A Left Axillary Artery Variation: Case Report

Hanieh Bayat, Shabnam Movassaghi, Mohammad Akbari

Department of Anatomical Sciences and Cognitive Neuroscience, Faculty of Medicine, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran

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Abstract- Fetal abnormalities can cause axillary artery variations. Recognize and document of these variations are essential for surgeons performing interventional or diagnostic procedures for cardiovascular diseases. During routine dissection of an old female cadaver in the department of anatomy of Islamic Azad University, Tehran of Medical Sciences, we came across a variation in the branching pattern of the left axillary artery. The third part of the left axillary artery gave rise to a common trunk which was divided into the subscapular, lateral thoracic, posterior, and anterior circumflex humeral arteries.

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Keywords: Anatomic variation; Axillary arteries; Surgery; Dissection; Pectoralis muscles

Introduction

The axillary artery, an extension of the subclavian artery, spans from the first rib to the teres major muscle before transitioning into the brachial artery. It is segmented into three parts by the pectoralis minor muscle, giving rise to branches such as the superior thoracic artery and the thoracoacromial trunk. Variations in branching patterns are common, impacting arteries like the lateral thoracic artery. In clinical settings, the axillary artery plays a vital role in arterial cannulation during cardiac surgeries and can be safely clamped proximal to the origin of the subscapular artery. Understanding the anatomy of the axillary artery is crucial for surgical and radiological procedures involving the upper limb and thorax. (Figure 1) (1-5).

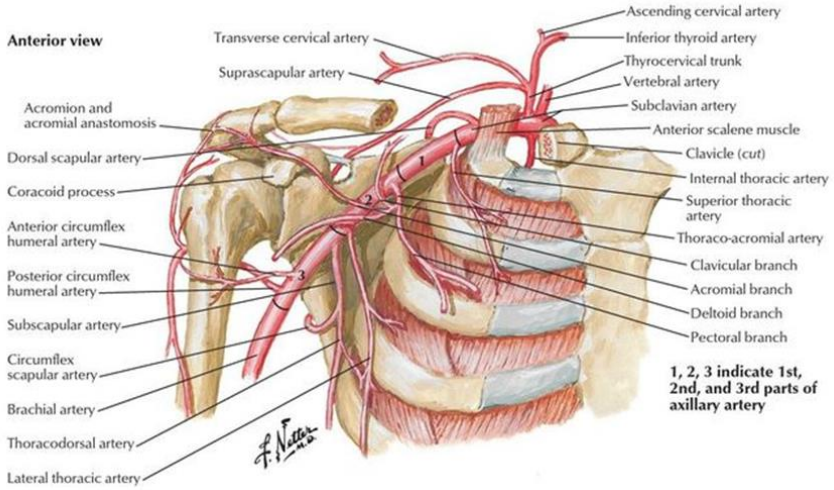

Figure 1. Schematic representation of normal branching pattern of axillary artery showing superior thoracic artery from the first part; thoracoacromial artery and lateral thoracic artery from the second part; subscapular artery, anterior circumflex humeral artery, and posterior circumflex humeral artery from the third part of the axillary artery (6)

Corresponding Author: M. Akbari
Department of Anatomical Sciences and Cognitive Neuroscience, Faculty of Medicine, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
Tel: +98 2122006660-7, E-mail address: akbarimo1338@gmail.com

Case Report

During a routine dissection for undergraduate medical students at the Department of Anatomy, Islamic Azad University, Tehran of Medical Sciences, Tehran, Iran, in August 2021, a unique variation in the branching pattern of the left axillary artery was observed in an elderly female cadaver. The right axillary artery displayed a normal branching pattern. Notably, the first part of the left axillary artery gave rise to the superior thoracic artery, while the second part produced the thoracoacromial artery with its branches. However, the third part of the artery diverged into a common trunk that divided into four distinct branches: the lateral thoracic artery, the anterior and posterior circumflex humeral arteries, and the subscapular artery. This observation is novel and has not been previously documented in radiological studies. The subclavian and brachial arteries on both sides exhibited normal branching patterns.

