the antibiotic prophylaxis, TE prophylaxis and advice regarding postoperative advice.

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Cost and quality 0628

Million pound vascular workload in a district general hospital

M. Ghosh-Dastidar, A. Kharay, P. Bharania, J. Eaton, J. Gennari, J. Derodra, S. Vig
Mayday University Hospital, Croydon

Background: Centralisation of vascular services onto a single site is not possible in most SHAs for logistical reasons. Networks of vascular specialists, providing a service for 800,000–1,000,000, are an alternative solution. The Vascular Society suggests that regardless of whether vascular services are centralised or in a network, outreach services need to be provided for venous disease, venous ulcers, diabetic feet and in-patient consultation services that can be delivered more locally. The aim of this paper was to analyse the value of revenue generated within a District General Hospital (DGH) within a vascular network by two vascular surgeons for inpatient activity.

Methods: All inpatient activity under the two surgeons was collected prospectively between 1/1/06 and 30/09/06. Assigned ICD (international classification of disease) coding was checked and corrected weekly. All finished consultant episodes (FCEs) for the two vascular surgeons were then identified from the Patient Administration System database between 1/1/06 and 30/09/06. The PAS data was crosschecked against the internal audit database to ensure that all activity had been identified and coded correctly. Vascular activity under the care of other consultants was not included within this study.

Results: Patients had multiple FCEs within a hospital spell and so each FCE was interrogated to identify the dominant Healthcare Resource Group (HRG) tariff and resulting revenue. The length of stay was also analyzed and additional revenue generated by long stay patients was identified. Short stay trim points were also applied to the tariffs. 534 FCEs were identified generating total revenue of £111,428.

Conclusion: These data suggest that at least 1.5 million pounds will be generated by vascular workload at a DGH site per annum. This workload needs to be supported locally as patients expect ‘Care closer to home’ and many DGHs struggling to balance books will not sustain this loss of revenue.

Cost and quality 0725

The cost effectiveness of laparoscopic colorectal surgery

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1 Minimal Access Therapy Training Unit, Guildford, 2 Royal Surrey County Hospital, Guildford, 3 University of Surrey, Guildford

Background: Laparoscopic surgery is increasingly being used for colorectal procedures. However, studies comparing laparoscopic and open colorectal surgery, have thus far failed to show significant differences between the 2 techniques with regards to the quality of life (QoL) of patients during their recovery. NICE have concluded that in order for laparoscopic surgery to be considered cost effective, the QALY gain associated with laparoscopic surgery, which exceeds the NICE threshold of 0.010. SF36 confirms the EQ5D results with a statistically significant difference in favour of the laparoscopic approach on days 6, 28, and 42.

Conclusion: This study demonstrates that there is a significant advantage with laparoscopic colorectal surgery in terms of the QoL of patients during their recovery. Using the EQ5D scores to calculate QALYs reveals that laparoscopic colorectal surgery is cost effective when compared to open surgery.

Cost and quality 0923

Management of colonic polyps – a strategy to improve compliance with national guidelines

Mayday University Hospital, Croydon

Background: The BSG have laid down guidelines for surveillance colonoscopies in patients with large bowel adenomatous polyps. However, numerous studies have shown the gross over-utilization of colonoscopic services in their management. We audited our practice of polyp management and evaluated the benefits of ‘prominent display of BSG guidelines in the clinic’ on our practice. Additionally, we evaluated the impact of enforcing these guidelines on our colonoscopic waiting lists.

Methods: All patients diagnosed with large bowel polyps over a two-month period were included in the first loop of the audit. Data on the colonoscopic findings, histology and management were retrieved from paper and on-line records. The BSG guidelines were printed, laminated and prominently displayed in each of the colorectal clinics. Following this, we re-audited (second loop) our practice over two months.

In the second part of the study we randomly retrieved 533/1800 case notes from our colonoscopic waiting list. Those on surveillance for colonic polyps were included. Compliance was ascertained as regards need for procedure and appropriateness of surveillance interval.

Results: 54 patients were diagnosed with colonic polyps in the first loop and 59 during the second loop of the audit. A total of 61 patients were excluded as they either had hyperplastic polyps (57 patients) or had insufficient data for assessment. Guidelines were followed in 16% (4/25, 95% CI 0.054–0.33) of patients in the first loop and 46.5% (13/28, 95% CI 0.293–0.642) in the second loop (p = 0.017).

In the second part of the study 214/533 patients were on the waiting list for polyp surveillance. 31 were excluded due to insufficient data, 25/183(14%) satisfied guidelines. Of those that did not satisfy guidelines, 47.5% (75/158) did not require any further surveillance and the remaining were booked for a procedure earlier than recommended. Enforcing the guidelines shortened the waiting list by 30% and waiting times by 3 months (assuming 6 procedures/session and 6 sessions per week). Cancelling unnecessary procedures will save at least £40,000.

Conclusion: Adherence to guidelines has significant cost and waiting-time benefits. Simple measures like the one we used can improve compliance. Strategies for successful enforcement of guidelines need to be an integral part of guideline formulation. Audit of individual practice is recommended.

Cost and quality 0729

The cost of minimally invasive oesophagectomy is equivalent to open surgery

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Background: It is often perceived that minimally invasive procedures involving disposable equipment are more expensive than the equivalent open surgery. As a consequence, development of advances in surgical practice may be discouraged. The aim was to compare the relative costs of minimally invasive oesophagectomy (MIO) and traditional open surgery.

Methods: MIO has been the procedure of choice for oesophageo-gastric resection in our unit since 2004. This involves thoracoscopic oesophageal mobilisation, laparoscopic gastric mobilisation and conduit formation with open cervical anastomosis. We compared the total cost incurred for MIO, with that of open Ivor-Lewis oesophagectomy performed prior to 2004. Data relating to all variables contributing to both the operative cost and subsequent in-patient care were collected.

Results: Fifty patients underwent MIO between April 2004 and July 2006 (mortality 2%), thirty patients underwent open surgery between January 2002 and November 2003 (mortality 3%). Both groups had comparable demographic status and pathological staging as well as similar complication rates. The median cost for the surgical procedure was £3,763 (range £2,591–£8,080) for MIO compared to £2,537 (range £2,517–£6,152) for open surgery. Differences were attributable to the use of disposable devices. In-patient care expense was dependant on the total length of stay, utilisation of intensive care and transfusion requirements, with a median cost of £4,480 (range £2,560–£11,114, 318) and £4,530 (range £2,240–£8,145, 153) in the groups respectively. The overall median cost for MIO was £7,885 (range £6,116–£11,19, 135), similar to open oesophagectomy, £7,017 (range £5,018–£8,52, 499) with no statistically significant difference observed, and within the national tariff code FO1 (£9,049) for oesophagecetomy.

Conclusion: The cost of MIO is equivalent to open surgery. Utilisation of intensive care facilities as a consequence of complications can lead to increased expenditure for all patients. Objections to the development of MIO based on financial resources cannot therefore be justified.

Cost and quality 0407
Paid work increases and state benefit claims decrease after bariatric surgery
S. Hawkins, A. Osborne, I. Finlay, S. Alagaratnam, J. Edmond, R. Wellbourn
Dept. Upper Gastrointestinal Surgery, Mugee Park Hospital, Taunton

Background: Bariatric surgery is a clinically effective treatment for obesity and has been shown to be cost effective. The impact of bariatric surgery on the subsequent ability to work and the uptake of state-funded benefits is not well documented.

Methods: A consecutive series of 79 patients who had undergone laparoscopic Roux en Y gastric bypass (LRYGB) or laparoscopic adjustable gastric banding (LAGB) were surveyed to assess changes in their ability to work and the number of weekly hours they work increases. After surgery patients claim fewer state benefits. The results suggest that after bariatric surgery patients can expect similar employment prospects to the rest of society with benefit claims also reverting to levels comparable with population norms. The findings may be useful in estimating the wider effects of bariatric surgery.

Cost and quality 0626
VAC therapy enhances patient independence and revenue generation
R. D. Bhatte, A. Kharyar, P. Bharania, T. Pacha, J. Gennari, J. Derodra, S. Vig
Mayday University Hospital, Croydon

Background: The V.A.C.® System delivers Negative Pressure Wound Therapy and improves the rate of wound healing. The V.A.C.® Freedom allows patients increased mobility and independence, and costs £53/day. Early discharge with a V.A.C.® frees up an inpatient bed (hotel beds cost of £574/day) which can then be used to generate revenue. A new policy for early discharge was introduced in December 2005 and the aim of this study was to ascertain revenue generated by these patients, VAC expenditure and bed days saved for the Trust.

Methods: All patients with ‘difficult’ wounds were referred to the vascular team from 1/03. Wounds were debrided promptly and if appropriate V.A.C.® therapy was applied with early discharge. V.A.C.® dressings were changed every 48–72 hours initially on the ward to allow inspection of the wound and then at home with follow up in clinic. V.A.C.® therapy was discontinued once the wound became appropriate for a superficial wound care dressing (Grade 1 pressure and diabetic ulcer). Bed days saved were calculated by the number of days that a V.A.C.® was used in the community after discharge.

Results: 86 patients were identified between 1/03–10/06 with wounds, many of which required debridement prior to V.A.C.® therapy. Referrals were trusts wide (23 different consultants within 9 separate departments). 21 patients (24.4%) had an early discharge with V.A.C.® therapy. Each Finished consultant episode was identified from the Patient Administration system and revenue calculated by tariffs allocated to each dominant Healthcare Resource Grouping for the hospital spell. Long stay funding was allocated in accordance to the length of inpatient stay. The total revenue for these patients was £670451 with a V.A.C.® rental and consumable spend of £18130. Number of bed days saved was 492 costing £26676 of the total V.A.C.® spend. 369 (75%) bed days saved were within acute and elective orthopaedic and surgical beds.

Conclusion: These data suggest that V.A.C.® therapy aids the safe, early discharge of difficult wounds allowing patients increased independence at home. In addition, this frees up bed capacity to further income generate or may facilitate bed closures enabling Trusts to decrease expenditure.

Cost and quality 0459
Use of misadventure codes to benchmark clinical performance in England
S. Sarceen, G. David, D. J. Corless, S. N. Selvanchandran, J. P. Slavin, D. Cale
Leightun Hospital, Crewe, Cheshire

Background: Misadventure codes (International Classification of Diseases, ICD-10) are now used to benchmark clinician performance in some trusts in England. We have studied the use of misadventure codes following discharge nationally and investigated whether there is a relationship with objective measures of outcome such as length of stay (LOS) and mortality.

Methods: Hospital Episode Statistics for the year 2003–2004 were obtained from the Department of Health and imported into an Access database for analysis. Episodes in which a misadventure code was recorded were identified and used for this analysis. Ratio of finished consultant episode (FCE) with misadventure to that of total FCE within a trust was used to divide the trusts into six approximately equal sized groups.

Results: 9997 episodes were identified in which a misadventure code was used. Accidental puncture or laceration during a procedure (T812) accounted for 4769 episodes and foreign body accidentally left in body cavity or operation wound (T815) accounted for 404. The mortality rate and median length of stay of patients coded as suffering a misadventure was significantly less in trusts that report a high misadventure rate.

Conclusion: These data suggest variation in the way that misadventure is coded. Paradoxically in trusts with high misadventure rates, patients who are coded as a misadventure have lower length of stay and mortality suggesting
that these trusts are using misadventure codes more frequently. Accurate benchmarking of clinicians or trusts using misadventure codes cannot occur until these codes are used uniformly across the NHS.

Cost and quality 0419

Health-related quality of life improvement following surgical treatment of primary hyperparathyroidism in a United Kingdom population

K. J. Leong, R. Sam, A. W. Garnham
Department of Surgery, New Cross Hospital, Wolverhampton

Background: The aim of this study was to determine if parathyroidectomy for primary hyperparathyroidism produces improvement in patient-reported quality of life in a United Kingdom population.

Methods: Since October 2002, patients undergoing parathyroidectomy for primary hyperparathyroidism were asked to complete the SF-36 questionnaire, a validated self assessment tool prior to surgery and at 6 months post surgery. The questionnaires were either mailed to the patients or given at the time of outpatient follow up.

Results: 24 out of 29 patients completed the questionnaire pre- and post-operatively. There was 1 death not related to surgery, 1 patient suffered post head injury memory loss and 3 patients did not return the questionnaires. Compared to the national norm, the median preoperative scores were worse in all 8 domains. At 6 months post surgery, there were significant improvements in 6 out of 8 domains (p < 0.05); physical and social functioning, physical and emotional role limitations, energy and mental health. The median physical component summary score (PCS) and the mental component summary score (MCS) were also significantly improved post-operatively [Preop versus Postop (PCS) = 28 ± 16 versus 35 ± 40 (p = 0.03)] and Preop versus Postop (MCS) = 41 ± 50 versus 56 ± 23 (p = 0.005)].

Conclusion: This study shows, for the first time in a UK population that parathyroidectomy for primary hyperparathyroidism improves health-related quality of life.

Cost and quality 0638

Factors influencing early health related quality of life of patients after elective abdominal colorectal surgery

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Mayo Clinic, Rochester, United States

Background: We analyzed disease and treatment factors influencing QOL of patients (pts) during the 6-weeks (wks) following elective colorectal surgery.

Methods: Two hundred and thirty pts were evaluated between May 2005–June 2006 at a single institution. The EORTC QLQ-C30 and QLQ-CR38 were administered preoperatively, and 2 and 6 wks postoperatively. Mixed effects models were used to assess impact of disease (benign versus malignant) and treatment (laparoscopic versus open, stoma versus no stoma) characteristics on QOL across time after adjusting for confounders (age and gender).

Results: Mean age of the cohort was 53 years with 125(53%) men. Diagnosis was malignant in 31% with laparoscopic surgery performed in 53% and a stoma being required in 35% of the pts. Relevant functional and symptoms scales and items (global health, physical, role, emotional, social, body image, future perspective, pain, nausea/vomiting) independently improved postoperatively but were adversely impacted by the presence of a stoma. The diagnosis of cancer did not impact any of the QOL measures; laparoscopic surgery was associated with less pain, nausea and vomiting postoperatively (Table 1).

Conclusion: Patient QOL significantly improved during the initial 6 wks. Diagnosis of cancer had no impact but presence of a stoma had an adverse influence on QOL. Minimally invasive surgical techniques had a favourable benefit on certain patient reported outcomes.

Table 1

<table>
<thead>
<tr>
<th>Domains</th>
<th>Pre-op</th>
<th>Post-op</th>
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<th>Malignant versus Benign</th>
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Endocrine/vascular/transplant

Endocrine/vascular/transplant 0067

Following parathyroidectomy for secondary hyperparathyroidism, is the incidence of postoperative hypocalcaemia increased in patients taking cinacalcet?

N. Smart, J. Morgan
North Bristol NHS Trust, Bristol

Background: Secondary hyperparathyroidism (SHPT) is a major risk factor for the development of postoperative hypocalcaemia. Patients undergoing parathyroidectomy for SHPT receive alfacalcidol 4mg once daily for three preoperative days as prophylaxis against postoperative hypocalcaemia. The aims of the study were to establish whether the current protocol for prophylaxis of hypocalcaemia was effective and secondly to assess whether the introduction of cinacalcet had altered the rates of postoperative hypocalcaemia in patients with SHPT.

