Bilateral variations in the branching pattern of brachial artery

Adib A. Aughsteen¹, Hasan M. Hawamdeh², Muzahim Al-Khayat³

¹Department of Anatomy and Histology, College of Medicine, Hawler Medical University, Erbil, Iraq
²Departments of Pediatric and Community Medicine, Faculty of Medicine, Hashemite University, Zarqa, Jordan.
³Departments of Pediatric and Community Medicine, Faculty of Medicine, Surgery, Hashemite University, Zarqa, Jordan.

*Corresponding Author:
Dr. Adib A. Aughsteen (MBChB, M Med Sci, PhD)
Department of Anatomy and Histology, College of Medicine, Hawler Medical University, Erbil, Iraq.
Tel: +964 750 1394455
E-mail: adib@go.com.jo

Date of Received: May 28th, 2011
Date of Accepted: August 11th, 2011
Published Online: October 6th, 2011
Abstract
Multiple bilateral variations in the course and branching pattern of the brachial arteries were recorded in a 70-year-old male cadaver during the routine dissection carried in the practical sessions of the medical students of Hashemite University in Jordan. The right main brachial artery divided in the upper third of arm into the medial and lateral brachial branches. The medial brachial artery descended as the usual brachial artery with the median nerve crossing anteriorly from the medial to lateral side. In the cubital fossa, under the bicipital aponeurosis, it ended by dividing into the superficial ulnar and radial arteries. The lateral brachial artery descended posterolateral to the median nerve and continued in the cubital fossa as the common interosseous artery where it divided into the anterior and posterior interosseous arteries deep to pronator teres. The left brachial artery was smaller in size, and bifurcated high in the arm into the superficial radial and ulnar arteries. Unexpectedly, the left radial artery in the cubital fossa, gave origin to the common interosseous artery, which descended deep to pronator teres where it divided into the anterior and posterior interosseous arteries. These variations are thoroughly discussed and compared with previously published findings, and their clinical significances are highlighted.

Keywords
vascular anatomy, cadaver, male, variation, brachial artery

Introduction
The recognition and documentation of developmental variation in the course, distribution, and branching pattern of the arteries of upper limb is highly significant in the angiographic and surgical practice. The frequent existence of upper limb vascular variations is attributed to the complex and multiple sites of their embryonic development [1–3]. Variations of the upper limb arteries are rather common and have been reported since the 17th century [3]. The first systematic description and classification of these variations was published in 1844 by the Quain's review of literature and analysis of cadaver dissection and angiographic studies [4]. Several gross anatomical and radiographic reports have been published on various unusual branching and distribution patterns of upper limb arteries [5–10]. However, many conflicts and frustration in expressing the terminology and course of these variations are still faced. In a previous report [11], a duplicated incomplete superficial palmar arch solely arising from the ulnar artery was reported. The present report demonstrates bilateral variation in the course and branching pattern of brachial artery in the same cadaver.

Case Report
Developmental variations in the course and branching pattern of the right and left brachial arteries were observed and recorded in a 70-year-old male cadaver during routine cadaver dissection in the practical sessions of the medical students of Hashemite University, Jordan. The skin and fascia of the right and left upper limbs were completely dissected, and the neurovascular bundles of the axillae and the whole limbs were clearly explored. The course of the arteries and their branches were thoroughly traced and the observed anatomical variations were recorded and photographed using a Canon PowerShot A620 digital camera.

The axillary artery in both upper limbs had normal anatomical course and branching pattern with the branches of brachial plexus cords normally distributed around it. However, the anterior and posterior circumflex humeral arteries of the 3rd part of axillary artery in both limbs arose from a common trunk (Figure 1).
In the right upper limb, the principle brachial artery descended from axillary artery with median nerve lying anteromedial. The principle brachial artery, few centimeters below the origin of profunda brachii artery, bifurcated into the medial and lateral brachial arteries (Figure 2).
The medial brachial artery was larger in size, crossed anteriorly by the median nerve from medial to lateral side, and descended under the deep fascia representing the usual brachial artery. In the cubital fossa and deep to bicipital aponeurosis, it divided into superficial ulnar and radial arteries (Figure 2). The ulnar and radial arteries descended in the forearm under the deep fascia and superficial to the flexor muscles, however and unexpectedly, the radial artery gave origin to the common interosseous artery passing deep to pronator teres where divided into anterior and posterior interosseous arteries (Figure 3). The superficial palmar arch of the right palm was unique and was represented by duplicated incomplete arches solely originated from the ulnar artery. This variation was documented in a previously published report [11].

The smaller right lateral brachial artery descended in the arm posterolateral to the median nerve and gave origin to all branches normally arisen from a usual brachial artery. In the cubital fossa and lateral to the median nerve, it descended deep to pronator teres as the common interosseous artery (Figure 4).

In the left upper limb, the brachial artery was smaller in size, and a little below the origin of profunda brachii artery, it divided into the ulnar and radial arteries (Figure 4). The course of the ulnar and radial arteries was as usual in the forearm, however and unexpectedly, the radial artery gave origin to the common interosseous artery which descended deep to pronator teres and divided into the anterior and posterior interosseous arteries (Figure 5). The left superficial palmar arch showed no variation in the pattern of formation.