

## ABNORMAL BRANCHING PATTERN OF THE AXILLARY ARTERY – A CASE REPORT

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### ABSTRACT

**Introduction:** Axillary artery is the derivative of axis artery of the upperlimb. It is prone to damage during injuries like penetrating wounds, during traumatic dislocation of the shoulder. It is the artery for ligation during amputation procedures of the upperlimb. Compression of the third part against the humerus may be necessary when profuse bleeding occurs. Axillary artery bypass is one of the most commonly performed extra anatomic bypasses in vascular surgery today. Variations are frequent in the axillary artery and significant during vascular surgeries.

**Materials & Methods :** Exposure of axillary artery and its branches was achieved following classical incisions and dissection procedures in 50 upper limbs of 25 cadavers (15 males & 10 females) of the department of Anatomy, Sri Ramachandra. Medical College, Chennai and all the branches of the axillary artery were studied. During such study, an unusual variation was found in one upper limb.

**Observation:** Variations in the axillary artery looked for and recorded. A common trunk from the second part for thoracoacromial, lateral thoracic, subscapular and posterior circumflex humeral artery was observed in one of the cases. Superior thoracic artery arose from the first part. Anterior circumflex humeral artery arose from the third part.

**Discussion:** An axial arterial pattern represented in the adult by axillary artery, brachial artery and interosseous artery of the forearm develops first while other branches develop later from the axial system. The anomalies can be explained by the persistence of embryological vessels, genetic influences, factors like fetal position in utero, first limb movement or unusual musculature

**Key words:** axillary artery, axis artery, subscapular artery

### INTRODUCTION

The **axillary artery** the continuation of the subclavian artery commences at the outer border of the first rib, and ends at the lower border of the tendon of the teres major muscle, where it takes the name of brachial artery. To facilitate the description of the vessel it is divided into three portions; the first part lies above, the second behind, and the third below the pectoralis minor. The axillary artery is conveniently described as giving off six branches but the number arising independently from it, is subject to considerable variations; two or more of its standard branches may arise by a common trunk or a usually named artery may arise separately. The commonly described branches of the axillary artery are superior thoracic artery, thoraco-acromial artery, lateral thoracic artery, subscapular artery, anterior circumflex humeral artery and posterior circumflex humeral artery. (Williams et al, 1989)<sup>(1)</sup>

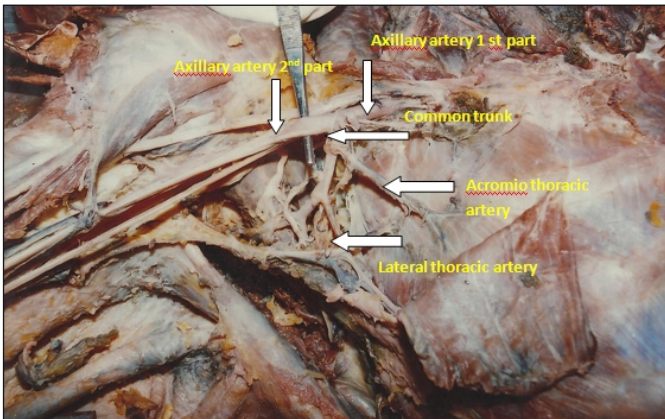
### MATERIALS & METHODS

Axillary arteries belonging to 50 upper limbs of 25 cadavers (15 males & 10 females) of the department of Anatomy, Sri Ramachandra. Medical College, Chennai comprised the material for the study. These limbs were dissected retaining continuity with the trunk. Exposure of axillary artery and its branches was achieved following classical incisions and dissection procedures taking care to preserve all the branches of the axillary artery. Variations were observed and recorded.