Methods: This was a retrospective cohort study of all patients who had parathyroidectomy for SHPT from January 2003 to September 2006. The two cohorts were patients operated on before cinacalcet was licensed (pre-license, 2003 and 2004) and those operated on when the drug was available (post license, 2005 and 2006). The end point was hypocalcaemia (corrected calcium <2.0 mmol/L) within 48 hours of surgery. Drug records were reviewed to ensure that patients had received prophylaxis and whether they were taking cinacalcet.

Results: 53 patients had parathyroidectomy for SHPT. 26 patients were operated on pre license, of which 10 became hypocalcaemic. Of the 27 patients operated on post license, 17 became hypocalcaemic and of these 8 were on cinacalcet. A total of 9 patients were on cinacalcet and of these 8 became hypocalcaemic within 48 hours, the remaining patient eventually became hypocalcaemic on the 5th post op day. The proportion of patients becoming hypocalcaemic since the introduction of cinacalcet increased from 38% to 63% (p = 0.007).

Conclusion: Alfacalcidol 4 mg once daily for three preoperative days is an ineffective prophylactic against postoperative hypocalcaemia following parathyroidectomy for SHPT. Patients taking cinacalcet for SHPT are almost certain to become hypocalcaemic post parathyroidectomy. Since the introduction of cinacalcet the proportion of patients developing postoperative hypocalcaemia has increased significantly.

Endocrine/vascular/transplant 0180

Totally Implantable Venous Access Devices – 20 years experience of implantation in Cystic Fibrosis patients

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Heart of England NHS Foundation Trust, Birmingham

Background: Totally Implantable Venous Access Devices (TIVADs) are widely used to provide secure, long-term, central venous access for antibiotic delivery in Cystic Fibrosis (CF) patients. However, few studies have demonstrated long-term follow-up with large cohorts. This is a cohort study at a Tertiary Referential Centre, reviewing TIVADs implanted by open venous cutdown technique with fluoroscopic control, no immediate intrathoracic complications occurred.

Results: 165 TIVADs, in 109 patients (34 males, 75 females), were reviewed. Median survival was 1441 days (range 6-4440 days), mean survival 1799 days. Cumulative patency was 146,072 catheter days. No immediate intra-thoracic complications (pneumothorax, haemothorax, nerve injury) occurred. There were 4 early and 82 late complications, namely: occlusion (33 TIVADs, at a median age of 310 days), infection (23 TIVADs, median 376 days), leakage (16, median 283 days), pain or discomfort (6), venous thrombosis (4), fracture (2), extravasation/skin necrosis (1), vegetation in Right Atrium (1). The overall incidence of complications was 0.59/1000p catheter catheter days.

Conclusion: This study concurs with others that TIVADs are safe and effective, with a median lifespan of almost 4 years in CF patients if well looked after in a specialist centre. Complications of infection, leakage and occlusion do occur but overall incidence is low. As expected, using an open venous-cutdown technique with fluoroscopic control, no immediate intrathoracic complications occurred.

Endocrine/vascular/transplant 0892

Ultrasound Guided Foam Sclerotherapy (UGFS) for Treatment of Symptomatic Varicose Veins

D. Bartlett, I. Nyamekye, J. Robinson
Worcestershire Royal Hospital, Worcester

Background: UGFS offers a minimally invasive outpatient alternative to varicose veins surgery. We intend to assess the efficacy, complications and clinical outcome of UGFS in patients presenting with symptomatic varicose veins.

Methods: Patients with duplex determined truncal incompetence were offered UGFS. Following duplex-guided cannulation of incompetent trunks and varicosities, aliquots of 2.5 ml foam (0.5 ml 3% sodium tetradecyl sulphate [STD] & 2 ml air) were injected to fill all targeted veins. Treated limbs were compressed with 5 days bandaging and 2 weeks stockings, and then reviewed with duplex at 2 weeks. Incomplete occlusions were offered further treatment. Patients were reviewed 6 months after completion of treatment.

Results: 218 limbs were treated in 176 patients with a mean age of 57 (range 18-86). 117 patients (66%) were women and 162 limbs (68%) were CEAP 2. 159 limbs (67%) underwent treatment for primary varicose veins. A median (range) of 2 (1-4) cannulae and 10 ml (4-20) of foam were used per limb. At 2 weeks 180 limbs (76%) were reported to be asymptomatic and 221 (74%) of treated trunks showed complete occlusion. 74 (25%) showed segmental occlusion. Reported complications included transient visual disturbance in 2 patients (1%), lumpiness 18%, tenderness 6%, bruising 4% and significant phlebitis 4%. 30 limbs (13%) had further treatment. At six months 73% of trunks remained occluded and 10% showed segmental occlusion. 17% of trunks had recanalised to leave small sclerosed veins, which were competent.

Conclusion: UGFS is a safe and effective outpatient treatment for symptomatic varicose veins. Symptomatic and objective improvement is sustained at 6 months.
Methods: Data were prospectively collected on all elective admissions to the vascular wards over a 4-week period. Patients with peripheral arterial disease, cerebrovascular disease and aortic aneurysms were included. We recorded whether a patient was on the appropriate secondary modification (AP & ST). Secondly, we recorded whether or not patients had serum total cholesterol (TC) check within 1-month of admission or at admission. Thirdly, we collected data regarding discharge medication.

Results: 107 patients were included in the study (median age 74, IQR 66–78), of which 67 (63%) were male. Only 59 patients (55%) were on both an AP & ST. 15 patients (14%) were not on any secondary modification at all. 32 patients were on a combination of AP alone (11), ST alone (13), ST and warfarin (8) and warfarin alone (1). 77 patients (72%) had a serum TC checked. The median TC was 4.0 (IQR 3.4–4.7) with a range of 1.2–6.7. Of the 15 patients not on any secondary modification, 10 were discharged on both an AP & ST, 2 on an AP and 1 on ST alone. 2 patients were not discharged on any secondary modification, despite not having any contraindications to an AP or ST.

Conclusion: Admission compliance with the Joint British Societies’ guidelines is suboptimal. However, on discharge the majority of patients are commenced on an AP & ST. A significant number (48%) of vascular patients have a serum TC > 4.0. A targeted effort towards risk factor modification in atherosclerotic disease is required and involves improving vascular units’ awareness and compliance with guidelines.

Endocrine/vascular/transplant 0394

Do vascular interventions influence patients’ smoking habits?

G. Markides, D. Subar, L. Thompson, M. Asad Rahi, H. Al-Khaffaf
North Bristol General Hospital, Bristol, Lansdown

Background: Smoking is a major risk factor associated with the development and progression of atherosclerosis. The aim of this study was to investigate the effect of vascular interventions on patients’ smoking habits.

Methods: Smoking habits of patients presenting at the vascular outpatient department between June and October 2006 were assessed via a questionnaire and through retrospective review of their notes. All patients included in the study had been diagnosed and treatment was instituted at least six months prior to their smoking habit assessment.

Results: The study included 120 patients (m : f ratio = 6 : 4, mean age 65). Prior to the first vascular consultation, 7% of patients were non-smokers, 32% ex-smokers and 61% smokers. Advice to stop smoking was given to 97% of smokers at time of diagnosis and 64% of patients were referred to the smoking cessation clinic. Of the smokers, 38% were managed conservatively, 28% underwent angioplasty, 13% carotid endarterectomy, 26% bypass surgery, 8% abdominal aortic aneurysm repair and 7% lower limb amputation. All interventions except the latter two showed a statistical significant lowering effect on smoking habits (p = 0.0015, p = 0.0004, p = 0.0134, p = 0.0007, respectively). Although statistically there was an overall significant reduction (P < 0.05) in smoking habits, 85% of smokers continued to smoke. Of those continuing to smoke, 65% reduced their cigarette consumption by an average of 11 cigarettes per day, while the rest continued to smoke at the same level.

Conclusion: The level of vascular intervention influences patients’ smoking habits. However, even though the number of cigarettes smoked per day decreases after most vascular interventions, literature emphasizes that a clinically significant effect on patients’ health only occurs after complete smoking cessation. Therefore, a more aggressive approach towards smoking cessation is required.

Endocrine/vascular/transplant 0085

Does cold ischaemia impair renal function in kidneys transplanted from non-heartbeating donors?

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North Bristol NHS Trust, Southmead Hospital, Bristol

Results: Twenty-five pairs of kidneys from NHBD were transplanted at the North Bristol NHS Trust between 2002 and 2005. The kidneys were implanted one after the other into two different recipients due to logistical constraints. The first kidney graft was received by the patient with the best HLA match, whereas the second graft went to the longest waiter. Frequent postoperative measurement of renal profile parameters were carried out in the recipients postoperatively between postoperative days 1 and 180.

Results: The mean cold ischemia time for the first recipient was 943 ± 198 minutes. The mean cold ischemia time for the second recipient was 1252 ± 311 minutes. We report that, despite prolonged ischemia time in the second graft, postoperative renal function was not significantly different from renal function in the first graft. The eGFR and Creatinine levels on days 1 to 180 did not differ significantly between the recipients of the first and second kidney from one NHBD. Moreover, these renal function parameters did not correlate to the prolongation of cold ischemia incurred between the first and the second transplant.

Conclusion: These findings demonstrate that in kidneys derived from NHBD, a moderate increase in cold ischemia alone would not hamper renal function. Therefore, it appears to be safe and acceptable to endeavour sequential rather than parallel transplants in renal grafts from NHBD.

Endocrine/vascular/transplant 0131

Killer immunoglobulin like receptor and HLA-C mismatches are associated with a significant deterioration in long-term allograft survival after liver transplantation

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Nephrology/Transplantation, University Hospital Birmingham, Birmingham

Background: Unlike other solid organ transplants, liver allograft survival is not determined by HLA matching. Immune mechanisms underlying liver injury remain elusive but innate immunity may be a contributing factor. Natural killer (NK) cells represent a population of important innate cells with the capacity to exert allogenicity via interaction with HLA-C. Increasing interest in NK cells parallels a better understanding of its complex repertoire of receptors known as killer immunoglobulin like receptors (KIR). To date there is limited evidence on the interaction of NK cells in liver transplantation, and moreover NK cell functions appear to be relatively resistant to immunosuppression.

Methods: To investigate the impact of NK cell KIRs on liver allograft survival we have undertaken a retrospective single centre population based genetic study, genotyping 254 liver transplant donor and recipient pairs for inhibitory KIRs (2DL1, 2DL2, 2DL3, 3DL1), their known ligands HLA-Bw4 and HLA-C (C group 1 and C group 2) and activating KIRs (2DS1, 2DS2, 2DS3, 2DS4, 2DS5, and 2DS1) and correlating to clinical outcomes. Genotyping was performed by PCR-SSP using previously published primers.

Results: Based on a recipient mean follow-up of 2960 days Kaplan-Meier survival calculations were performed. The analysis demonstrated significantly poorer allograft survival (p = 0.002) when the donor tissue was lacking HLA-C group 2 and the recipient possessed inhibitory 2DL1 KIR. 10-year graft survival was 90% when the allograft possessed C group 2 ligand compared with a 60% survival in the absence of this ligand. Activating KIR status independently had no impact on allograft outcomes.

Conclusion: This combination of inhibitory 2DL1 KIR and HLA-C group 2 counter-ligand mismatch is likely to represent activation of recipient NK cell with persistent liver allograft injury undetected by immunosuppression. KIR and ligand typing may form an additional tool in determining liver allograft allocation for non-super-urgent cases and live donation programme.
Endocrine/vascular/transplant 0358

Kidney transplantation from elderly non-heart beating donors: a single centre experience

S. Farid, A. Aldouri, A. Al-Mukhtar, K. Haluzan, R. Baker, A. Lewington, K. Menon, N. Ahmad
St James University Hospital, Leeds, Yorkshire

Background: In an effort to meet the increasing demand for kidney transplantation many centres are expanding their donor pool by using marginal donors or extended criteria donors (ECD). Non-heart beating donors (NHBD) are generally regarded as marginal donors and most centres in the United Kingdom do not except NHBD over the age of 60 years. We report our experience of renal transplantation from elderly NHBD’s (eNHBD) aged over 60 years and compare outcome with our conventional NHBD (cNHBD) transplantation

Methods: A retrospective analysis of all non-heart beating donor kidney transplants at our institution from January 2004 to May 2006. Patients were divided into two groups: eNHBD (> 60 yrs) and cNHBD (< 60 years). Primary end points for comparison were hospital stay, graft function and patient survival at one year.

Results: 15 patients received kidney transplants from eNHBD (60 yrs) and 65 patients received grafts from cNHBD (< 60 yrs). Median donor and recipient age was 66 and 66 years for eNHBD and 41 and 48 years for cNHBD respectively. Median time on the transplant waiting list for patients receiving eNHBD grafts was 46 months compared to 12 months receiving cNHBD grafts. Primary function was observed in 20% of eNHBD versus 88% cNHBD graft group, delayed graft function; 80% of eNHBD versus 55% of cNHBD’s and primary non function in 11% of cNHBD only. Median hospital stay was 21 and 14 days in eNHBD and cNHBD groups respectively. Grafts from eNHBD were associated with higher creatinine levels (168 umol/l versus 77 umol/l at one year) but similar graft survival (82% versus 87% at one year, \( p = 0.8 \)) compared to cNHBD kidneys. One year patient survival in eNHBD and cNHBD groups was 100% and 94% respectively.

Conclusion: We conclude that the use of carefully selected NHBD kidneys from patients aged over 60 years can have a favourable outcome. In our centre, we have used such kidneys in age matched recipients with long times on the waiting list. These recipients are otherwise unlikely to receive a cadaveric kidney through the UK standard allocation system.

Endocrine/vascular/transplant 0359

Outcomes of kidney grafts refused by one or more centres and subsequently transplanted at a single UK centre

S. Farid, A. Aldouri, S. Fraser, R. Rajasundaram, A. Al-Mukhtar, R. Baker, A. Lewington, J. P. A Lodge, K. Menon, N. Ahmad
St James University Hospital, Leeds

Background: The rate-limiting factor in kidney transplantation is the shortage of donor organs with resultant steady increase in the transplant waiting list. In our centre we have seen an increase in the use of kidneys refused as suitable by one or more centres in the UK. This study was conducted to analyse the outcome of transplant from kidneys refused by one or more centres and subsequently transplanted by our institution.

Methods: A retrospective analysis using the UK Transplant database of donor grafts refused by one or more centres and subsequently transplanted at our centre from January 2000 to December 2005. The reason for refusal, donor and recipient factors, graft rejection, primary and delayed function, post operative complications, graft and patient survival at three years were studied.

Results: During the period, January 2000 to December 2005 a total of 623 renal transplants were carried out of which 60 (9.6%) donor grafts were refused by one or more centres. The main reasons for initial refusal included: elderly donor 26.6% (mean age 59.7 yrs), better HLA match required 36.6%, anatomical 5%, past medical history 6.6%, prolonged cold ischaemia time 3.3% (median 1091 mins), organ damage 1.6%, and “centre criteria not met” 1.6%. 1 and 3 year creatinine were, 120 \( \mu \)mol/l (56–599), 126 \( \mu \)mol/l (62–566) respectively. Acute rejection occurred 8.2% of cases. Three-year graft and patient survival was 88.3% and 96% respectively. None of the above variables were significant predictors of 3-year graft survival on multivariate analysis.

