AXILLARY FOSSA VARIATIONS

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ABSTRACT

Knowledge of muscular, vascular, and neural variations in the axilla is of great clinical importance, especially in mastectomies, breast reconstruction, and axillary bypass operations. The aim of our study is to emphasize on multiple variability of the axillary structures and its clinical importance. In this paper we report some varieties of the axilla, found in two cadavers, including: the axillary arch muscle of Langer; atypical inflow of cephalic vein into external jugular vein; variations in branching of brachial plexus. In one of the axillae we discover an availability of muscular fibers bridging between pectoralis major and latissimus dorsi muscles. The second finding though more rare than the first one is of particular importance for cardiac implant techniques still treating the cephalic vein as a target for venesection. The branching varieties of the nerves in the axilla are presented by musculocutaneus nerve starting from median nerve. Identification of the axillary arch and its variations may help avoid accidental injury to axillary vessels and the brachial plexus during surgical procedures. Some device implanters still prefer to cut down the cephalic vein as the initial approach to venous access for transvenous placement of pacemaker or defibrillator leads out of concern for the risk of pneumothorax, subclavian crush, and other possible complications. Anesthesiologists administering local anesthetic blocks and surgeons operating in the axilla should be aware of nerve varieties to avoid iatrogenic injury. We conclude that more wide concern of the pattern of the axillary fossa structures is necessary to escape inadvertent accidents.

Key words: *human anatomy variations, axillary arch, cephalic vein, brachial plexus, axillary fossa*

INTRODUCTION

The human anatomic variations though rare are often concomitant. The finding of more than one variation is possibly due to common onto- and phylogenetic similarities of the variable structures and their aberration from the standard mean. Knowledge of muscular, vascular, and neural variations in the axilla is of great clinical importance, especially in mastectomies, breast reconstruction, and axillary bypass operations (10). The axillary region is a clinically important area because it possesses neurovascular and lymph node structures associated between the neck and the upper limb. Anatomical variations of axillary muscular slips may cause obstructions of axillary vessels and nerves (4). Muscular variations in the axillary region may be involved in thoracic outlet syndrome, shoulder instability, development of lymph edema of the upper limb, and surgical interventions such as breast surgery (2,11,13). By shoulder magnetic resonance imaging examination, Guy et al. (3) suggested that the axillary arch can cause lymph node concealment and brachial plexus impingement. Rarer is the cephalic vein abnormality on the same cadaver and its entity and course of great importance for transvenous lead placement (7). Accent on axilla is performed

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by these two cases in order to highlight the regional awareness.

MATERIAL AND METHODS

Two Cases Report: **Cadaver 1** - In this case we describe two concomitant variations in the proximal end of the upper limb. Such dual combination of abnormal structures is not found in the available literature, that is the presence of Langer's axillary arch and unusual termination of cephalic vein into the external jugular vein (Fig. 1 and Fig. 2).

Fig. 1. Cephalic vein with unusual end in external jugular vein

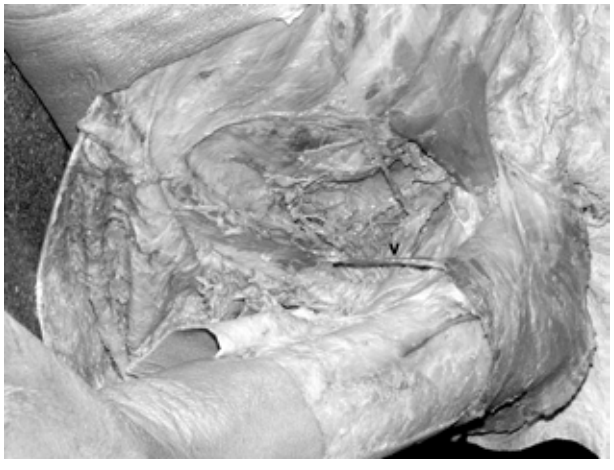

Fig. 2. Axillary arch of Langer

The axillary arch found in our department during routine students' dissection has two tendinous ends. It bridges between pectoralis major lower border and latissimus dorsi muscles. It is massive and prominent muscular formation palpable in axillary fossa contents and having a transverse course. More rare but found first during our work was an extra subcutaneous vein connection over clavicle, which was proved to be cephalic vein with unusual course. The variable cephalic vein was situated in the deltopectoral groove, passing over clavicle medial to the attachment of deltoid muscle. The superficial dissection on the neck revealed that that structure entered omoclavicular triangle piercing the cervical fascia and reached the external jugular vein as its final destination.