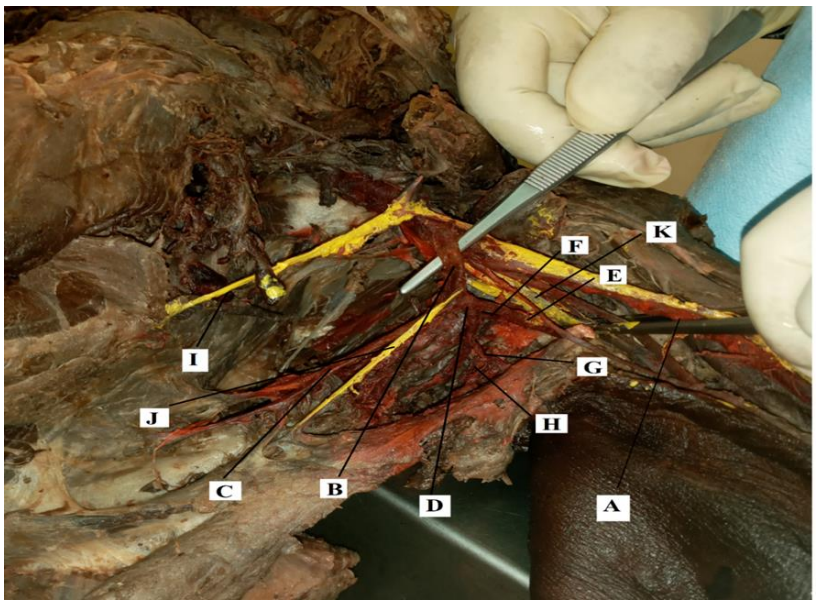

Figure 2. Dissection of left axilla shows the variant branching pattern of axillary artery: A: axillary artery, B: Third part of the axillary artery, C: Lateral thoracic artery, D: Common trunk artery, E- Anterior circumflex humeral artery, F: Posterior circumflex humeral artery, G: Circumflex scapular artery, H: Thoracodorsal artery, I: Long thoracic nerve, J: Thoracodorsal nerve, K: Axillary nerve

Discussion

The present study shows variations of the axillary artery in which the lateral thoracic artery, anterior humeral circumflex, posterior humeral circumflex arteries, and subscapular artery originate from the common trunk of the third part of the axillary artery. According to studies, the number of arterial variations on the right is two times that of the left arterial variations (7). As organ buds grow, the main artery expands longitudinally (8). Changes in the branching pattern of the main arterial trunks have been reported by up to 20% in adult human organs (9). The origin and morphology of axillary artery branches varied, and according to studies, axillary artery branches often branched together (10,11). During embryogenesis, the axial artery of the upper limb is formed by the enlargement of the outer branch of the seventh artery between the cervical vertebrae, and arterial variations can occur due to differences in the development of the vascular network of the buds of the organs in the embryo (12). Also, in a 2012 study of 40 adults, Astic *et al*., the origins of the subscapular artery, anterior humeral circumflex artery, posterior humeral circumflex artery, and profunda brachii artery originated from the common trunk of the third axillary artery (13). After examining 92 upper limbs of 82 bodies in Midwestern University, the results were as follows: in 45 bodies, the external thoracic artery was directly separated from the axillary artery, in 30 bodies from the thoracodorsal artery, and in 6 the corpse also originated from the artery before the humeral circumflex artery branched (14,15). Recognize and document axillary artery variations due to surgical procedures in this area, as well as cases of

axillary lymph node removal or shoulder dislocation, the use of upper extremity artery branches for flaps in reconstructive surgery, angiography, and coronary artery bypass grafting, and for surgeons, anatomists, and medical professionals is essential (16-18).

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