Conclusion: 9.6% of transplants in our center in the studied period were performed with graft refused by one or more centers as ‘unsuitable’ with graft and patient survival similar to other standard grafts. None of the factors for refusal of kidneys by other centers were found to predict for graft failure at 1 year. There may be an element of subjective assessment of these kidneys and a ‘cascade effect’ involved in refusal of these kidneys.
Benign hepatobiliary

Benign hepatobiliary 1039
A clipless technique for laparoscopic cholecystectomy using the harmonic scalpel
T. Yu, D. Patel, N. Marshall
Newham University Hospital, London

Background: The technique of laparoscopic cholecystectomy still has areas of refinement, including complications of clips being dislodged. The use of ultrasonically activated scalpel for tissue cutting and coagulation is a potential replacement for electrosurgery, which can be related to different complications. The harmonic scalpel has been used safely in other general surgical operations.

Methods: This was a prospective study of 22 patients undergoing laparoscopic cholecystectomy in a London hospital using the harmonic scalpel. These were elective patients for gallstone disease diagnosed with Ultrasound. Harmonic scalpel was used as the sole instrument for division of the cystic duct and artery as well as dissection of the liver bed.

Results: The average operation time was 14 minutes. However, this is inclusive of time from instrumental and skin preparation to closure of skin. The average post-operative inpatient stay was 7.2 hours (all discharged on the same day of surgery). No patients developed postoperative haemorrhage or bile leakage.

Conclusion: The harmonic scalpel provides complete haemobiliary stasis for all patients and is a safe alternative to standard clip or ligature closure of the cystic duct. Furthermore, there may be a cost savings inherent in a procedure as well as dissection of the liver bed. Advancements in the Harmonic scalpel blade tip now provide for the reliable ultrasonic division and closure of the cystic duct.

Benign hepatobiliary 0822
Elective or immediate surgery for acute cholecystitis? – Hasten slowly!
Newcastle & Hunter Hospitals, Newcastle, New South Wales, Australia

Background: Surgery for cholecystitis is generally performed electively. Recently, there has been a shift towards ’immediate’ surgery for many patients presenting with acute symptoms, although the validation for such a change remains open to question. We examined whether such a policy had any impact on clinical outcome.

Methods: All patients undergoing cholecystectomies were prospectively studied during a one-year period from July 2003 to June 2004 in four hospitals in our region. Endpoints investigated included conversion rates, length of hospital stay, morbidity & mortality. Statistical assessment carried out using ANOVA, Mann-Whitney U-test & T-test analyses where appropriate.

Results: 525 cholecystectomies were carried out in this period. 452 operations (86%) were electively planned. The remaining 73 procedures (14%) took place during the acute hospital admission. Conversion rates to open surgery were unrelated to ‘urgency’ (6% in elective group, p = 0.32). Length of postoperative stay was significantly different between the subgroups (mean of 3.2 ± 2.9 days for elective patients versus 4.8 ± 4.2 days for urgent, p = 0.001). The incidence of morbidity was greater in patients undergoing cholecystectomy during their acute admission (15% in urgent group versus 7% in elective group, p = 0.02). Notably, the occurrence of ‘major’ complications was strongly associated with ‘urgency’ (2% in elective and 10% in urgent group, p = 0.001). There were no mortalities in either group.

Conclusion: Our results demonstrate that ‘urgent’ cholecystectomies are more likely to result in prolonged postoperative hospital stay and increased morbidity, in particular major morbidities. We advise caution when considering immediate surgery for acute cholecystitis.

Benign hepatobiliary 1040
Single stage management of common bile duct explorations: a prospective series
C. Moore, A. Hamouda, A. H. Nassar
Newlands District General Hospital, Airdrie, Lanarkshire

Background: To review a prospective series of 377 laparoscopic biliary duct explorations in a unit adopting single session management of all-comers with suspected ductal stones. The ERCP service has been discontinued.

Methods: A specialist upper GI laparoscopic unit receives all acute biliary admissions with suspected choledocholithiasis. A single session protocol applies to all patients fit for surgery. We perform routine cholangiography and proceed to bile duct exploration when necessary.

Results: Of 1964 cholecystectomies carried out over 15 years, 605 patients (30%) had risk factors for ductal stones and laparoscopic bile duct exploration was attempted in 377 (19%). 39% were emergency admissions. 285 were females and the mean age was 58 ± 4 years. Seventy-five (20%) were in patients who were ASA 3. Cholangiography was abnormal in 49% of those with risk factors resulting in 270 explorations and in 117/1334 (8%) without any preoperative risk factors resulting in 80 explorations. 27 explorations were done based on clinical or operative suspicion without an IOC or subsequent to an apparently normal IOC. There were 207 transcystic, 155 choledochotomies and 15 open conversions (41%) (conversion rate 2000 onwards 1%). Operative time averaged 39 mins; 169 mins for choledochotomy, 125 mins for transcystic. However over half of the procedures were difficulty grade III or above with respect to gallbladder and pedicle dissection. Presentation to resolution period was 2 weeks or less in 78% of patients, 84% having only one admission episode. Overall success rate of ductal clearance was 95% and post-operative ERCP was necessary in 5.6%, including 2% with retained stones. The rate of recurrent stones at 2 years was 0.8%. There was a low rate of major complications, 8.2%, major complications, 13%, readmissions, 6.6%, re-operations, 0.8% and mortality, 0.25%. Average total hospital stay was 8.2 days (median 6).

Conclusion: Single stage management of choledocholithiasis is clinically efficient. Unnecessary investigations and interventions were avoided in over 50% of patients with risk factors and unsuspected stones were detected in 5.6%. It results in fewer admission episodes and a short presentation to resolution time for gallstone related disease.

Benign hepatobiliary 0088
Common bile duct stones: A review of management options
C. J. O’Neill, D. M. Gillies, J. S. Gani
John Hunter Hospital, Newcastle, New South Wales, Australia

Background: Two recent meta-analyses support operative common bile duct (CBD) exploration (laparoscopic or open) as at least equal to endoscopic retrograde cholangiopancreatography (ERCP) for the management...
of choledocholithiasis with the gall bladder in situ. Much of the literature regarding laparoscopic exploration comes from enthusiasts of the technique and may not be transferable to other institutions. In our institution both hepatobiliary and general surgeons perform cholecystectomy with a variable comfort level with laparoscopic CBD exploration. ERCP and laparoscopic antegrade transpapillary biliary stents are available. We review the management of choledocholithiasis in this setting.

**Methods:** A retrospective review of all patients who underwent cholecystectomy during 2004 and 2005 at two hospitals was conducted.

**Results:** The incidence of choledocholithiasis was 10.3% (70 of 681 patients who underwent cholecystectomy). Of the 36 patients with choledocholithiasis diagnosed pre-operatively, 22 underwent pre-operative ERCP (62.5% clearance rate) and 14 underwent planned operative CBD exploration (100% clearance). In addition, a normal pre-operative ERCP was performed in 22 patients with presumed choledocholithiasis. Operative choangiogram first confirmed choledocholithiasis in 31 patients; CBD exploration in these patients was successful in 10 of 17 (58.8%). Fifteen patients had antegrade stents inserted due to a small caliber or friable CBD, failed CBD exploration, or lack of equipment and time for operative exploration. Hepatobiliary surgeons more frequently performed CBD exploration and the placement of intraperative stents.

**Conclusion:** The management of common bile duct stones will vary depending on the clinical scenario and local expertise. This series defines a role for intra-operative antegrade stent placement, suggests pre-operative ERCP is over-utilised, and that operative CBD exploration is successful with low morbidity.

**Benign hepatobiliary 0296**

**Previous attacks of acute biliary pancreatitis significantly increase the risk of a future ‘severe’ attack**

A. Z. Al-Bahrami, M. Al-Rashedy, N. A. Yassin, M. Charalambous, B. J. Ammori
Manchester Royal Infirmary, Manchester

**Background:** The influence of previous attacks of acute biliary pancreatitis (ABP) on the likelihood of a subsequent severe attack remains unclear.

**Methods:** Patients who underwent cholecystectomy for ABP between 1992 and 2004 were identified and their clinical data retrieved.

**Results:** There were 97 patients (67 female) with a median (range) age of 50 (48–87) years. The final preoperative attack of ABP was mild in 64 patients (66%) and severe in 33 patients (34%). The median (range) number of previous attacks was 1 (0–7) and 78 patients (80%) had previously suffered one or more acute attacks of pancreatitis. The median interval between first attack and surgery was 65 days. Patients who had previously suffered more than one attack of ABP were significantly more likely to develop a severe attack compared with those who did not [15 of 23 patients (65%) versus 18 of 74 patients (24%)], p < 0.0001. Multivariate analysis identified the number of previous attacks and not the interval between first and last attack, age or sex as an independent predictor of severity (p = 0.001).

**Conclusion:** Previous attacks of ABP increase the likelihood of a future severe attack. Definitive management of gallstones is required during the index admission with ABP.

**Benign hepatobiliary 0994**

**Does gallbladder need to be removed during bariatric surgery?**

R. Yagati Satchidanand, D. Bryant, D. D. Kerrigan
University Hospital Aintree, Liverpool

**Background:** Prophylactic cholecystectomy at the time of bariatric surgery is widely practiced because rapid post-operative weight loss is associated with gallstone formation in up to 30% of patients. However, cholecystectomy has its own inherent risks, and can be a challenging procedure in the morbidly obese. Furthermore, in non-bariatric patients, cholecystectomy is usually only offered for symptomatic gallstones. So what are the chances of symptomatic stones forming after bariatric surgery?

**Methods:** Using a combination of case note review, postal and telephone questionnaires, we studied the incidence of symptomatic gallstones in 178 patients with a minimum of 12 months follow-up, who had undergone gastric bypass (n = 130) and duodenal switch (n = 48) surgery between 1998 and 2005.

**Results:** One hundred and six patients (60%) responded to the questionnaire. Mean post-op follow-up was 17.4 months. Eleven patients (10%) were diagnosed with symptomatic gallstones after bariatric surgery. There was no significant difference in the incidence of symptomatic gall stones after gastric bypass or duodenal switch (p = 0.00)

**Conclusion:** The incidence of symptomatic gall stones developing during the period of rapid weight loss after malabsorptive surgery is low and does not appear to justify the routine use of prophylactic cholecystectomy during bariatric surgery. In the era of laparoscopic bariatric surgery, symptomatic gallstones which develop after massive weight loss should be managed by elective laparoscopic cholecystectomy in a slimmer, lower risk patient.

**Benign hepatobiliary 1214**

**Current management of benign liver cysts**

T. Gall, G. Oniscu, R. Parks, K. K. Madhavan, J. Garden
Royal Infirmary of Edinburgh, Edinburgh

**Background:** Despite the increasing use of minimal access techniques, the optimal surgical approach for non-parasitic cystic disease of the liver has not been well defined. This paper aims to determine the optimum operative management approach for patients with hepatic cysts.

**Methods:** Data were identified from Lothian Surgical Audit, a prospective departmental data base, case note review and general practitioner and patient
Results: One-hundred and two patients underwent 114 operative procedures for hepatic cysts between June 1985 and April 2006. Predominant symptoms included pain (83%), bloating (44%) or early satiety (26%). Laparoscopic deroofing was undertaken in 62 cases, open deroofing on 15, resection on 36 and liver transplantation in one instance. The mean follow-up period was 77.6 months (range: 3–250). Sixty-seven patients had simple cysts; 31 polycystic liver disease (PCLD); and 4 patients were found to have cystic tumours on final histology (3 benign cystadenoma and 1 cystadenocarcinoma). Morbidity rates were greater in patients with PCLD than those with simple cysts when a laparoscopic approach was employed (31% versus 15%). There was no postoperative mortality. Eighty-five percent of those with PCLD had recurrent symptoms following laparoscopic deroofing. Only four of the 67 patients undergoing surgery for simple cysts required further surgical intervention compared to 8 of the 31 patients with PCLD. There was no difference in the quality-of-life for patients with simple cysts however, for those with recurrent symptoms after operations for PCLD, patients had a significantly better quality-of-life after laparoscopic deroofing than resection.

Conclusion: The majority of simple liver cysts can be managed by a laparoscopic approach but there is a definite role for open resection in some patients. For patients with PCLD, open deroofing is the preferred approach for a dominant cyst pattern but hepatic resection is necessary for disease with a diffuse cyst pattern.

Benign hepatobiliary 0967
Perioperative use of the limon method of indocyanine green elimination measurement to detect post-hepatectomy liver failure
N. de'Liguori Carino, D. O’Reilly, K. Dajani, M. Ballal, P. Ghaneh, G. Poston, A. Wu
University Hospital Aintree, Liverpool

Background: There are few practical and reliable tests for the estimation of hepatic functional reserve in patients being assessed for hepatic resection. Recently, a non-invasive liver function monitoring system, the LiMON (Pulsion Medical Systems, Munich, Germany), has been developed that measures indocyanine green (ICG) elimination by pulse spectrophotometry. The aim of this study was to assess the utility of the LiMON system in the prediction and early detection of liver failure post-hepatectomy.

Methods: Indocyanine green elimination, using the LiMon system, serum liver function tests and Child-Pugh score were assessed in 21 patients undergoing major liver resection pre-operatively and at days 1, 5 and 10 post-operatively. Post-operative course, complications and final outcome were recorded.

Results: There were 16 men and 5 women with a median age of 68 years (range 39–76), all of whom were Child score A preoperatively. On days −1, +1, +5 and +10, the median ICG 15-min retention rates (R15) were 1.9, 2.8, 3.0 and 4.3 in those who remained Child A postoperatively (Group A) and 7.6, 17.5, 11.5 and 7.8 in those who became Child B or C post-operatively (Group B), p = 0.4, 0.04, 0.02, and 0.03 respectively, Mann-Whitney U test. On day +1, median R15 for Child A, B and C patients were 7.4, 7.6 and 19.5, respectively, ANOVA p < 0.001.

Conclusion: LiMON ICG elimination by pulse spectrophotometry is a quick, non-invasive and reliable liver function test in patients undergoing liver resection that aids in the early identification of post-hepatectomy liver failure.
Training and assessment 0438

Simulation based objective assessment of technical skills as part of the selection of individuals for higher surgical training in general surgery at a national level

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National Surgical Training Centre, Royal College of Surgeons in Ireland, Dublin

Background: To objectively assess the technical skills of junior surgeons who had applied for a higher surgical training program in general surgery.

Methods: Thirty two individuals (20 male) applied for higher surgical training at a national level. Fifteen applicants (seven males) were short-listed for interview and further assessment. All applicants were required to report on their education performance at undergraduate level and their post-graduate and professional development. On the basis of these reports fifteen individuals were short-listed for interview and further assessment. Short-listed applicants completed a simulation-based objective assessment of surgical skills which included four virtual reality simulation tasks psychomotor co-ordination tasks, a laparoscopic cholecystectomy, upper and lower gastro-intestinal flexible endoscopic examination and six high fidelity physical tasks. These included, Lichtenstein Hernia Repair, End-to-End Bowel Anastomosis, Resection of Ingrown Toenail, Sapheno Femoral Junction Ligation and Division, Excision of Subcutaneous Lesion and Arterial Closure with Dacron Patch.

Results: The nine individuals who were selected for higher surgical training consistently performed significantly better than those candidates who were not selected in technical skills as shown in Table 4. The mean difference between the two groups overall performance was found to be statistically significant (156 versus 125, p < 0.002).

