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Variant Origin of Pronater Teres from Struthers Ligament with Higher Bifurcation of Brachial Artery

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Abstract
During routine dissection of the upper limb of an adult male cadaver we noticed the Struthers ligament with variant higher origin of Pronater teres from it. We have also noticed the higher bifurcation of Brachial Artery as superficial and deep brachial arteries. Knowledge of these kinds of vascular variations is important during vascular and reconstructive surgeries and also in evaluation of angiographic images. Trauma to the Radial artery is common because of its superficial course .As Ulnar artery and Median nerve were passing beneath Struthers ligament they may get compressed and cause neurovascular complications. Hence knowledge of these kinds of rare variations is important for surgeons, radiologists and clinicians.

Key Words: *Struthers ligament, Pronater Teres, Brachial Artery, Coracobrachialis.*

INTRODUCTION

The Coracobrachialis muscle arises from the tip of coracoid process of scapula together with short head of biceps and is inserted into the middle of medial border of shaft of humerus. It represents the adductor muscle of arm but such function is insignificant in man. The Coracobrachialis is tricipital in origin but in case of humans upper two heads fused to take origin from coracoid process and encloses Musculocutaneus nerve. The lower head is usually suppressed, if present is represented by a fibrous band called as Struthers ligament or inter brachial ligament. Ligament of Struthers extends from supracondylar process which is a bony projection present on the anteromedial surface of lower part of shaft of humerus to the medial epicondyle of humerus. Median nerve and Brachial Artery may pass beneath the ligament which may compress upon to cause neurovascular symptoms.[1]

Some authors have also reported the variant high origin of Pronater teres from Struthers ligament which is very rare.[2&3]

The Brachial artery begins as a continuation of Axillary artery at the lower border of Teres major and ends at the neck of radius into Radial and Ulnar arteries deep to bicipital aponeurosis. The Brachioradialis muscle overlaps the radial artery in the upper part of forearm, later it becomes superficial in the lower part in between the tendons of brachioradialis and flexor Carpi radialis.[1]

The Brachial artery may bifurcate at more proximal level than usual, in this case the ulnar & radial arteries begin in the middle part of the arm and the median nerve passes between them. Superficial ulnar artery seen in approximately 3% of individuals.[4] In this case course and its branches becomes very important to note.

CASE REPORT

During routine dissection of an adult male cadaver in the department of anatomy for Undergraduates we found the following variations in right upper limb.

We found a fibrous band extending from the anteromedial surface of lower part of shaft of humerus below the insertion of Coracobrachialis to medial epicondyle of humerus in a fan shaped manner, this is ligament of Struthers. There was no supracondylar process. The Pronater teres muscle was found to arise from ligament of Struthers along with its normal origin from medial epicondyle and lower part of medial supracondylar ridge (fig-1).

The Brachial artery was bifurcating in the mid arm 16cms from interepicondylar line of humerus into superficial brachial artery and deep brachial artery. Superficial brachial artery continued as Radial artery and deep brachial artery continued as ulnar artery in the forearm. Median nerve and Ulnar Artery passed beneath Struthers ligament, further course and distribution were normal. There was no narrowing of median nerve and Ulnar Artery beneath ligament and post-stenotic dilatation of artery (fig-2).

The Radial artery passed medial to Biceps brachii and superficial to ligament of Struthers up to elbow joint, later it followed a superficial oblique course over Brachioradialis in the upper part of forearm; in the lower part it followed a normal course. It gave only muscular branches to Biceps and Brachioradialis. Ulnar artery followed normal deep course.

