



ANAMALOUS BRANCHING PATTERN OF RIGHT AXILLARY ARTERY: CASE REPORT

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ABSTRACT Axillary artery is continuation of subclavian artery. It is divided into 3 parts by Pectoralis minor muscle, 1st part gives superior thoracic artery, 2nd part gives 2 branches- Thoracoacromial artery, lateral thoracic artery & 3rd part give rises to 3 branches –Subscapularis artery, Anterior circumflex humeral artery & Posterior circumflex humeral artery. An anomalous branching pattern in axillary artery was found during routine anatomical dissection on the right upper limb of a 55 year old male cadaver. This finding is of academic interest and clinically significant for surgeons, Radiologist & Orthopaedicians operating in this area for shoulder joint fracture & dislocation or brachial plexus injury.

KEYWORDS : Axillary artery, Shoulder joint, Coracobrachialis.

Introduction:

The Axillary artery is often referred to as having three parts, with its divisions based on its location relative to the Pectoralis minor muscle, which is superficial to the artery. First part give superior thoracic artery, two branches – Thoraco-acromial artery and Lateral thoracic artery arises from 2nd part while 3rd part gives origin to Subscapular artery, anterior circumflex humeral artery & Posterior circumflex humeral artery. However origin of these branches is highly variable. Previous research studies have documented different types of variations in their course and branching pattern which shows that there is no fixed and standard branching pattern of the Axillary artery [1-3]. The knowledge of variant vascular pattern is important for the Radiologists, vascular Surgeons, Anaesthesiologists and the Clinical Anatomists while doing the procedures in and around the axilla.

In present study three aberrant branches were discovered, arising from 2nd and 3rd part of the artery. One branch was supplying shoulder joint and two others were muscular branches.

Case report:

During routine dissection for under graduate medical student, we observed unusual unilateral variation in branching pattern of the right Axillary artery in a male cadaver.

During dissection of the axillary region, the axillary artery was exposed and cleaned. The course and branching pattern was then noted and reported in this study. First part of artery didn't give any branch. Apart from the usual two branches, 2nd part of the artery gave rise to a 3rd unusual branch to the Shoulder joint. This aberrant branch originated from superior surface of main trunk at the distance of 8 cm from outer border of first rib. The artery traversed backward and upward behind the Musculocutaneous nerve and its twig to the coracobrachialis muscle for about 2.8 cm. It terminated by supplying the shoulder joint. (fig. 1)

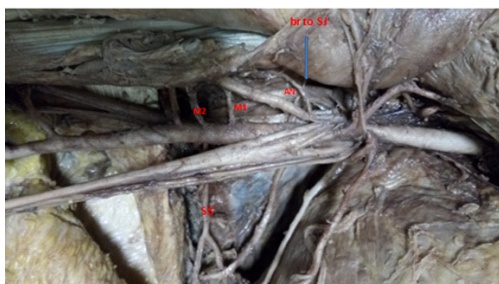


Figure 1: origin, course and relation of branch to the shoulder joint. (blue arrow)

M1–muscular branch1, M2 –muscular branch 2, AN- Axillary nerve, MPN- Medial pectoral nerve, SS- Subscapular artery

3rd part of the axillary artery gave 5 branches, out of which 3 were normal and 2 others were muscular branches. First branch of this part was muscular branch (M1) supplying the Coracobrachialis muscle. M1 arose from superior aspect of the axillary artery, 9 cm distal to the outer border of first rib. 2.5 distal to its origin M1 ran towards the neck of Humerus, superficial to the Axillary nerve but deep to the musculocutaneous nerve. (fig. 2)

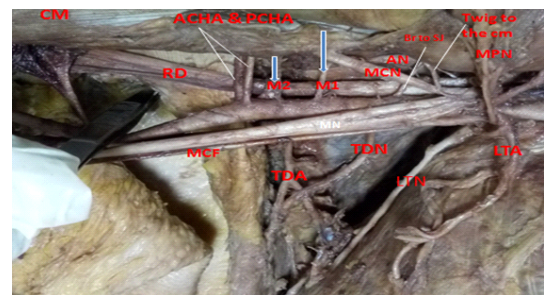


Figure2: showing anomalous branches (M1, and M2, shown by blue arrow) arising from 3rd part of right Axillary artery