Table 4 Means and standard deviation of the two groups for all ten skills stations

<table>
<thead>
<tr>
<th>Surgical Skills Assessment Task</th>
<th>Selected</th>
<th>Not Selected</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean SD</td>
<td>Mean SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laparoscopic Cholecystectomy</td>
<td>15.78 7.1</td>
<td>14.33 7.2</td>
<td>9%</td>
</tr>
<tr>
<td>Lichtenstein Hernia Repair</td>
<td>7.11 4.9</td>
<td>6.17 7.8</td>
<td>2%</td>
</tr>
<tr>
<td>Arterial Closure with Dacron Patch</td>
<td>16.67 6.6</td>
<td>16.50 2.3</td>
<td>1%</td>
</tr>
<tr>
<td>End-to-End Bowel Anastomosis</td>
<td>20.00 0.0</td>
<td>13.33 10.3</td>
<td>33%</td>
</tr>
<tr>
<td>Resection of Ingrown Toenail</td>
<td>18.33 3.5</td>
<td>13.34 8.8</td>
<td>27%</td>
</tr>
<tr>
<td>Core Laparoscopic Skills: Object Positioning and Sharp Dissection</td>
<td>13.78 7.4</td>
<td>10.67 5.6</td>
<td>23%</td>
</tr>
<tr>
<td>Sapheno Femoral Junction Ligation and Division</td>
<td>18.78 2.7</td>
<td>16.17 8.0</td>
<td>14%</td>
</tr>
<tr>
<td>Upper Gl Endoscopic Examination</td>
<td>17.33 4.5</td>
<td>14.67 7.9</td>
<td>15%</td>
</tr>
<tr>
<td>Lower Gl Endoscopic Examination</td>
<td>17.78 6.7</td>
<td>10.00 10.9</td>
<td>44%</td>
</tr>
<tr>
<td>Excision of Subcutaneous Lesion</td>
<td>11.11 6.5</td>
<td>10.00 6.3</td>
<td>10%</td>
</tr>
</tbody>
</table>

Conclusion: Aviation-style team resource management training can improve team work. Subgroups within theatre vary in their response to the training provided, perhaps because of differences in their acceptance of the value of the course. We have previously shown correlation between technical error rates and teamwork, but direct demonstration of an improvement in clinical outcomes of surgery after training will require further study.
Training and assessment 0429

Aviation style theatre teamwork training can reduce theatre time during laparoscopic cholecystectomy

A. Mishra, K. Catchpole, A. Handa, P. McCulloch
Nuffield Department of Surgery, Oxford

Background: Aviation style teamwork and safety training has been advocated to reduce human error and increase patient safety in operating theatres, but direct evidence of benefit has been lacking. A systems approach to human error reduction may have the added advantage of improving performance and efficiency. Our objective was to evaluate the effects of an aviation style training intervention on operative duration.

Methods: 2 trained observers evaluated operating theatre teamwork during laparoscopic cholecystectomies using the NOTECHS scale before (n = 26) and after (n = 19) an aviation-style training intervention comprising 9 hours classwork and 8 weeks mentoring. Total patient theatre time was recorded.

Results: Mean theatre time was reduced from 75 mins (95% C.I. ± 65 mins) to 67 mins (95% C.I. ± 7.6 mins) (t = 2.14, p = 0.025). This was attributable to improvements on all 4 NOTECHS dimensions (Table).

Conclusion: Multi-disciplinary teamwork training utilising expertise from aviation can significantly reduce operative time during LC. If these effects can be generalized to other types of surgery, they could result in considerable cost and efficiency improvements, as well as reducing errors and improving patient safety.

Training and assessment 0648

Do laparoscopic courses really improve dexterity skill?

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1Northumbrian Upper Gastrintestinal Team of Surgeons, Northumbria, 2Leeds Institute of Minimally Invasive Therapy, Leeds, 3National Surgical Training Centre, Royal College of Surgeons in Ireland, Dublin

Background: Basic Surgical Skills Courses (BSS) introduce laparoscopic skills but have not been proven to improve trainee dexterity skill. The Royal College of Surgeons has introduced a dedicated Core Laparoscopic Skills course (CLS) training left sided laparoscopic colectomy.

Methods: 14 years practising minimally invasive surgery (MIS) but novice in laparoscopic colorectal procedures constituted the novice group and three very experienced laparoscopic colorectal surgeons (> 300 laparoscopic colectomies) who had been practising MIS for 14 years served as our experts. Training and testing was completed during one day. During the morning novice subjects received instruction in practice of LC from the experts with didactic educational sessions. During the afternoon novice subjects received instruction and demonstration on the surgical technique they were to use for the simulation component which consisted of a physical model of the abdominal cavity with augmented VR coaching cues. They were also closely supervised by an experienced operator. Experts performed the exact same case as the novices. Trays were removed from the simulator for subsequent objective scoring for explicitly pre-defined intra-operative events such as steps in the procedure or intra-operative errors which were scored for absence or presence and after respective course training. Student controls repeated 2 assessments and improvement were assessed by non parametric and linear regression analysis.

Results: Table 1 shows that the experts performed better in eleven of measured events metric description

<table>
<thead>
<tr>
<th>Metric description</th>
<th>Novice</th>
<th>Expert</th>
<th>Experts better</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division of the inferior</td>
<td>82</td>
<td>100</td>
<td>✓</td>
</tr>
<tr>
<td>mesenteric artery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division of the inferior</td>
<td>100</td>
<td>100</td>
<td>=</td>
</tr>
<tr>
<td>mesenteric vein</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesenteric injury</td>
<td>27</td>
<td>100</td>
<td>✓</td>
</tr>
<tr>
<td>Exposure of the left ureter</td>
<td>82</td>
<td>100</td>
<td>✓</td>
</tr>
<tr>
<td>Division of the Sigmoid</td>
<td>91</td>
<td>100</td>
<td>✓</td>
</tr>
<tr>
<td>mesentery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral mobilization of the colon</td>
<td>45</td>
<td>50</td>
<td>✓</td>
</tr>
<tr>
<td>Mobilization of the splenic</td>
<td>55</td>
<td>75</td>
<td>✓</td>
</tr>
<tr>
<td>flexure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division of the mesorectum</td>
<td>55</td>
<td>100</td>
<td>✓</td>
</tr>
<tr>
<td>Rectal transaction</td>
<td>82</td>
<td>75</td>
<td>0</td>
</tr>
<tr>
<td>Anastomotic alignment</td>
<td>29</td>
<td>100</td>
<td>✓</td>
</tr>
<tr>
<td>Anastomosis tension free</td>
<td>18</td>
<td>75</td>
<td>✓</td>
</tr>
<tr>
<td>Anastomosis centered</td>
<td>55</td>
<td>100</td>
<td>✓</td>
</tr>
<tr>
<td>Organ injury</td>
<td>50</td>
<td>75</td>
<td>✓</td>
</tr>
</tbody>
</table>

Conclusion: Motion analysis simulators are a feasible method of evaluating trainee dexterity, providing instant objective feedback. Inmate ability predicts final outcome. Baseline differences between Trainees and Students are detectable but depend up on the skill attribute measured. BSS and CLS training improve laparoscopic skills more than no training. CLS may improve economy of movement more than BSS.
novices (75 (1-5) versus 482 (1)), \( z = -2.56, p = 0.01 \). The experts were also less likely to injure adjacent organs (0.75 (0.5) versus 0.91 (1)) this difference was not statistically significant. However, when overall objectively assessed events were combined (i.e., procedural errors and organ injury errors) it was found that experts made significantly fewer errors (2.5 (1.5) versus 5.01 (6), \( z = -2.48, p = 0.013 \).

**Conclusion:** This simulation for training LC was able to distinguish between the objectively assessed performance of LC experts and novices. This finding is novel for a number of reasons including that the 'novices' were very experienced laparoscopic surgeons, they had received extensive education on the procedure before performing it, were explicitly shown how to 'accurately' complete the simulation and were also given expert mentoring during their completion of the simulation.

Training and assessment 0872

**Gaze-down three-dimensional 'open-box' training leads to a shortening of the laparoscopic learning curve**

R. Aggarwal, P. Boshier, G. Hanna, A. Darzi

**Imperial College London, London**

**Background:** Laparoscopic procedures require surgeons to manipulate instruments whilst viewing a two-dimensional video display. Three-dimensional vision has been proposed to improve operative performance, though its effect on rapidity of skills acquisition has not been evaluated. The aim of this study was to determine whether the learning curve for a complex laparoscopic task is shortened by preliminary training with gaze-down three-dimensional 'open-box' training.

**Methods:** 20 laparoscopic novices were recruited to the study and their baseline surgical skills were confirmed on 10 repetitions of open bench-top knot tying. Following randomisation, 10 subjects (group A) performed 60 intracorporeal knots in a standard laparoscopic box-trainer set-up. Group B (10 subjects) performed 30 knots with a gaze-down three-dimensional 'open box', followed by 30 standard laparoscopic knots. Performance was recorded with a validated motion tracking device to provide objective measures of dexterity, i.e. time taken (Tt) and total number of movements (Tm). Non-parametric tests of significance were employed, with \( p < 0.05 \) deemed significant.

**Results:** There were no baseline differences on open knot tying between groups A and B at the tenth trial for Tt (median 62 (4) versus 71 (2) seconds, \( p = 0.971 \)) and Tm (52 (4) versus 50, \( p = 0.912 \)). Learning curves on standard laparoscopic knots for group A did not show further significant improvement beyond the 20th (Tt) and 29th (Tm) repetitions (\( p > 0.05 \)), and for group B at the 10th (Tt) and 9th (Tm) sessions (\( p > 0.05 \)). There were no significant differences for standard laparoscopic knot tying between the two groups at the outset of training for Tt (156 (6) versus 130 (1) seconds, \( p = 0.315 \)) and Tm (198 (176), \( p = 0.796 \)) nor at the end of training: Tt (179 (3) versus 163 (6) seconds, \( p = 1 \)) and Tm (117 (115), \( p = 0.739 \)).

**Conclusion:** The length of the learning curve for acquisition of a complex laparoscopic skill such as intracorporeal suturing can be halved by initial training on an 'open-box' trainer. This is a cheap, easily available and effective mode of training and was also given expert mentoring during their completion of the simulation.

Training and assessment 0065

**Assessment of surgical skills during carotid endarterectomy (CEA)**

J. Beard, S. Chokey, S. Khan

**Sheffield Vascular Institute, Sheffield**

**Background:** Objective assessment of surgical skills, using a combination of task specific and global (non-specific) scores (Procedure-Based Assessment), has recently been introduced by the Intercollegiate Surgical Curriculum Project (ISCP).

**Methods:** Over a two year period, 17 trainees and 11 consultants were assessed whilst performing CEA using task-specific and global scores. Operative time and previous experience were also recorded. Data are presented as medians (IQR).

**Results:**

<table>
<thead>
<tr>
<th>Operation</th>
<th>Trainee</th>
<th>Consultant</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. performed</td>
<td>15 (17–24)</td>
<td>94 (61–33)*</td>
</tr>
<tr>
<td>Duration (mins)</td>
<td>128 (119–143)</td>
<td>90 (82.5–98.5)*</td>
</tr>
<tr>
<td>Task Specific score</td>
<td>23 (17–26)</td>
<td>25 (24.7–27.5)*</td>
</tr>
<tr>
<td>Global score</td>
<td>33 (30–35)</td>
<td>40 (36.5–43)*</td>
</tr>
</tbody>
</table>

* \( p < 0.001 \), \( + p = 0.001 \), \( \dagger p = 0.031 \), \( a P = 0.001 \) (unpaired T tests).

Consultants were quicker, had performed more CEs and had higher task specific and global scores, (with global scores correlating strongly with experience (\( r = 0.83 \), \( p < 0.001 \), Pearson). Amongst trainees there was a better correlation between task-specific scores and experience than for global scores (\( r = 0.83 \), \( p < 0.001 \) and \( r = 0.69 \), \( p = 0.002 \) respectively, Pearson).

**Conclusion:** Task-specific scores seem more valid for trainees and may be useful for summative assessment (examination or revalidation). Experience is vital for competence and speed.
Training and assessment 0767

The iliac module of a virtual reality simulator can objectively assess endovascular experience and technical skill

S. Neequaye, I. Van Herzeel, A. Aggarwal, A. Choong, R. Brightwell, A. Darzi, N. Cheshire
Imperial College, London

Background: Virtual reality (VR) simulation has been proposed as a means to train and objectively assess technical performance during endovascular interventions without risks to patient safety. The aim of this study was to validate assessment parameters during an endovascular iliac intervention recorded by a commercially available simulator and to subsequently define the benchmark levels of endovascular skill.

Methods: A total of 37 physicians with varying levels of endovascular experience were recruited. Group 1 (n = 10) nil endovascular experience, group 2 (n = 8) > 100 therapeutic endovascular cases, group 3 (n = 19) > 300 procedures. All subjects performed a standardised ipsilateral, right common iliac artery lesion using a VIST simulator. Metric performance data was collected automatically by the simulator. The Kruskal-Wallis test was used to compare performance across the three groups.

Results: Stent deployment was more successful in the more experienced groups compared to novices with minimal residual stenosis at completion angiogram (median 34·5 v 4·4%, p < 0·001; groups 1, 2 and 3 respectively) and higher stent: vessel ratio (0·655 v 0·96 v 0·94, p = 0·001). There was no significant difference in terms of other qualitative performance metrics i.e. stent placement accuracy (2·1 v 0·6 v 1·8 mm, p = 0·658) or lesion coverage (100 v 100 v 100%, p = 0·696).

Using quantitative metrics however increased endovascular experience was associated with a significantly higher fluoroscopy time (119·5 v 205 v 180 seconds, p = 0·003) though there was no difference between the groups for procedure time (357·5 v 401 v 441 seconds, p = 0·119) or volume of contrast fluid used (10·1 v 10·9 v 10·9 mls, p = 0·815).

Conclusion: The use of qualitative metrics on a VR endovascular simulation model differentiates between subjects of different endovascular experience and may enable novices to train to expert benchmark levels prior to intervening on patients. Quantitative metric data such as procedure time may not be an appropriate assessment tool. Indeed in this study more experienced subjects tended to use more fluoroscopy screening which may reflect greater awareness of risk.
Post-operative outcome

Post-operative outcome 0576
Prospective regional audit of appendicectomies
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Background: Appendicitis is the most common acute surgical emergency of the abdomen and about 10% of the population will develop acute appendicitis in their lifetime. Surgical options include open appendectomy or laparoscopic appendectomy.

Methods: We performed a prospective audit of appendicectomies over a one year period in the south eastern region from July 2004 to July 2005. All operative data was documented using a pre-designed Pro forma sheet and also recorded using a regional database system (Lothian 2000). Data collected included patient details, method of appendicectomy, time of surgery, length of stay, principal operating surgeon, subjective and objective histology, morbidity and readmission rates.

Results: 592 appendicectomies were performed in total in the 4 centres. 23.5% of appendicectomies were performed laparoscopically with a conversion rate of just 2.4%. The remainder had open appendicectomy. The principal operating surgeon was the consultant in 34% of cases with a further 57% performed by the specialist registrar or registrar. Only 3-4% of cases were performed between the hours of midnight and 8am. The overall appendicectomy rate was 11%. The overall morbidity rate of the 532 histologically proven appendicectomy was 8.5% (47 patients) with 62% and 16.2% complications for open and laparoscopic respectively (p < 0.01). The morbidity rate for those with a histologically normal appendix was 1.8%. The readmission rate was less than 1%.