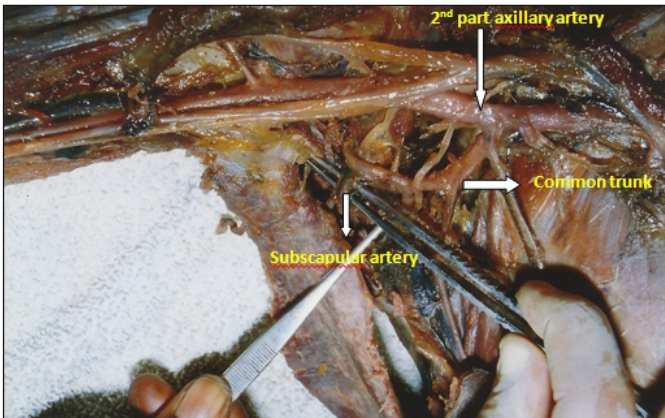
### RESULTS

The first part gave the superior thoracic artery (Fig. 3). A common trunk (Fig. 1) for thoraco-acromial (Fig. 4), lateral thoracic (Fig. 4), subscapular (Fig. 2) and posterior circumflex humeral artery (Fig. 4) was found. The anterior circumflex humeral artery arose from the third part (Fig. 5).

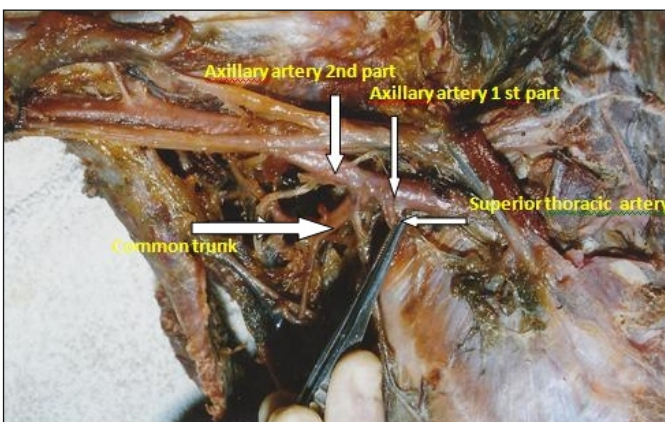
**Figure 1. Axillary artery with common trunk from 2<sup>nd</sup> part and brachial plexus exposed**



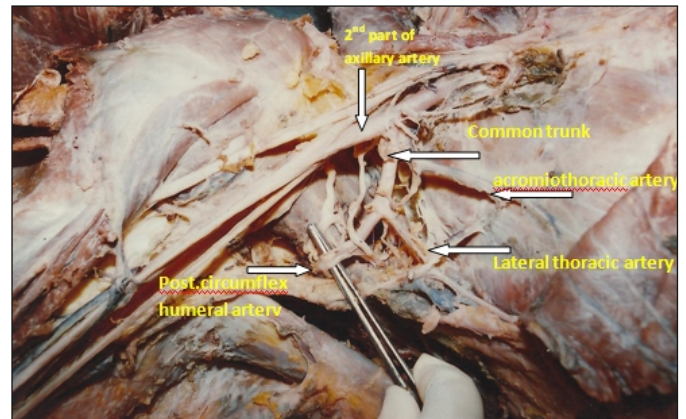
**Figure 2. 2<sup>nd</sup> part of axillary artery giving a common trunk which gives subscapular artery**



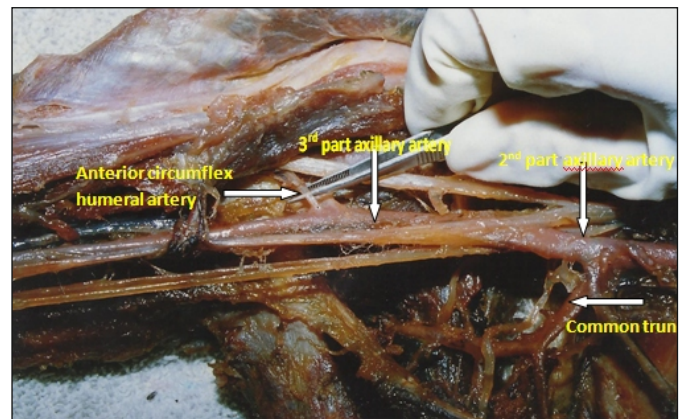
**Figure 3. superior thoracic artery from 1<sup>st</sup> part, common trunk from 2<sup>nd</sup> part of axillary artery**