Cadaver 2 - In the right axillary fossa of a male cadaver it was found out that the musculocutaneous nerve had its beginning more distally than usual and was coming out from median nerve 41 mm further from its formation. The rest of the brachial plexus had its normal pattern.

Fig. 3. Musculocutaneous nerve originating from median nerve trunk

DISCUSSION

Ramsay first described the axillar arch muscle (AMM) in 1795 (1,8). Testut observed what he stated to as the axillary arch of Langer in 1884, (16) while Sachatello identified this variation as the axillopectoral muscle in 1977 (12). The AAM is the most common variation of the axilla with a reported incidence of 7%–8%, it crosses from the edge of latissimus dorsi, midway in the posterior fold, over the front of the axillary vessels and nerves to join the tendons of pectoralis major, coracobrachialis or the fascia over the biceps (15).

Variations of this muscle typically involve a bidirectional slip with one origin and one insertion (1). Few cases are reported in the literature with more complex connections and multiple site insertions (8). We describe a case where the variant axillary arch originates from latissimus dorsi and inserts on pectoralis major with distinguished middle-placed body and peripheral tendinous extensions. This case is classified as the classic case of axillary arch with not unusual attachments.

Axillary arch muscle is implicated in various clinical complications (4). Langer's arch can occasionally be palpable during routine clinical examination when, presenting as an axillary mass, it can be confused with enlarged lymph nodes or soft tissue tumors (2).

Identification of the axillary arch and its variations may help avoid accidental injury to axillary vessels and the brachial plexus during surgical procedures (10). It's of great importance during mastectomy, breast reconstruction and lymph node biopsy. The anterior edge of the latissimus dorsi marks the dorsal extent of a total mastectomy (14). Langer's arch may be a direct relation of the axillary structures, such as the thoracodorsal neurovascular bundle, the brachial plexus, the lateral lymphatic trunks or the axillary vein. These structures may be at risk if the presence of Langer's arch is not considered, leading to bleeding or nerve damage (2). Axillary arch muscle may be involved in neurovascular compression syndrome (9) and provoke circulatory deficiency, chronic pain, and parestesiae in the arm, forearm, and hand (5). Furthermore, it is possible that axillary arch causes functional disturbances including shoulder elevation and hyperabduction syndrome because of the restriction of axillary muscular slip (4). The axillary arch can pose difficulty during sentinel lymph node biopsy because the slip stretches in the hyperabducted position and shifts the node higher (6). The above pointed reports show the multiple implications of the AAM, which underlines the importance of our finding.

While the subclavian or axillary vein can be safely and successfully punctured in the majority of cases, some device implanters still prefer cut down to the cephalic vein as the initial approach to venous access for transvenous placement of pacemaker or defibrillator leads out of concern for the risk of pneumothorax, subclavian crush, and other possible complications. Very occasionally, like in this case, the cephalic vein crosses superficial to the clavicle to join the external jugular vein, making it rather unappealing for this purpose. Relying on a guide wire introduced through the cephalic vein to guide puncture of the subclavian vein is unlikely to be successful in such a situation and may cause accidental damage to the vital structures in the thoracic inlet region (7). Multiple variations in the axilla will increase the possibilities of iatrogenic injuries like nervous or vascular lesions.

CONCLUSIONS

Varieties are sometimes subtle and misdiagnosed except occasionally and after the death of the individual. The knowledge of this part of human anatomy is of great importance for the physicians and should be considered always to avoid unexpected incidences. Axillary fossa is quite important since it is one of the most variable regions and also a common target for clinicians.

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