Conclusion: Appendicectomy, whether open or laparoscopic, is associated with appreciable morbidity. The benefits of a Regional database and audit system has enabled large cohorts of patients to be included in studies and has stemmed informed discussion on improving regional practice and patient care.

Post-operative outcome 0578
Twelve years experience with distal pancreatectomy
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Background: Distal pancreatectomy (DP) is performed for a range of benign and malignant lesions. Accurate pre-operative diagnosis of pancreatic lesions can be unreliable but the high incidence of tumours with malignant potential often favours resection. This study evaluates a twelve-year, single centre experience with DP.

Methods: A retrospective review of all patients who underwent DP at a UK-based tertiary referral centre between 1994 and 2006 was undertaken. Preoperative investigations, operative details, pathology and post-operative outcome were recorded for each available case.

Results: Sixty-nine patients underwent distal pancreatectomy during the study period. Three patients were excluded due to insufficient data. Sixty-six patients (26 male, 40 female), mean age 49.9 years (range 15–88) had final diagnoses including chronic pancreatitis (n = 23), benign cystadenoma (n = 15), neuroendocrine tumour (n = 8), primary pancreatic carcinoma (n = 6), no abnormalities (n = 4), trauma (n = 3), acute pancreatitis (n = 2), metastatic carcinoma (n = 2), simple cyst (n = 2) and malignant local invasion (n = 1). DP performed for presumed cystic neoplasm (n = 24) revealed a correct pre-operative diagnosis in 71% of patients. Pathology confirmed that 59% of resected cystic tumours were either malignant or had malignant potential. DP undertaken for presumed pseudocyst (n = 12) showed 83% of cases were correctly diagnosed pre-operatively. Overall morbidity and mortality rates were 39% and 3% respectively with 5 patients (8%) having a clinically significant pancreatic leak. There was no association between pancreatic stump closure ( staple and suture, suture and duct liggment, suture alone) and overall post-operative morbidity (p > 0.05). Spleen preserving DP (15%) did not reduce morbidity or influence length of hospital stay (p > 0.05). Diabetes mellitus developed in 17% of patients and 14% required long-term pancreatic supplementation.

Conclusion: DP can be performed with acceptable morbidity and mortality. Accurate pre-operative diagnosis of cystic lesions is possible in the majority of cases. Pancreatic leak remains the major source of morbidity and some patients develop pancreatic insufficiency.

Post-operative outcome 0869
Wound infections after elective arterial surgery: How informed is your consent?
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Background: Post-operative wound infections remain a clinical priority. Infection rates quoted at consent are often an underestimate, informed by awareness of only in-patient complications. However, shortened post-operative stays have led to increased diagnosis of wound infections in the community. Our aim was to determine wound infection rates prospectively and to compare these with surgeons’ quoted rates on one vascular unit.

Methods: All 5 surgeons on a vascular unit provided their infection rates as used in the consent process, for elective infrarenal reconstructions. Wound infections were diagnosed using the Nosocomial Infection National Surveillance Scheme (NINSS) and together with post-discharge surveillance. Data was collected up to 30 days post procedure.

Results: Surgeons’ quoted wound infection rates were 1–5% for aortic surgery, 5–10% for ilio-femoral/femoral reconstructions and 10–20% for infrainguinal bypass. Prospective data collection showed that only 40% of all wound infection occurred in hospital. Wound infection rates were 2% for 86 aortic aneurysm repairs and 19% for 21 aortobifemoral procedures. Wound infection rates were 10% for 50 iliofemoral and femoral reconstructions and 26% for 126 infrainguinal bypasses. However, only 9% of infrainguinal wound infections were diagnosed in hospital.

Conclusion: Surgeons tended to underestimate their rates of wound infection. Actual infection rates were significantly greater than quoted rates for aortobifemoral and infrainguinal procedures. Surgeons should include post-dischARGE surveillance in audits of post-operative wound infection.

Post-operative outcome 0527
Factors associated with in-hospital mortality from the Scottish Audit of Gastric and Oesophageal Cancer group (SAGOCS)
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Background: To evaluate the relative importance of factors associated with hospital mortality after oesophagectomy and gastrectomy for cancer in a comprehensive prospective national audit.

Methods: A prospective cohort study was conducted of all patients diagnosed with upper GI cancer in Scotland between 1997–1999 (SAGOCS). We studied all patients undergoing surgery (n = 1102), evaluating the effects of patient age, sex, Scottish socio-economic deprivation quintile (SIMD 1 = least deprived, 5 = most deprived), ASA grade, tumour stage, and hospital case volume on in-hospital mortality after upper GI cancer surgery. Multivariable
Post-operative outcome 0838
Anastomotic failure as a cause of death following cancer surgery in Scotland

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Background: The Scottish Audit of Surgical Mortality (SASM) seeks to peer review all deaths on a surgical ward or within 30 days of an operation. Anastomotic leak is a contributory factor for death following gastrointestinal cancer surgery in Scotland. The aim of this study was to identify adverse events in patients who died with anastomotic failure following surgery for GI cancer.

Results: In the eight years 1996 to 2003, 5369 patients (26% of all general surgical deaths) died with pancreatic, colon, stomach, biliary tree, liver or oesophageal cancer. 46% of these patients underwent an operation. A total of 2436 operations resulted in 163 anastomotic leaks and 1469 areas of concern or areas for consideration (ACONS) on peer review. These were 7 leaks in 294 pancreatic cancer operations, 1/10 liver, 6/92 biliary tree, 86/1260 colorectal, 27/171 oesophageal and 16/421 for stomach cancers. As a contributing factor to death, the anastomotic leak rate has risen overall for pancreatic cancer (0 to 7%), colon (6 to 9%), biliary tree (7 to 20%) and stomach cancer (11 to 21%) but remained static for oesophageal cancer (at 8%). Over the same period the incidence of ACONS (number of ACONS/number of operations) has fallen for pancreatic (0.24 to 0.20), biliary tree (0.73 to 0.70), oesophageal (0.56 to 0.26) and colon cancers (0.71 to 0.40) but risen for gastric cancer (from 0.38 to 0.41). The most common ACONS related to surgery and decision making by the surgeon on choice of operative procedure, timing of surgery and of the management of complications.

Conclusion: Anastomotic leak remains comparatively rare as a contributing factor to death with GI cancer under surgical care. Specialist team working may have contributed to fewer adverse factors for oesophageal and colorectal cancers, but surgical decision making remains a key factor.

Post-operative outcome 0591
Correlation between deprivation levels and outcome from colorectal cancer

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¹Prince Charles Hospital, Merthyr Tydfil, ²Royal Glamorgan Hospital, Llantrisant, ³Llandough Hospital

Background: To study whether factors that influence the level of social deprivation have any correlation with outcomes from colorectal cancer.

Methods: The Townsend Index (TI) determines the socio-economic status based on the % unemployment, availability of vehicle, property ownership & household overcrowding. Higher scores indicate greater deprivation. Scores can be negative denoting affluent areas. All patients with colorectal cancer diagnosed in two adjacent DGHs in the South Wales from January 2003 to December 2003 have been included. Patients who did not have pre-operative staging were excluded. Patients were classified into the 5 TI categories based on their residential address.

Results: There were 404 colorectal cancers with the mean TI of +0.64 (range = 6.0 to +7.6, SD 2.94). As can be seen from the distribution of patients in the various TI categories (Table), the % of patients in the higher socio-economic categories is low in this study group. Mean TI was significantly higher (p < 0.005) for patients who were sent in as urgent referrals (+1.13, SD 2.1), compared to patients who presented as non-urgent referrals (+0.34, SD 2.6). The percentage of patients requiring urgent surgical intervention was also higher in the urgent referral group (36% versus 8.4%, p = 0.0001). There was a higher 30-day mortality in patients in the urgent referral group (9.0%) compared to 5.6% in patients in the non-urgent group (p=NS). There was no correlation between presenting symptoms and TI. Patients diagnosed with modified Dukes’ D cancers had high a TI compared to other stages (p = NS).

Conclusion: This study demonstrates convincingly that patients with colorectal cancer from deprived areas are more likely to be referred as urgent

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Post-operative outcome 0120
The role of trainees in colorectal cancer surgery and their association with outcome

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Background: Surgical training has undergone substantial changes with reductions in working time, shortened training and sub-specialisation, while increasing interest in surgical outcome and the mounting pressure on service delivery make training difficult. We examined a large population of colorectal cancer patients for the involvement of trainees and their effect on outcome.

Methods: NORCCAG is a population-based surgical audit of patients with colorectal cancer in the Northern Region of England, including 8,219 patients between 1998 and 2002. Unadjusted and adjusted outcome comparisons were made between unsupervised trainees, supervised trainees and consultants as the primary surgeon.

Results: Surgery was performed on 7,411 patients; 656 (8.8%) cases were operated by unsupervised and 1,578 (21.3%) by supervised trainees. Unsupervised trainees operated on more emergency and high-risk patients than supervised trainees and consultants. Operative mortality and three-year survival (14.2%; 47.0%) were significantly worse than in consultant-led surgery (7.3%; 58.8%). However, consultant presence did not affect the adjusted risk for operative and three-year death significantly in elective (OR = 0.70, p = 0.10, HR = 0.97, p = 0.75) or emergency surgery (OR = 0.88, p = 0.47, HR = 1.03, p = 0.72). Supervised trainees had similar a case-mix and achieved results comparable to consultants as primary surgeons (elective: OR = 0.96, p = 0.72, HR = 0.98, p = 0.68; emergency: OR = 0.73, p = 0.16, HR = 0.99, p = 0.94). Colorectal specialists were more likely to be present at surgery than non-specialists (OR = 3.5, p = 0.001) and provide supervised training (OR = 3.34, p < 0.001).

Conclusion: only one-third (30.1%) of patients were operated on by trainees. Supervised trainees achieved similar outcomes to consultants. Poorer results for unsupervised trainees could be largely explained by differences in case-mix.
referrals as well as require urgent intervention. It also shows that these patients may have poorer outcomes in terms of stage of disease at diagnosis as well as postoperative mortality, though, due to sample size, statistical significance was not achieved. This study supports the argument that funding for cancer services should be based on the socio-economic profile rather than the catchment population.

Post-operative outcome 0846

Deprivation is an independent risk predictor of post-operative death but not survival in patients with colorectal cancer

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2NORCCAG, Newcastle-Upon-Tyne
3University of Newcastle, Newcastle-Upon-Tyne

Background: This study explores the impact of deprivation on stage, post-operative death and overall survival in patients with colorectal cancer (CRC).

Methods: This is an observational study based on the Northern Region Colorectal Cancer Audit Group (NORCCAG) for the period 1998–2002. The Index of Multiple Deprivation 2004 is a composite, area based measure derived from multiple domains. The score/rank of the individual can be identified from the postcode of their residence. Patients were categorised into tertiles [deprived, middle and affluent groups] and comparisons made with the deprived group. Logistic and Cox proportional hazard multivariate models were used for risk prediction.

Results: Of 8236 patients who had diagnosis of CRC, 7419 underwent an operative treatment. The distribution of patients across the deprived, middle and affluent categories was 3442 (47%), 2461 (31%) and 1447 (19%). More patients in the deprived category had unfavourable ASA grades (<p = 0.001). Fewer patients in the deprived group underwent operative treatment ($\chi^2$ test; $p = 0.01$) and a higher proportion of them were unplanned (emergency/urgent) operations ($\chi^2$ test for trends = 9.2; $p = 0.002$). On the multivariate models after adjusting for case mix, deprivation was not associated with Dukes’ stage, curative resection or survival (Table 1).

Table 1 Multivariate risk predictive models for Dukes’ stage, curative resection, post-operative death and mortality (number of patients in parenthesis)

<table>
<thead>
<tr>
<th></th>
<th>Deprived ($n = 3442$)</th>
<th>Middle ($n = 2461$)</th>
<th>Affluent ($n = 1447$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dukes’ stage</td>
<td>1</td>
<td>0.96; $p = 0.4$</td>
<td>0.94; $p = 0.28$</td>
</tr>
<tr>
<td>(C&amp;D)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R0 resection</td>
<td>1</td>
<td>1.14; $p = 0.15$</td>
<td>1.11; $p = 0.40$</td>
</tr>
<tr>
<td>Post-operative</td>
<td>1</td>
<td>0.93; $p = 0.45$</td>
<td>0.72; $p = 0.02$</td>
</tr>
<tr>
<td>deaths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survival in 3</td>
<td>1</td>
<td>0.94; $p = 0.14$</td>
<td>0.92; $p = 0.11$</td>
</tr>
<tr>
<td>years</td>
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</table>

Conclusion: Increasing deprivation is associated with poor general health. Lesser number of deprived patients underwent an operative treatment. There is more chance of an unplanned treatment with increasing deprivation. Deprivation had a linear independent risk association with post operative death. Deprivation was not an independent predictor of stage, curative resection or overall survival in patients who undergo an operative treatment for CRC.

Post-operative outcome 0444

Lamin A/C status is a marker for death in colorectal cancer

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Background: Lamin A/C is a member of a group of proteins known as the A-type lamins. These proteins are expressed in most differentiated somatic cells where they are integral parts of the nuclear lamina – the complex meshwork underlying and supporting the nuclear membrane. Mutations in A-type lamins have been implicated in no less than 9 different laminopathies (inherited diseases resulting in premature aging) and several epithelial-derived cancers, but to date, direct involvement in colorectal cancer has yet to be shown.

Methods: Patient information and tumour material was collected from 734 incident colorectal cancer cases. 4 micron sections were immunohistochemically stained for lamin A/C expression using the J62 mAAb. A scoring system was devised for lamin A/C expression and slides were scored by two independent observers blinded to each others findings and patient data. Data analyses were based on 656 participants with available follow-up and lamin A/C expression data. Differences in patients’ tumour and follow-up characteristics were analysed and subsequent hazard ratios (HR) for colorectal cancer related mortality according to lamin A/C status were estimated using Cox regression analysis.

Results: 463 specimens were scored as lamin A/C positive and 193 were scored as lamin A/C negative. During the follow-up period, from 1989 to 1997, 246 patients died, of which 161 died as a result of colorectal cancer. Patients with tumours expressing lamin A/C were observed to be slightly older, having substantially more colorectal cancer related deaths and a significantly decreased survival period. The lack of expression is associated with a decreased risk of mortality, HR = 0.59 (95%-CI 0.41–0.85, $p$-value 0.006) in the overall population as well as in the individual Dukes’ A, B and C stages. Almost all Dukes D patients died within the follow-up period.

Conclusions Our data show that the expression of lamin A/C in colorectal tumours is significantly linked to colorectal cancer associated mortality in patients. Regression analyses including lamin A/C expression and other factors associated with tumour initiation and progression indicate that lamin A/C expression is independently related to survival and is a strong candidate as a prognostic marker for colorectal cancer related mortality.
Surgical technique 0267

Experience in minimally invasive video – assisted thyroidectomy in a UK district general hospital

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Background: Cervicotomy for thyroidectomy must be sized and positioned to allow a satisfactory cosmetic result without compromising surgical exposure or safety. In our centre Minimally Invasive Video-Assisted Thyroidectomy (MIVAT) has been adopted. We report the results of our initial 3 year experience.