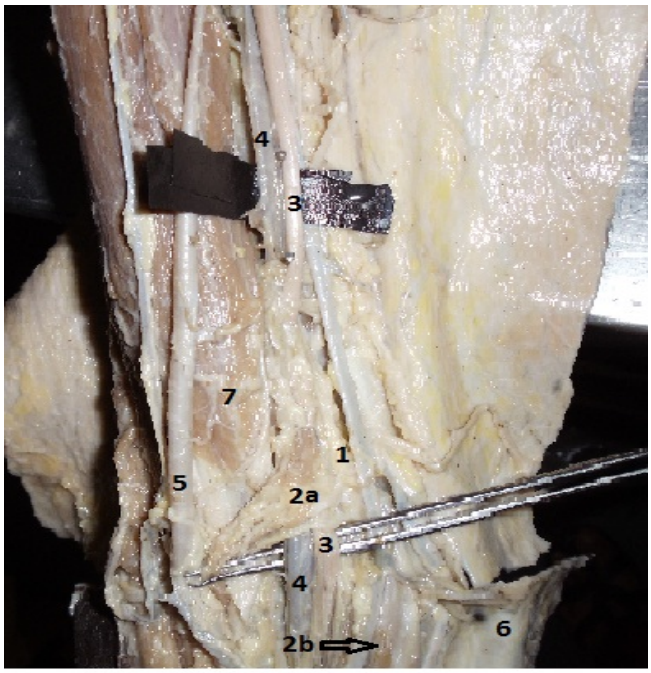

Fig-1: Showing Struthers Ligament and Reflected Accessory head of Pronater Teres

1- Struthers Ligament, 2a-Reflected Accessory head of Pronater Teres, 2b(arrows)-Humeral head of Pronater Teres, 3-Median Nerve, 4-Deep Brachial Artery, 5-Superficial Brachial Artery, 6-Medial Epicondyle, 7-Biceps Brachii.

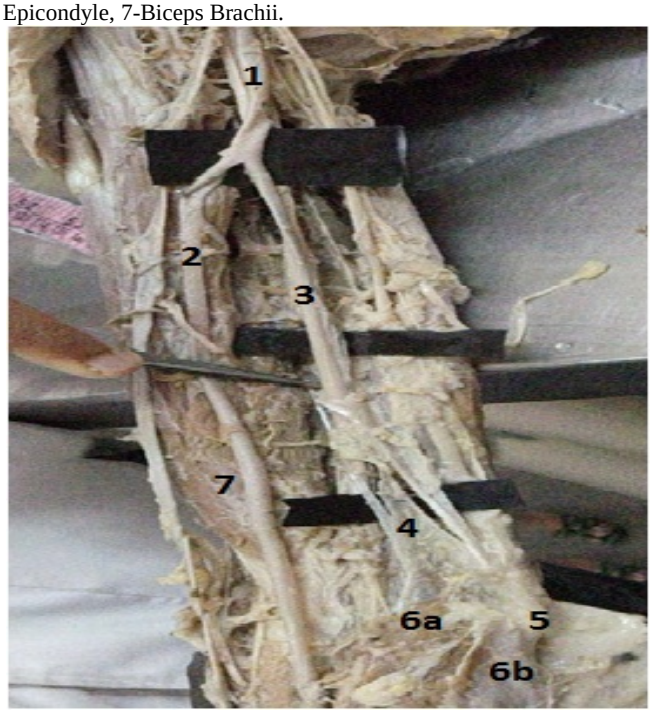

Fig-2: Showing Higher Division of Brachial Artery (Median Nerve is overlapped by Deep brachial artery).

1-Brachial Artery, 2-Superficial Brachial Artery, 3-Deep Brachial Artery, 4-Struthers Ligament, 5-Medial Epicondyle, 6a-Accessory head of Pronater Teres, 6b-Humeral head of Pronater Teres, 7-Biceps Brachii.

DISCUSSION

The Coracobrachialis muscle is more important morphologically than functionally. It is the sole representative of adductor group of muscles in the arm. During the process of evolution adduction function became insignificant in man. The three heads of Coracobrachialis muscle are described in amphibians and reptiles-

1) Coracobrachialis brevis- inserted into humerus superior to tendon of latissimus dorsi

2) Coracobrachialis medius- inserted into humerus inferior to tendon of latissimus dorsi

3) Coracobrachialis longus-extends inferiorly upto medial supracondylar ridge and sometimes up to medial epicondyle also called Wood's muscle. The Coracobrachialis in man represents fused brevis and medius. If longus persists in man represents a fibrous band extending from supracondylar process to medial epicondyle of humerus, this was first time described by Struthers hence called ligament of Struthers. Supracondylar process or spur is bony projection of 2-20mm length present on anteromedial surface of lower part of shaft of humerus. But in few cases it may be absent and ligament of Struthers extends from anteromedial surface of lower part of shaft of humerus to medial epicondyle of humerus.[5]

Struthers ligament forms an osseofibrous tunnel through which Median nerve and brachial artery or its terminal branches may pass which is normally seen in lower animals for protecting the vessels and nerves.[3&6]