ACHA–Anterior circumflex humeral artery, M1–muscular branch1, M2 –muscular branch 2, MCN- Musculocutaneous nerve, PCHA- Posterior circumflex humeral artery, AN- Axillary nerve, MPN- Medial pectoral nerve, MCF- Medial cutaneous nerve of forearm, TDN- Thoracodorsal nerve, TDA – Thoracoacromial artery, LTN- Long Thoracic nerve, CM – Coracobrachialis Muscle, RD – Radial nerve, LTA- Lateral thoracic artery, Br. to SJ-Branch to the Shoulder Joint, SS- Subscapular artery, MN- Median nerve

2nd branch of this part was also muscular (M2). It originated 0.8 cm distal to the M1, opposite the origin of Subscapular artery. It was 2.2 cm long. Both M1 and M2 ended by supplying Coracobrachialis muscle from its deep surface. Rest 3 branches (Subscapular artery, anterior circumflex humeral and posterior circumflex humeral artery) followed normal course (fig.1,2)

Course and branching pattern of axillary artery of left side, was normal.

Discussion:

Variations related to the Axillary artery are not uncommon. De Garis and Swartley in their study of 512 cases on white and Negro stocks documented 5-11 branches originating from Axillary artery [1]. In our case we found 8 branches wherein superior thoracic artery was absent.

Cavdar *et al.* observed that the third part of Axillary artery gave two branches named superficial and deep brachial artery. The anterior and posterior circumflex humeral artery, Subscapular artery, and Profunda brachii artery arose from deep brachial artery.[4] In present study 5

branches arose from 3rd part of Axillary artery out of them 3 were normal and variant 2 branches ended by supplying Coracobrachialis muscle.

Suman et al reported an aberrant artery emerging from the postero-inferior surface of the third part of Axillary artery arising between Acromio-thoracic trunk and anterior circumflex humeral artery. It coursed towards the shoulder joint to supply it by passing deep to the Coracoid process [5]. In present case the artery to the shoulder joint arose from second part of Axillary artery.

According to Samta et al the second part of Axillary artery illustrated two to three extra branches in 6% of cases called as Alar arteries. They also documented that in 4% cases Subscapular artery originated from the second part of Axillary artery but the circumflex artery did not arise from the Subscapular artery [6].

Arey LB. [1957] explained embryologically that the causes of the anomalies of blood vessel are disappearance of vessels normally retained, persistence of vessels which are normally obliterated, incomplete development, fusions and absorption of the parts which are usually distinct and choice of unusual paths in the primitive vascular plexuses [7].

Coracobrachialis muscle is supplied muscular branches from brachialis artery. In present case axillary artery was supplying the muscle. [8]

As described by Langman 12th edition FGF2 induces development of Blood Island from mesodermal cell forming hemangioblast. These hemangioblasts forms blood vessels and cells by VEGF. VEGF stimulate proliferation of endothelial cells at the point of origin of new vessels. Finally the PDGF and TGF β helps in modeling and stabilization of the developing vessels. Thus any alteration in the developmental process may lead to formation of variant arterial pattern. [9] Accordingly, existence of 3 variant branches in present study may be due to persistence of vessels which should have been obliterated.

Knowledge of such variant vascular pattern is vital for a surgeon operating in this area for reconstructive surgery of carcinoma breast [10], Arterio-venous fistula [11], Axillary artery thrombosis [12] and post traumatic reconstructive surgery of axillary artery [13].

Conclusion:

Detailed knowledge of altered vasculature of axillary artery can be of colossal importance for accurate diagnostic interpretation while treating Brachial plexus Palsy, surgical interventions for fractured upper end of Humerus and shoulder dislocations, creating the Axillary-Coronary bypass shunt in high-risk patients, cannulating the Axillary artery for several procedures and angiography in chest wall reconstruction.

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