Methods: Patients fulfilling the selection criteria had gasless MIVAT performed via a 1.5 cm incision using a combination of sharp and blunt dissection, a 30 degree angle 5mm scope and harmonic scalpel. Patients were clinically assessed for recurrent laryngeal nerve palsy and serum adjusted calcium was assayed for post-operative hypocalcaemia.

Results: Fifty-four resections were performed. Forty-two lobectomies with isthmectomy, 4 total thyroidectomies, and 8 completion thyroidectomies were performed. Two involved deliberate resection of a concomitant parathyroid adenoma. Four required extension of the incision and direct visualisation of the surgical field. Mean operating time was 90 minutes (SD 28 min) and mean hospital stay 1 day (range 0–7 days). Five transient and possibly 2 permanent RLN palsies were observed. Two transient and no permanent cases of post-operative hypocalcaemia were observed. A range of histological abnormalities were confirmed in the excised specimens including 12 papillary, 4 follicular and 3 mixed carcinomata.

Conclusion: Minimally invasive video-assisted thyroidectomy is a safe alternative technique for thyroid resection. It achieves a highly acceptable cosmetic result without limiting the surgical field and allows resection of both benign and low risk malignant disease. Low perioperative morbidity rates can be attained and the procedure can be performed successfully on a short stay basis in the District Hospital setting.

Surgical technique 0012

Mammotome excision of gynaecomastia – a novel and effective surgical technique

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Background: More aesthetically acceptable treatment options have been sought to minimize the morbidity associated with open surgery for gynaecomastia. This study investigated the use of a vacuum assisted biopsy device (VABD) and liposuction to provide a minimally invasive approach.

Methods: Patients diagnosed with idiopathic benign gynaecomastia and requesting surgical intervention underwent VABD excision and liposuction. All patients underwent clinical, biochemical and radiological evaluation to exclude any underlying cause for their gynaecomastia. The procedure was carried out by a single consultant surgeon with special interest in breast surgery. An 8-gauge mammotome probe was advanced through a 4mm incision positioned lateral to the breast in the anterior axillary line area, to excise the glandular disc. Liposuction was performed through the same incision. Incision wounds were closed with steristrips and pressure dressing applied.

Results: 27 male patients were recruited (13 bilateral, 14 unilateral). Mean age was 33.3 years (16–88 years). All underwent mammotome excision and liposuction. There were no conversions to an open procedure. The average procedure time was 50.3 minutes (30–80 minutes). No intraoperative complications recorded. 25 patients reported excellent satisfaction, 2 patients had a recurrence of their gynaecomastia and required further surgery. 3 patients developed small haematomas that resolved spontaneously.

Conclusion: This novel, minimally invasive, surgical approach for gynaecomastia gives excellent results with minimal morbidity.

Surgical technique 0290

New efficient breast cancer sentinel node biopsy technique for all

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Background: Sentinel node biopsy as practiced in New Start is cumbersome, time consuming and cannot be performed in many hospitals. The aim was to make this sentinel node biopsy an efficient cost effective technique available to all. The aim was to evaluate new “efficient” sentinel node biopsy technique.

Methods: The surgeon was the ARSAC licence holder and the radio-pharmaceutical was delivered in a unique one use only syringe and all theatre staff were educated on all aspects of radiation protection. 96 patients with normal in the body and tail, seven 22–28 mBq of Tc99m radioactive albumin colloid followed by 2 ml of patent blue V followed by 5 mls of saline injected into the subareolar region immediately following induction of anaesthesia. Sentinel nodes (blue/hot) and palpable axillary nodes were removed only.

Results: In the first 96 patients sentinel nodes were identified in 94 (98%), both blue dye and radioactivity were needed to achieve this. Patients included 15 who had undergone neoadjuvant endocrine therapy, 3 previous neoadjuvant chemotherapy and 3 patients who had undergone a previous node sample. The average number of sentinel nodes was 2.9, median 3. 2 patients without sentinel nodes had a positive axillary sample or a positive intramammary node. There were 12 patients (12.2%) with positive nodes – 11 of whom had a positive SN and one patient had a positive node sample – single involved node with extra-nodal spread, but a negative SN.

Conclusion: This new efficient technique gives results equivalent to any other technique. It can be performed in any hospital with appropriate training and there is no disruption to normal routine practice. Sentinel node biopsy needs to be combined with sampling of palpable nodes and will not work in some patients with involved nodes. Following further validation this new technique will allow all hospitals to perform sentinel node biopsy.

Surgical technique 0555

Laparoscopic management of insulinomas

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Background: A single centre experience of laparoscopic management of 20 pancreatic insulinomas between December 2000 and December 2006 is presented.

Methods: There were four males and 16 females. All tumours were localised preoperatively with CT/MRI, endoscopic ultrasound, and angiography with calcium stimulation and venous sampling. Five tumours were localised in the head, nine in the body, and six in the tail. Laparoscopic intraoperative ultrasound (LIOUS) was routinely used in the last 13 cases.

Results: All operations, except for one in the head with severe adhesions after severe acute pancreatitis, were completed laparoscopically. All five tumours in the head/uncinate process were successfully enucleated. Amongst the tumours in the body and tail, 7 underwent a spleen preserving distal pancreatectomy, and 8 were enucleated. Three patients suffered pancreatic leaks, and these cases are discussed.

Conclusion: The laparoscopic management of pancreatic insulinomas which have been meticulously localized preoperatively is feasible. LIOUS is mandatory.
considering that the majority of tumours are not visible, and the decision to enucleate or resect is based on an acceptable distance from the pancreatic duct.

Surgical technique 0772

An isolated pancreatic-jejunosotomy with P-loop reconstruction reduces pancreatic fistula related morbidity following pancreateoduodenectomy (PD)

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Background: Life-threatening complications after PD are frequently associated with leakage at the pancreatic anastomosis. As mixed biliopancreatic juices result in rapid activation of pancreatic enzymes, a reconstruction technique that separates the biliary and pancreatic systems may reduce the risks associated with pancreatic fistula. This study investigates outcome after PD using a standard Roux-en-Y reconstruction and a modified P-loop configuration to avoid mixed biliopancreatic secretions at the pancreatic anastomosis.

Methods: Cancer patients undergoing PD between Jan 2000 and Dec 2005 had a two layer duct-to-mucosa pancreatico-jejunosotomy (P-JA). Group 1 – separated pancreatic and biliary anastomosis with a modified P-loop configuration. Group 2 – Biliary and pancreatic anastomosis on a single roux-loop. Pancreatic leak defined as presence of hyperamylasaemic drain fluid (3 x serum) after day 10, or radiological confirmation. End-points for comparison were pancreatic fistula incidence, re-intervention rates, length of hospital stay and mortality.

Results: 55 consecutive PD were analysed. A P-loop (group 1) reconstruction was performed in 17 pts, while group 2 had 16 pts. Overall incidence of P-JA leak was 35% for P-loop and 36% for group 2. The incidence of clinically relevant fistula observed, as defined by the ISGPF grade B and C, was (11% Group 1 versus 22% Group 2). Resolution by conservative management was obtained in 100% in the P-loop group versus 54% in group 2 (p = 0.003). Mean length of hospital stay was 25 versus 29 days (±9.5 versus 17.4 SD) respectively and in the event of a P-JA leak was 29 versus 40 days (±9.5 versus 12.6 SD) (p = 0.03). Re-interventions: Group 1: 2 patients required radiologic embolisation for delayed massive haemorrhage. Group 2: 2 completion pancreatectomies, 3 insertion of percutaneous drains and 1 embolisation for delayed massive haemorrhage (p = 0.02). Overall hospital mortality was 5.6% and leak-related mortality was 10.5%.

Conclusion: The P-loop reconstruction, by converting a mixed biliopancreatic leak into a pure pancreatic leak, determines a more benign clinical course and is associated with a lower re-intervention rate and shorter hospital stay.

Surgical technique 1051

Liver surgery planning using 3 dimensional liver images reconstructed from CT scans: prospective non- randomised study

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Background: The ability to construct a 3D model of the liver and its structures before hepatic resection could be useful in determining the extent and nature of resection. Accurate assessment of Liver and tumour volume dictates functional liver volume and predicts postoperative liver failure in patients undergoing resection.

Methods: A prospective non-randomized study was conducted on patients scheduled for liver resection following discussion at multi-disciplinary meeting. 3D models were constructed from CT images using computer software. From these 3D models, total LV, functional LV, and tumor volume were calculated. The resected Liver volume was also calculated and was compared to the resected liver weight.

Results: A total of 37 patients of mean age 63 (31–78), and male to female ratio 2: 1 were scheduled for liver resection, mean height was (162 ± 9.08 cm) and mean weight was (73.87 ± 12.39). Of these patients, Pre-operatively, 9 patients went for volume enhancing embolization, 2 had a non-resectional approach, and 1 patient was subjected to further imaging due to proximity of the tumour to the vessels. 8 patients underwent right heptectomy, 5 underwent extended right heptectomy, 3 had extended left heptectomy, 5 were operated using Habib resection, 4 had right trisegmenectomy, and 1 had left medial sectionectomy, 1 had trisegmenectomy, 4 patients were managed by local resection, 1 by central resection, 2 by wedge resection, and atypical resection was used in 3 patients. Incidence of postoperative liver failure was 0%. The mean total liver volume calculated based on 3D-CT model was (1565 ± 404 ml), mean functional liver volume was (1404 ± 138 ml), and mean tumour volume was (104 ± 142 ml), computer prediction of resected LV using 3D reconstructed CT images correlated well with resected liver weight, mean of resected liver volumes predicted was (578 ± 507 ml) and the mean specimens weights was (415 ± 200–68 g) (P > 0.05).

Conclusion: 3D-CT reconstructed images can accurately predict resected liver volume and future liver remnant volume during liver resection surgeries. It aids the decision on the need for pre-operative portal vein embolization to induce liver hypertrophy.

Surgical technique 0954

Enhanced recovery after surgery in liver resection: a two site pilot study

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1University of Edinburgh, Edinburgh, 2University Hospital Maastricht, Maastricht, Netherlands

Background: Optimising peri-operative recovery using an enhanced recovery programme has been shown to improve short term outcomes following major abdominal surgery. A two centre pilot study was conducted to assess feasibility, efficacy and safety of an Enhanced Recovery after Surgery (ERAS) protocol for patients undergoing elective major or minor liver resection. A prospective cohort of patients within an enhanced recovery programme (E, n = 63) was compared with a prospectively studied historic cohort receiving traditional perioperative care (T, n = 162).

Methods: 63 consecutive patients undergoing elective liver resection, without underlying cirrhosis or jaundice, were managed prospectively using an ERAS protocol. The protocol incorporated preoperative counselling, continuous thoracic epidural analgesia, early mobilisation and early return of oral nutrition. Clinical outcomes were compared with the control patients receiving traditional care.

Results: Baseline clinical data and patient demographics were similar in both groups. Patients in the ERAS cohort were able to tolerate a solid diet earlier, food started on the first postoperative day in 92% of ERAS patients versus 80% of the traditional care patients (p < 0.01). Time to discharge was significantly shorter in the ERAS cohort [6 (3, 82) versus 8 (5, 64) days, median (range), p < 0.05]. Morbidity [34% compared to 31%, E versus T; p: NS], readmissions [11% versus 14%, p: NS] and mortality [0% compared with 2%, p: NS] were similar in both groups.

Conclusion: An Enhanced Recovery after Surgery protocol is both safe and effective for non-cirrhotic, anicteric patients undergoing elective major or minor liver resection. Confirmation of enhanced recovery and reduced length of stay should be explored in a randomised trial.

Surgical technique 0468

Routine division of the inferior mesenteric vein during left sided colonic surgery – Will it leave the anastomosis hanging by a thread?

Y. Shumeyko, I. Eid, V. H. Muir, D. Clough, A. Macdonald

1Department of Surgery, Monklands Hospital, Airdrie, 2Department of Anaesthetics, Monklands Hospital, Airdrie

Background: Routine division of the inferior mesenteric vein (at the DJ flexure) is recommended (though not always necessary) during anterior resection. While the vascular anatomy of the splenic flexure is well described,
the effect of high ligation of the mesenteric vein on venous back-pressure, and hence, perfusion pressure have not been studied previously. This study examines the changes in venous pressure during mobilisation and excision of the left colon.

**Methods:** During routine mobilisation of the left colon for cancer surgery, patients either had their inferior mesenteric vein divided early or late in the operation. The inferior mesenteric vein (IMV), inferior mesenteric artery (IMA) and radial artery were each cannulated and the intra-vessel pressure recorded using a water-perfusion manometer (Ohmeda Oestiva 5 recording device (Philips)). The central venous pressure was also recorded. 9 Patients underwent early division of the vein, 10 late. Pressures were recorded as mmHg

**Results:**

<table>
<thead>
<tr>
<th></th>
<th>arterial pressure</th>
<th>IMV</th>
<th>IMA</th>
<th>IMV</th>
<th>IMA</th>
<th>IMA</th>
<th>IMV</th>
<th>IMV</th>
</tr>
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<tr>
<td></td>
<td>mean</td>
<td>pre-lig</td>
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<td>pre-lig</td>
<td>post lig</td>
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<td></td>
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<tr>
<td>late division</td>
<td>73</td>
<td>63.5</td>
<td>35</td>
<td>7</td>
<td>18.5</td>
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<tr>
<td>early division</td>
<td>77</td>
<td>74.5</td>
<td>42</td>
<td>8</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all cases</td>
<td>73</td>
<td>67.5</td>
<td>37.5</td>
<td>7.5</td>
<td>17</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Conclusion:** These results demonstrate that routine division of the inferior mesenteric vein results in a x2 rise in mesenteric venous pressure and hence a reduction in perfusion pressure to approximately 20 mmHg. Where elective left-sided resectional surgery is followed by intra-abdominal compartment syndrome, routine division of the IMV may reduce perfusion pressure and predispose to anastomotic failure.

**Methods:** Prospective data was collected on patients undergoing APE for malignancy between October 2003 and November 2006. Patient demographics, preoperative treatment with radiotherapy, operating time, wound complications and length of stay were recorded. Major complications were defined as perineal wounds not healed at one month, wound infection requiring drainage or debridement or any patient requiring reoperation or readmission. Minor complications encompassed all other complications.

**Results:** 35 patients underwent APE during our 38 month study period. Of these, 17 had primary closure and 18 had myocutaneous flap closure (15 vertical rectus abdominis muscle, 3 gracilis). Average age of patients in the primary closure group was 68 years versus 66 years in the flap group. Over 60% ($n = 11$) of the primary closure patients were male compared to 50% of patients ($n = 9$) in the flap group. The proportion of patients undergoing preoperative radiotherapy was similar (71% versus 72% respectively). Flap formation was associated with a longer mean operating time (384 versus 235 mins) and shorter mean length of stay (22 versus 42 days). Major perineal wound complications were seen in 6 patients (35%) with primary closure but in only 3 patients (16%) with flaps. 3 of these primary closure patients needed reoperation or debridement compared to only 1 patient in the flap group. Minor complications were seen in 3 patients (18% versus 17%) in each group.