A radiographic study done in Turkish living individuals showed incidence of supracondylar process as 1% out of 903 cases, overall incidence of Struthers ligament is less than 2%.[7] In the study done by Testut on 921 cadavers gave a frequency of 0.6%.[8] According to some authors the ligament of Struthers very rarely gives origin to Pronater teres. From embryological point of view the Struthers ligament is a remnant of tendon of vestigial muscle the latissimo – condyloideus which is found in some climbing animals and also provides a large muscular attachment for Pronater teres.[3]

Brachial artery normally bifurcates at the neck of radius into Radial and Ulnar arteries; occasionally it may bifurcate at a higher level. Harbans etal have reported a case of bilateral higher bifurcation of brachial artery at mid arm and superficial course of Radial artery in the fore arm. Mid arm bifurcation is rare.[10] Namani etal have reported a case of unusually short segment right Brachial artery of 11.5cm length and having slightly less caliber than usual. Brachial artery bifurcated in to Radial and Ulnar arteries of same caliber branches and course of these were normal.

These vascular anomalies occur due to persistence of vessels which normally obliterate and disappearance or failure of development of vessels which normally persist. This reversal of the normal process of vascular development is largely due to altered local hemodynamic environments.[9] Jelev etal have observed a case of coexistence of Variant high origin of Pronater teres from ligament of Struthers with absent musculocutaneus nerve-which has fused with median nerve and branches to Coracobrachialis and Biceps arose from median nerve.[3] most of cases ligament of Struthers is usually

asymptomatic but in some cases it may cause entrapment of median nerve causing paraesthesia or hypoesthesia of hand and fingers, weakness of forearm and hand muscles. Compression of Brachial artery or its branches causes ischaemic pain in forearm and hand, embolisation of distal arm arteries.[2, 3,6] Superficial course of Radial artery makes it vulnerable to trauma and bleeding. It may be mistaken for a vein and accidental injection of certain drugs may cause reflex vasospasm and gangrene of hand. Being superficial makes it accessible for cannulation and also used as a graft for coronary artery bypass graft surgery.[10]

Higher bifurcation of brachial artery may disturb the evaluation angiographic images. Knowledge of such variations has got clinical importance in the field of vascular, orthopedic and plastic surgeries.[9]

REFERENCES

1. Standring S, Johnson D, Ellis H, Collin P. Pectoral girdle and Upper limb. In: Ellis H, Healy J C, Johnson D, Williams A, Collins P. Gray's Anatomy.39th Ed. Philadelphia, Elsevier Churchill Livingstone. 2005;852-64.
2. Stephen F, Gunther, Doreen D, Martin R. Struthers's ligament and associated median nerve variations in a cadaveric specimen. Yale journal of biology and medicine 1993:203-208.
3. Jelev L, Georgiev GP.Unusual high origin of pronater teres muscle from a Struther's ligament coexisting with a variation of the musculocutaneus nerve. Romanian journal of morphology and embryology 2009; 50:497-9.
4. Moore K L, Dalley A F, Agur A M. Upper limb. Clinically oriented Anatomy 6th Edn. Philadelphia, Wolters Kluver (India) Pvt Ltd, NewDelhi.2010;767.
5. Guha R, Satyanarayan N, Reddy C K, Jayashri N, Nitin V, Praveen G. Variant insertion of Coracobrachialis muscle-morphological significance, embryological basis and clinical importance. Journal of College of medical sciences-Nepal 2010; 6:42-6.
6. Suranyi L Median nerve compression by Struther's ligament. Journal of Neurology, Neurosurgery and Psychiatry 1983; 46:1047-9.
7. Aydinliglu A, Gunirukcuoglu FN, Koyun N.The prevalence of supracondylar process in living: A radiographic study. West Indian Med J 2010; 59:545-8.
8. Terry RJ.A study supracondyloid process in living. American Journal of Physical Anthropology 1921; 4:129-39.
9. Satyanarayan N,Sunitha P,Shaikh MM,Satyavathidevi P. Brachial artery with high up division with it's embryological basis and clinical significance.IJAV 2010;3:56-8.
10. Singh H,Gupta N.Bargotra RN,Singh NP.Higher bifurcation of Brachial artery with superficial course of Radial artery in forearm.JK Science 2010;12:39-40.