**Figure 4. 2<sup>nd</sup> part of axillary artery giving a common stem which gives acromiothoracic, lateral thoracic, posterior circumflex humeral arteries**



**Figure 5. anterior circumflex humeral artery arising from 3<sup>rd</sup> part of axillary artery**



**DISCUSSION**

The branches of the axillary artery vary considerably in different subjects. Occasionally the subscapular, circumflex humeral, and profunda brachii arteries arise from a common trunk, and when this occurs the branches of the brachial plexus surround this trunk instead of the main vessel. Sometimes the axillary artery divides into the radial and ulnar arteries, and occasionally it gives origin to the volar interosseous artery of the forearm. (Williams et al, 1989)<sup>(1)</sup>

The upper limb arteries develop in five stages. An axial arterial pattern represented in the adult by

axillary artery, brachial artery and interosseous artery of the forearm develops first while other branches develop later from the axial system. In the later stages the median artery branches from the anterior interosseous artery and the ulnar artery branches from the brachial artery respectively. In the further course of development a superficial brachial artery arises from the axillary artery and it continues as radial artery. Regression of the median artery and an anastomosis between the brachial artery and superficial brachial artery with regression of the proximal segment of the latter gives rise to the definitive radial artery. The anomalies can be explained by the persistence of embryological vessels. Genetic influences are deemed to be prevalent causes of such variation, although factors like fetal position in utero, first limb movement or unusual musculature cannot be excluded. (M. Rodriguez-Niedenfuhr, G. J. Burton, 2001)<sup>(2)</sup>

Common variations in literature:

(Ronald A. Bergman, Adel K. Afifi, Ryosuke Miyauchi 2006)<sup>(3)</sup>

The major variations of the axillary artery are:

Occasionally, it gives rise to the radial artery or, more rarely, to the ulnar artery. Still more rarely, it gives rise to the interosseous artery or a vas aberrans. It may give rise to a common trunk from which may arise the subscapular, anterior and posterior circumflex humeral, profunda brachii, and ulnar collateral arteries. The branches of the brachial plexus may surround this common trunk not the main brachial artery.

The first part of the axillary artery may also provide an accessory thoraco-acromial artery. The third part of the axillary artery is occasionally covered by a muscular slip (an axillary arch muscle) derived from the upper part of the tendon of latissimus dorsi. Unusual branches of the axillary include a glandular artery to lymph nodes and skin of the axilla (so called alar thoracic artery) and an accessory lateral thoracic artery.

A common trunk from second part of the axillary artery was reported by Kumar.Bhat<sup>(4)</sup> in 2008. which gave rise to muscular branches to pectoralis major and deltoid, lateral thoracic artery, subscapular artery and thoracoacromial artery. In the variation reported by VijayaBhaskar<sup>(5)</sup> in 2006 the third part of the axillary artery divided into superficial brachial and deep brachial arteries. The superficial brachial artery continued in the arm without giving any branches and ended in the cubital fossa dividing into radial and ulnar arteries. The deep brachial artery gave rise to subscapular, profunda brachii, articular branch to the shoulder joint, anterior circumflex humeral artery and posterior circumflex humeral artery.

Therefore the variation observed in this case will be of clinical use in the following instances:

In performing a brachial plexus block, it is important to feel the pulsation of the axillary artery

before performing it. In such variation the relation of the artery to the brachial plexus may be

disrupted causing difficulty in the procedure. Also such arterial variations may put the artery at

risk of injury during a central venous cannulation into the subclavian vein in which usually the

subclavian artery is at risk. (C. B. C. Tan, 1994)<sup>(6)</sup>

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