**Conclusion:** With the increasing incidence of preoperative radiotherapy, use of myocutaneous flaps can reduce perineal complications and mean length of stay. They can be performed within the context of an all day list with the availability of a plastic surgeon.

**Surgical technique 0314**

**Myocutaneous flaps following radical abdominoperineal excision**

S. Chan, M. Miller, R. Ng, D. Ross, P. Roblin, E. Carapeti, A. B. Williams, M. George

**St Thomas's Hospital, London**

**Background:** Abdominoperineal excision (APE) following radiotherapy is traditionally associated with a high rate of perineal complications (up to 40%). The use of myocutaneous flaps may improve wound healing by providing healthy tissue in an irradiated field. We review our experience of this.
Service provision 0014

A service in crisis?: Results of the all-Wales audit into paediatric general surgery

K. Gomez1, S. Huddart2, M. Foster1
1 Royal Glamorgan Hospital, Llantrisant, 2Children Hospital for Wales, Cardiff

Background: The aim of this study was to determine the current level of service provision within paediatric general surgery in Wales and attempt to model a service structure for the future.

Methods: Three individually designed questionnaires were sent out to all the surgical Specialist Registrars, Consultant General Surgeons and Chief Executives of NHS trusts in Wales. All responses were anonymous, with individual response rates exceeding 70% in all three groups.

Results: 90% of NHS trusts in Wales undertake both elective and emergency paediatric surgery. Approximately 50% of consultants in Wales operate on children electively, yet only 21% have pre-planned operating lists; and only 5% have weekly scheduled paediatric operating lists. The majority operate on fewer than 20 children a year. In comparison, over 84% of consultants operate on children in an emergency. The median age group consultants considered were comfortable operating on electively was 1–3 yrs and this rose to 3–5 yrs in an emergency. 88% of surgical SpRs have no interest in paediatric surgery, yet over 85% operate on children in the emergency setting. The median age group at which SpRs felt comfortable operating on in an emergency was 3-5yrs.

Conclusion: The aim of the study was to assess the appropriateness of referrals made by primary care physicians to open access endoscopy services at a district general hospital.

Service provision 0107

A two year outcome of one-stop out patient minor operations clinic

R. Jale, B. Choung, E. Kannan, H. El-Khalifa, M. Kassem, T. Fasihi, T. Kothari, A. Agarwal
University Hospital of Hartlepool, Hartlepool

Background: One-Stop Clinic for minor procedures offers the reduction on day case theatres and has been welcomed by patients. The aim was to determine the clinical outcome, financial implications and patient satisfaction of an out patient minor operation clinic, since its inception two years ago.

Methods: Hospital computer data was used for collecting information. Case notes of significant pathologies were studied. Costs of out patient minor surgery clinic and day theatre were obtained. On a random sample of patients, a patient satisfaction survey was conducted.

Results: Following receipt of GP referrals, patients are offered choice of clinic date and asked to come prepared for surgery. The clinic is held once a week. The operations are carried out under local anaesthesia only. Patients are assessed by an experienced middle grade surgeon and operation performed if felt appropriate. 408 patients (M:F ratio 1:0.7;1; Age group 18-90 years; Average age of 54 yrs) were on operating lists. 91% had operations performed on the same day. Pathological diagnosis was sebaceous cyst (31%), Lipoma (17%), Naevus (1%) and other benign skin lesions like papilloma, haemangioma etc. (38.5%). 10 out of 408 patients (2.5%) had malignant lesions [malignant melanoma (2), basal (4) and squamous cell carcinoma (2), metastatic chondrosarcoma (1) and adenocarcinoma (1)]. Further action for these incidentally found significant pathologies was timely and appropriately taken. Based on 40 sessions in a year, there is a saving of nearly £10, 000 per annum in running this clinic compared to day theatre session. 65% of patients surveyed, rated the care received at minor operations clinic as excellent, 28% as very good, 4% as good, 2% as fair and 1% of them not responded. Waiting time for minor operations improved from an average of 20 weeks to 6 weeks.

Conclusion: Moving minor operations from day theatre to out patient setting has substantial cost savings, creates theatre capacity and shortens the waiting times. Patient satisfaction of a One-Stop approach is high. A single named consultant streamlines timely action of significant pathologies.

Service provision 0124

Specialist multidisciplinary team networks are associated with improved outcomes for patients diagnosed with operable gastric cancer

South East Wales Upper GI Cancer Network, Cardiff

Background: The impressive outcomes of radical D2 gastrectomy for gastric cancer in Japan have not been reproduced in randomised comparative studies in Europe even with neoadjuvant chemotherapy. The aim of this study was to determine the outcomes of specialist multidisciplinary team (MDT) cancer network treatment for patients diagnosed with operable gastric cancer.

Methods: Two hundred and eighteen consecutive patients with operable gastric cancer [median age 69 (27–90) yr, 150 males] referred to a single regional MDT offering specialist radiology, oncology, anaesthesia and surgery were studied prospectively. Treatment strategies including neoadjuvant...
Service provision 0423

Pancreatic cancer centralization and severe pancreaticitis: What are the implications?

N. Behar1, J. Gonzalez2, A. C. Steger3
1Eastbourne District General Hospital, Eastbourne, 2Kings College Hospital, London
3Neville Hall Hospital, Abergavenny

Background: To assess the ICU resource implications of centralizing severe acute pancreatitis (SAP), requiring intensive care management, along with pancreatic cancer surgery in a major deanery in the southeast of England.

Objectives: To retrospectively collect prospectively recorded ICU data from all 16 hospitals in the region that will potentially refer their patients to the regional referral centre. Particularly, length of stay in ICU was collected.

Methods: A simple questionnaire was sent to all 16 ICU’s to be filled for each patient admitted to ICU with a diagnosis of SAP in 2004. A Poisson process was used to model the number of patients per day admitted in the central unit.

Results: Data for 68 patients from 8 hospitals were collected over 1 year (50% response rate). Average ICU stay was 8 days per patient (range 1–40 days). Total ICU bed requirement was 546 day. In ICU mortality was 25% (37/68). Transfer rate to other ICU’s was 10% (7/68). Transfer rate to specialized tertiary referral centre was 4% (3/68). Operative management was undertaken in 18% (11/62) (data not available on 6 patients). The mean number of patients requiring an ICU bed per day, assuming referrals from 16 hospitals, was estimated as 3.

Conclusion: The MRCST01 and MAGIC randomised trials of D1 versus D2 gastrectomy and neoadjuvant chemotherapy respectively, reported operative mortality of 13% and 6%, and 3 year survival of 33% and 16%. The outcomes of specialist treatment described in this study are clearly at odds with the above and demonstrate the magnitude of the improvements achievable in clinical outcomes by centralised, specialised care for patients diagnosed with gastric cancer.

Service provision 0698

Improving working life; flexible generic annualised timetabling of consultants in a colorectal surgical unit

M. Coleman, C. Oppong, W. Douie, S. Brundell, C. Gandy, K. Hosie
Plymouth Hospitals NHS Trust, Plymouth, Devon

Background: During the introduction of the new consultant’s contract, the colorectal unit in our Trust introduced a flexible generic annualised timetable, which was instituted with the appointment of 2 new consultants to make a total of 7 full time colleagues. No additional elective sessions were provided and the Trust required full utilisation of all elective sessions in return for funding the additional posts. Previously, as a result of leave and emergency work, approximately 40% of elective sessions were cancelled.

Methods: The new timetable incorporates the activity of the 5 previously appointed consultants into an annualised 14-week timetable. In any given week, 5 of the seven are timetabled to carry out all the elective and emergency activity leaving 2 on a flexible week, Each consultant has 14 flexible weeks per year during which each individual takes 6 weeks annual leave and uses the remainder for study leave, professional leave and other requirements.

Results: The change has resulted in complete achievement of all NHS targets including 2-week wait and other cancer targets. The increased usage of elective sessions has reduced waiting times for non-NHS target groups. All sessions including an internal colorectal rota, medical student teaching and private practice are accounted for within the rota.

This presentation will explore the development of the timetable, its modus operandi and its effects on the working lives of the 7 colorectal consultants this unit.

Service provision 0940

The dedicated emergency surgeon: towards consultant-based acute surgical admissions

P. Sorelli, N. El-Masry, P. Dawson, N. Theodorou
Department of GI Surgery, Charing Cross Hospital, London

Background: The management of an efficient acute surgical service with conflicting pressures of managing elective and emergency work, compounded by waiting list targets and the maximum 4 hour wait for patients in Accident and Emergency poses a significant challenge. We assess the impact of appointing a dedicated Emergency Surgeon on the delivery of our emergency surgery service.

Methods: A comparative retrospective review was undertaken of all surgical admissions (n = 1622) over a nine-month period (between February and November) in the year before and after (2004 and 2005) the appointment of a dedicated emergency Consultant Surgeon. The impact on service, training and possible financial consequences of this appointment was assessed.

Results: A total of 796 surgical admissions in 2004 were compared with 824 admissions in 2005 for the nine month periods of this study. Two hundred and fifty eight patients were operated on in 2004 compared with 286 in 2005 (NS). There was a significant increase in daytime operating from 57% in 2004 to 74% in 2005 (p < 0.001) and a significant increase in Consultant supervised operations from 14% to 52% (p < 0.001), with a consequent fall in out-of-hours operating (41% to 26%; p < 0.001). In addition there was a significant increase in early (within 48hrs) discharges from 41% to 53% (p < 0.001). The salary of the new appointment is more than offset by the quantifiable savings of approximately £90 000 per annum based on the increased proportion of earlier discharges alone as well as the improved quality of care provided.

Conclusion: The appointment of a dedicated emergency surgery Consultant has resulted in an increase in daytime Consultant supervised operating, shorter hospital stay for emergency admissions, improved training for surgical trainees, as well as providing potential financial savings for the Trust.

Service provision 1061

Changing patterns of vascular surgical practice: a survey of Vascular Society member work in the UK

N. Matharu, J. Bertalot, R. Vohra
University Hospital Birmingham NHS Foundation Trust, Birmingham

Background: To survey the specialist vascular and general surgical practice of UK ‘vascular’ surgeons. Our hypothesis was that current workload does not fit within 10PAs.

Methods: A consultant-designed postal questionnaire was sent to 411 ordinary members of the Vascular Society covering all aspects of workload as defined in the 2003 contract and experience with the implementation of the new contract. Data collected were entered into a specially-designed database (Microsoft Excel).
Access) by a blinded individual and analysed systematically with a programmed algorithm (Visual Basic).

**Results:** 207 replies from 411 questionnaires (51%). Overall, consultants calculated their jobs as being worth 12.5 PAs and were offered 12 PAs (medians). There was no difference between the number offered by trusts, those settled upon and those we calculated from the workload response data (all 12, median). 42% of respondents classified themselves as full-time vascular surgeons, 57% as having a mixed practice with no difference in the median number of PAs agreed in these two groups (both 12). Of those with a mixed practice, there was ~50% split between the general and vascular clinical workload (PA ratio 4:3, median). Correspondingly, the amount of pure vascular surgical activity undertaken by these 2 groups was 97% & 66% respectively.

**Conclusion:** A full-time vascular surgical post truly attracts 12 PAs. Many ‘vascular’ specialists in the UK still undertake a considerable amount of general surgical work. Such surgeons, with a mixed practice, also achieve 12 PAs. A reorganisation to 10 PAs of sole vascular specialist work would entail a reduced workload, would risk de-skilling surgeons and would result in a reduction of the workforce that currently delivers ‘general’ surgical service provision.

**Service provision 0335**

**Temporal artery biopsy – a case for deferral?**

B. J. Sebastian, Z. M. A Al-Khaddar, E. Coveney

*West Suffolk Hospital, Bury-St-Edmunds*

**Background:** Temporal artery biopsy (TAB) is widely accepted as the gold standard for the diagnosis of Temporal Arteritis (TA). Current practice advises high dose steroids prior to biopsy. These may be continued if clinical index is high irrespective of biopsy outcome. The current American College of Rheumatology (ACR) diagnostic criteria recommend treatment if 3 of 5 criteria are positive irrespective of histology. The aim of this study was to evaluate whether TAB influenced the clinical management of suspected TA.

**Methods:** The management of 96 patients who underwent TAB in our unit between 1993 and 2005 was reviewed and compared to the ACR criteria.

**Results:** Twenty patients had a positive biopsy. Of seventy-six patients with negative biopsies, only nineteen (%) had a change in management following TAB. Overall, 61 patients (%) had three or more positive ACR criteria for the diagnosis of TA without TAB, who could have been spared a biopsy. Only 15 patients (%) had ≤2 positive criteria for whom a positive TAB would prove diagnostic. None of this group had a positive biopsy and only five patients had any change in subsequent management.

**Conclusion:** A negative temporal artery biopsy resulted in little change in the treatment of most patients with suspected temporal arteritis. We recommend that patients with three or more ACR diagnostic criteria could reasonably be spared a temporal artery biopsy.
Trauma and emergency surgery

Management of cocaine mules: conservative versus surgery
I. Beckley, N. Ansari, H. Kwaja, Y. Mohsen
Hillingdon Hospital, London

Background: International smuggling of cocaine by internal concealment is a serious and growing concern. People who engage in this practice are commonly referred to as body packers or mules. Early reports noted a significant risk of morbidity and mortality from cocaine intoxication and as a result these patients were initially managed primarily by surgical retrieval. This was associated with significant mortality due to rupture of poorly constructed cocaine packages. More recently with improvement in packaging methods, conservative management e.g. whole bowel irrigation has been shown to be safe for the majority of patients. The current indications for surgery are symptoms of cocaine intoxication and/or intestinal obstruction. To date however, a consistent approach for the management of these patients has not been established. The aim of our study was to determine the need for surgical intervention and design a treatment protocol in order to optimise patient care.

Methods: We identified all the body packers detained at Heathrow airport between 2000 and 2005. We then retrospectively reviewed the case notes, prescription charts and investigations of all those admitted to our unit during this period, concentrating on initial management, complications and outcome.

Results: 2508 suspected body packers were detained at Heathrow during the study period. Of those 590 were subsequently referred to hospital for further assessment or treatment. 83 body packers required admission and of those 61 (69.4%) were admitted to our unit. Fifty six patients were managed conservatively with a selection of aperients and laxatives. Six patients were treated successfully for cocaine toxicity and five patients required surgical retrieval of cocaine packets. This extrapolates to an overall rate of surgical intervention of only 0.3% in all detainees.

Conclusion: Our results represent the largest published series in Europe. We confirm the safety of a conservative approach and highlight the fact that surgical intervention in this patient group is an extremely rare event. Based on our experience and a review of the literature, we propose a treatment protocol in order to reduce the risk of complications and the length of hospitalisation.

Trauma and emergency surgery

Pre-hospital hypotension which persists on arrival to the emergency department is a powerful predictor of mortality following major trauma

F. J. Dickson, S. Robertson, D van Niekerk, J. Goosen, F. Plani, K. D. Boffard
Johannesburg Hospital Trauma Unit and University of the Witswatersrand, Johannesburg, South Africa

Background: Outcome following major injury is time dependent. Early identification of high risk patients allows rapid decision making and correction of life-threatening disorders. Complex scoring systems are of limited value during major trauma resuscitation. Our aim was to evaluate the utility of a single blood pressure during the pre-hospital phase in combination with the blood pressure on arrival to the emergency department.

Methods: Data were collected prospectively on 1111 patients admitted to a Level 1 South African Trauma Unit over a one year period. Patients were subdivided into two groups according to the combination of their pre-hospital (PH) and emergency department (ED) blood pressure. Hypotension was defined as a systolic blood pressure of less than 90 mmHg.

Results: The mortality in patients (n = 1031) with normal PH and ED blood pressure was 5.4%. The mortality in patients (n = 80) with PH and ED hypotension was significantly higher at 45% (p < 0.0001, Chi-square).

Trauma and emergency surgery

Forward trauma and emergency surgery in Southern Afghanistan:
what skills are required on the asymmetric battlefield?

N. Tai, P. Hill, A. Kay, G. Kane, P. Parker
Hospital Skin, Joint Forces Med Grp, Camp Bastion, Helmand Province, Afghanistan

Background: The deployment of 16 Air Assault Brigade to Helmand Province, Afghanistan was supported by two surgeons (general and orthopaedic) working in the field surgical team (FST) of a 25 bedded Field Hospital. The summed operative experience of the FST for battle injured (BI) and disease/ non-battle injured (DNBI) casualties admitted over five months is presented in order to examine case-mix and the skills required of modern military surgeons.

Methods: Analysis of a prospectively maintained theatre registry.

Results: 138 pts underwent 255 theatre episodes, and 322 procedures.

<table>
<thead>
<tr>
<th>Stage</th>
<th>BI</th>
<th>DNBI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Episodes</td>
<td>Procedures</td>
</tr>
<tr>
<td>Initial surgery</td>
<td>106</td>
<td>142</td>
</tr>
<tr>
<td>Subsequent surgery</td>
<td>97</td>
<td>115</td>
</tr>
<tr>
<td>Total</td>
<td>203</td>
<td>257</td>
</tr>
</tbody>
</table>

Injuries included blast/fragmentation (56 patients), gunshot wounds (44) and blast/thermal injury (6). Procedures undertaken at initial surgery included wound excision (95 procedures), major amputation (9), laparotomy (9), application of ex-fix/skeletal traction (6), thoracotomy (4), plaster application (3), dural repair (2), tracheostomy (1), other (13). Procedures undertaken at subsequent surgery included delayed primary closures (67 procedures), split skin graft (7), wound excision (5), tendon repair (3), other (15). Complications included 2 pts with reactionary haemorrhage who required unplanned return to theatre. There was 1 in-hospital surgical death. 32 DNBI pts underwent surgery including 9 pts with major burns who required 26 procedures for burn excision and subsequent skin grafting.

Conclusion: Military surgeons encounter multiply-injured patients with high-energy transfer wounds requiring an assortment of damage control and definitive surgical competencies. Given the austere setting of forward surgery, the required interventions are best delivered by a surgical team combining the skills of appropriately trauma-trained general and orthopaedic consultant surgeons.

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Trauma and emergency surgery 0883

External peer review identifies potentially preventable deaths from trauma

R. Davenport, C. Aylwin, E. Ward, J. Goosen, J. McLeod, K. Brohi, M. Walsh, N. Tai
The Royal London Hospital, London

Background: A core function of established trauma systems is to improve performance through peer identification and review of potentially preventable mortality. The aim of this study was to evaluate the rate and cause of excess mortality occurring in an inner-city trauma centre that has invested substantial resources in developing a dedicated trauma service.

Methods: Retrospective peer review of all in-hospital deaths from April 2003–April 2004. Three external international trauma authorities graded each death as Not Preventable, Possibly Preventable, Probably Preventable or Preventable according to the American College of Surgeons guidelines. Mortalities were then assigned a preventability score of 1–4 accordingly, with an aggregate score of ≥7 flagged as potentially preventable.

Results: 177 pts with an ISS ≥15 were admitted, of whom 32 (18%) died. 29 pts who died from burn (n = 1), penetrating (n = 4) or blunt injury (n = 24) had retrievable post-mortem reports and were referred for peer review. The median (range) ISS and TRISS scores were 29 (17–75) and 36 (0–97). Median (range) preventability score was 4 (3–7). Mean weighted Kappa co-efficient for inter-observer variability was 0.345, indicating fair agreement between panel members. No death was considered entirely preventable. 5 (17%) cases were assigned as potentially preventable. The principle variances from standard of care identified in these cases included delay to surgery/angiography for haemorrhage control (4 cases), and failure to apply damage control principles during surgery (1). Other variances identified in non-preventable deaths were avoidable secondary brain injury (2) and delay in evacuating intracranial haematoma (1).

Conclusion: Delay to theatre or failure to utilise damage control principles was the primary cause of potentially avoidable death in major trauma patients. Robust, peer review systems assist objective analysis and the development of a culture of safety and quality, and are essential if excess trauma mortality is to be minimised.

Trauma and emergency surgery 0521

Mechanism and profile of fatal injury in modern counter-insurgency warfare

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Royal Centre for Defence Medicine, Birmingham

Background: Understanding the mechanism and patterns of wounding in warfare is important in planning medical support for operations and also influences design of individual and overall protective measures.

Methods: A prospectively maintained war wounding database was interrogated. Demographic data, mechanism and anatomical site of wounding were recorded. Death before reaching medical care is defined as “killed in action” (KIA). Death after receiving medical care is defined as “died of wounds” (DOW).

Results: Ninety-seven patients sustained fatal injuries as a result of hostile action in British areas of military operations between 1 April 2002 and 12 Nov 2006. The median age was 27 years (range 18–42 years). 85(97) (87.6%) of the casualties were KIA and 12(97) DOW (12.4%). Of these, 35 (36%) were due to gunshot wounds (GSW) and 37 deaths (38%) resulted from improvised explosive devices (IED). There were 14 fatalities (14%) from other explosive mechanisms. There were 11 (11%) fatalities in aircraft, which had been downed by hostile fire. Anatomical region of injury is shown in the table. IED injury is significantly more likely to result in injury to multiple anatomical regions compared to GSW (p = 0.003).

Conclusion: The majority of individuals who die in modern combat succumb before reaching medical care. The predominant mechanism of fatal injury in recent wars has been penetrating injury from shell fragments; however, fatalities sustained in British military operations since 2002 are increasingly likely to have been inflicted by gunshot wounds or improvised explosive devices. This paper facilitates a discussion about the observed transition in fatal wounding mechanisms and will have important implications for designers of ballistic protection and medical planning.

Trauma and emergency surgery 0329

Damage control: a prospective series in emergency and elective surgery

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1Department of Surgery, Queen’s Medical Centre, Nottingham 2Department of Critical Care, Queen’s Medical Centre, Nottingham

Background: Damage Control Surgery (DCS) is established in the management of trauma patients who have massive intra-operative fluid resuscitation and/or develop intra-operative acidosis, hypothermia or coagulopathy. Its role in emergency surgery and elective surgery with unanticipated intra-operative complications is unclear.

Methods: Data for patients who underwent DCS was collected prospectively over an 11-month period. Observed 30-day and overall hospital mortality rates were compared with those predicted by the Portsmouth Physiological and Operative Severity Score for the enUmeration of Mortality (P-POSSUM) equation using Chi-Square test. Factors which may be associated with an adverse outcome include: age, sex, the presence of pre-operative acidosis, hypothermia, coagulopathy or raised serum lactate, the use of inotropes, length of operation, intra-operative acidosis, hypothermia or coagulopathy, massive intra-operative fluid resuscitation, fashioning a laparostomy, re-operation and failure of lactate clearance. Univariate analysis was performed to determine factors that showed an association with outcome measures.

Results: Twenty-four patients (mean age 55; 13 male) were studied. Seventeen (71%) were emergency admissions and underwent DCS for iatrogenic bowel (seven patients), intra-abdominal sepsis (six patients), pancreatic necrosectomy (five patients) and overwhelming intra-operative haemorrhage (two patients). Seven had DCS for overwhelming intra-operative haemorrhage during elective operations. Mean P-POSSUM physiological and operative severity scores were 33.75 (range 14–56) and 29.9 (range 19–37), respectively. The observed 30-day mortality rate of 25% was significantly lower than that predicted by P-POSSUM (81.7%, p = 0.004). Overall hospital mortality was 41.6% (p = 0.07). Univariate analysis demonstrated that having two or more re-operations was associated with increased 30-day mortality (p = 0.003) and the presence of pre-operative and intra-operative acidosis was significantly associated with increased overall hospital mortality (p = 0.02 and p = 0.04, respectively).

Conclusion: The use of DCS principles in emergency and elective surgery may lower mortality rates from those predicted by P-POSSUM.

Trauma and emergency surgery 1047

The post cardiac surgery laparotomy – treatment or early post-mortem?

U. Minhas, M. M. Yusuf, P. O’Keefe, M. H. Lewis
University Hospital of Wales, Cardiff

<table>
<thead>
<tr>
<th>GSW</th>
<th>IED/explosion</th>
<th>Aircraft</th>
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<tbody>
<tr>
<td>Multiple regions</td>
<td>9 (28%)</td>
<td>31 (62%)</td>
</tr>
<tr>
<td>Single region</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Not available</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>51</td>
</tr>
</tbody>
</table>

Conclusion: The post cardiac surgery laparotomy is significantly more likely to result in injury to multiple anatomical regions.

Trauma and emergency surgery 0883

External peer review identifies potentially preventable deaths from trauma

R. Davenport, C. Aylwin, E. Ward, J. Goosen, J. McLeod, K. Brohi, M. Walsh, N. Tai
The Royal London Hospital, London

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Background: Intra-abdominal complications (IAC) following cardiac surgery (CS) are rare. However, morbidity and mortality is high, particularly for gut ischaemia which carries almost a 100% mortality. The diagnosis of IAC following CS is notoriously difficult and few surgeons have much experience of these complications. The objective of this study was to review the IAC requiring laparotomy following cardiac surgery over a 5 year period in a single centre.

Methods: We performed a retrospective study on CS patients requiring laparotomy over a 5 year period from Jan 2000 – 2005.

Results: 4279 patients underwent CS during the study period with an overall mortality of 4%. 26 (0.6%) had abdominal symptoms following CS sufficient to warrant laparotomy. Laparotomy findings included 4 patients with duodenal ulcers (3 bleeding and 1 perforated) 2 perforated gastric ulcers, 1 perforated sigmoid colon, 1 pelvic abscess, 1 uraemic bladder injury and only 2 bowel ischaemias. A further 11 laparotomies were negative and notes were unavailable from 4 patients. Of the 26 patients who underwent laparotomy 18 patients died (69%). Causes of death included bowel ischaemia (2), sigmoid perforation (1), pelvic abscess (2), gastric perforation (2), bleeding duodenal ulcer (1). 10 of these patients had negative laparotomies.

Conclusion: Abdominal symptoms sufficient to warrant laparotomy occur rarely following CS. A significant number of patients undergo a negative laparotomy where no surgical pathology can be identified and these patients usually die post-operatively (91%). Although the literature suggests that gut ischaemia should always be considered post CS and warrants early laparotomy, in our series only two patients suffered this and both died despite operation. We conclude that laparotomy following CS is often negative, rarely of value and may even further compromise the patient. Lastly laparoscopy may be the investigation of choice in diagnosing IAC post CS.

Trauma and emergency surgery 0807

Should the appendix be removed during laparoscopy for right iliac fossa pain even when it does not appear macroscopically inflamed?

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Background: Laparoscopic appendectomy is becoming an increasingly popular method for removing appendices due to faster postoperative recovery, reduced post operative complications, and reduced incidence of negative appendectomy. With increasing experience of surgical trainees, intra-operative time is now also approaching that of open appendectomy. However, laparoscopic methods still have a negative appendectomy rate of approaching 20%. In order to reduce this figure, many surgeons elect not to remove an appendix which looks macroscopically normal, especially in the presence of other pathologies which may explain the patient’s symptoms. This practice has the potential to miss the microscopically inflamed appendix which appears normal to the naked eye.

Methods: We performed a retrospective analysis of both open and laparoscopic appendectomies at the NNUH over a one year period for patients presenting with a clinical picture of acute appendicitis. Operative notes were examined to see whether the appendix appeared macroscopically normal and whether it was removed or not. Histopathological records were evaluated to confirm the presence of microscopic appendicitis.

Results: Over a 1 year period, 365 operations for suspected appendicitis were performed. 76 were done open, 289 laparoscopically. Appendicectomy was performed in all open procedures regardless of the macroscopic appearance of the appendix. In 67 (88%) of open appendicectomies the appendix was thought to be macroscopically inflamed. In the remaining nine (12%) of open appendicectomies, in which the appendix was thought to be normal, only one was found to have a microscopic appendicitis. Appendicectomy was performed in 261 (90%) of laparoscopies. Of the remaining 28 cases (10%) where the appendix was left in-situ, in 20 (8%) this was due to finding other explanatory pathology, however in 8 (2%) of the cases it was left despite an absence of any other findings to explain the clinical picture. In 224 (86%) of the laparoscopies the appendix was thought to be inflamed by the surgeon. This was confirmed histologically in all cases. In 37 cases (14%) the appendix appeared macroscopically normal. Eight of these 37 “normal” appendices (22%) in fact had microscopic appendicitis.

Conclusion: Our results support the practice of routine appendicectomy for patients presenting with a clinical picture of acute appendicitis, even if the appendix appears normal on macroscopic examination, because there is frequently an element of microscopic inflammation which may account for the symptoms.

Activated Protein C is safe in patients with intra-abdominal sepsis

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Background: To establish if activated Protein C (aPC) is safe in surgical patients with intra-abdominal sepsis (IAS). APC has been used in the treatment of IAS in our hospital since 2003. Fears persist regarding the potential for clinically significant bleeding in this surgical sub-group of patients.

Methods: 44 patients with IAS received aPC as a standardized regime between March 2003 and August 2006. Retrospective medical and ICU chart review was undertaken. Data collected included clinically significant bleeds and mortality. Descriptive sub-group analysis of unexpected non-survivors (died in ICU with Apache II (APII) predicted mortality < 50%) and unexpected survivors (survived to discharge from ICU with APII predicted mortality > 50%) was performed as statistical analysis of such small patient numbers was inappropriate.

Results: There was 1 episode (2.7%) of clinically significant bleeding (from a mucous fistula). There were no intracranial haemorrhagic events. ICU mortality was 38.6% with mean APII predicted mortality 37.2% and in-hospital mortality of 47.7%. These exceeded rates for aPC treated surgical cohorts in the literature. The unexpected survivors (5/44) were more likely to have been admitted to ICU from theatre. They had a shorter mean time from hospital to ICU admission (2.6 versus 5.6 days), duration on ventilator (10.8 versus 17.5 days), vasopressor (9 versus 17.7 days) and RRT (10.5 versus 23.5 days) dependence. All unexpected non-survivors (11/44) had a diagnosis of perforation or fistulae. They were more likely to have been transferred to ICU from another hospital or ward than theatre. Co-morbidities were more severe.

Conclusion: 1. aPC was very safe in use in this group of critically ill surgical patients. 2. Although patients may fulfill standard criteria for aPC use, if there is no definitive surgical cure for the IAS, aPC is inappropriate. 3. Delay in commencement of aPC in surgical patients due to bleeding concerns may be contributing to the high mortality. Earlier perioperative use of aPC in selected cases may offer improved mortality benefit and we are undertaking a prospective audit to further investigate this.
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