Case report

POSSIBLE ENTRAPMENT OF THE ULNAR ARTERY BY THE THIRD HEAD OF PRONATOR TERES MUSCLE

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RESUMEN

El conocimiento de las variaciones en los alrededores de la fosa cubital es útil para cirujanos ortopédicos, cirujanos plásticos y médicos en general. Observamos las variaciones arteriales y musculares en y alrededor de la fosa cubital. La arteria braquial terminó 2 pulgadas por encima de la base de la fosa cubital. Las arterias radiales y cubitales entraron en la fosa cubital pasando delante de los tendones de los músculos braquial y bíceps braquial respectivamente. La arteria cubital estaba rodeada por el tercer fascículo del pronador teres, que tuvo su origen en la fascia cubriendo la parte distal del músculo braquial. Este músculo se unió a tendón de pronador teres distalmente y fue suministrado por una rama del nervio mediano. Este músculo podría alterar el flujo sanguíneo en la arteria cubital y puede causar dificultades para el registro de la presión sanguínea.

***Palabras clave**: Arteria cubital; arteria braquial; tercer fascículo del pronador teres; atrapamiento*

ABSTRACT

Knowledge of variations at and in the surroundings of cubital fossa is useful for the orthopedic surgeons, plastic surgeons and medical practitioners in general. During routine dissection, we observed arterial and muscular variations in and around the cubital fossa. The brachial artery terminated 2 inches above the base of the cubital fossa. The radial and ulnar arteries entered the cubital fossa by passing in front of the tendons of brachialis and biceps brachii respectively. The ulnar artery was surrounded by the third head of pronator teres which took its origin from the fascia covering the distal part of the brachialis muscle. This muscle joined pronator teres tendon distally and was supplied by a branch of median nerve. This muscle could alter the blood flow in the ulnar artery and may cause difficulties in recording the blood pressure.

***Key words:** Ulnar artery, brachial artery, third head of pronator teres, entrapment, brachial artery*

INTRODUCTION

Ulnar artery is one of the terminal braches of brachial artery, the other terminal branch being the radial artery. It takes its origin in the cubital fossa, at the level of the neck of radius. It then passes deep to the ulnar head of pronator teres muscle and remains lateral to the ulnar nerve till the distal end of the forearm. It terminates by dividing into a superficial and a deep branch.

The pronator teres muscle is one among the five superficial muscles of the flexor compartment of the forearm. It normally has two heads; humeral head and the ulnar head. The humeral head takes origin from the medial epicondyle of the humerus and the ulnar head takes origin from the coronoid process of the ulna. It is inserted to the lateral side of the shaft of the radius.

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Received: 19 July, 2012. **Revised**: 14 August, 2012. **Accepted**: 18 September, 2012.

The muscle is supplied by a branch of median nerve (Datta, 1997). In the present case, we report a high origin of the ulnar artery and its possible entrapment by an abnormal third head of the pronator teres muscle.

CASE REPORT

During routine dissections for the undergraduate medical students, we noted arterial and muscular variations in an embalmed male cadaver aged approximately 65 years. The medical history of the cadaver was not available. These variations were found in the right upper limb and were unilateral. The brachial artery bifurcated about 2 inches above the base of the cubital fossa. The radial artery entered the cubital fossa in front of the tendon of the biceps brachii and the ulnar artery entered the cubital fossa in front of the brachialis tendon (Fig. 1 and 2). The pronator teres muscle had an abnormal third head. This third head took its origin from the fascia covering the distal part of the brachialis muscle (Fig. 1 and 2). The fleshy fibres of this muscle surrounded the ulnar artery in the cubital fossa and then joined the humeral head of the pronator teres muscle. This muscle was supplied by a branch of the median nerve. There was no variation in the further course and distribution of the radial and ulnar arteries in the forearm.

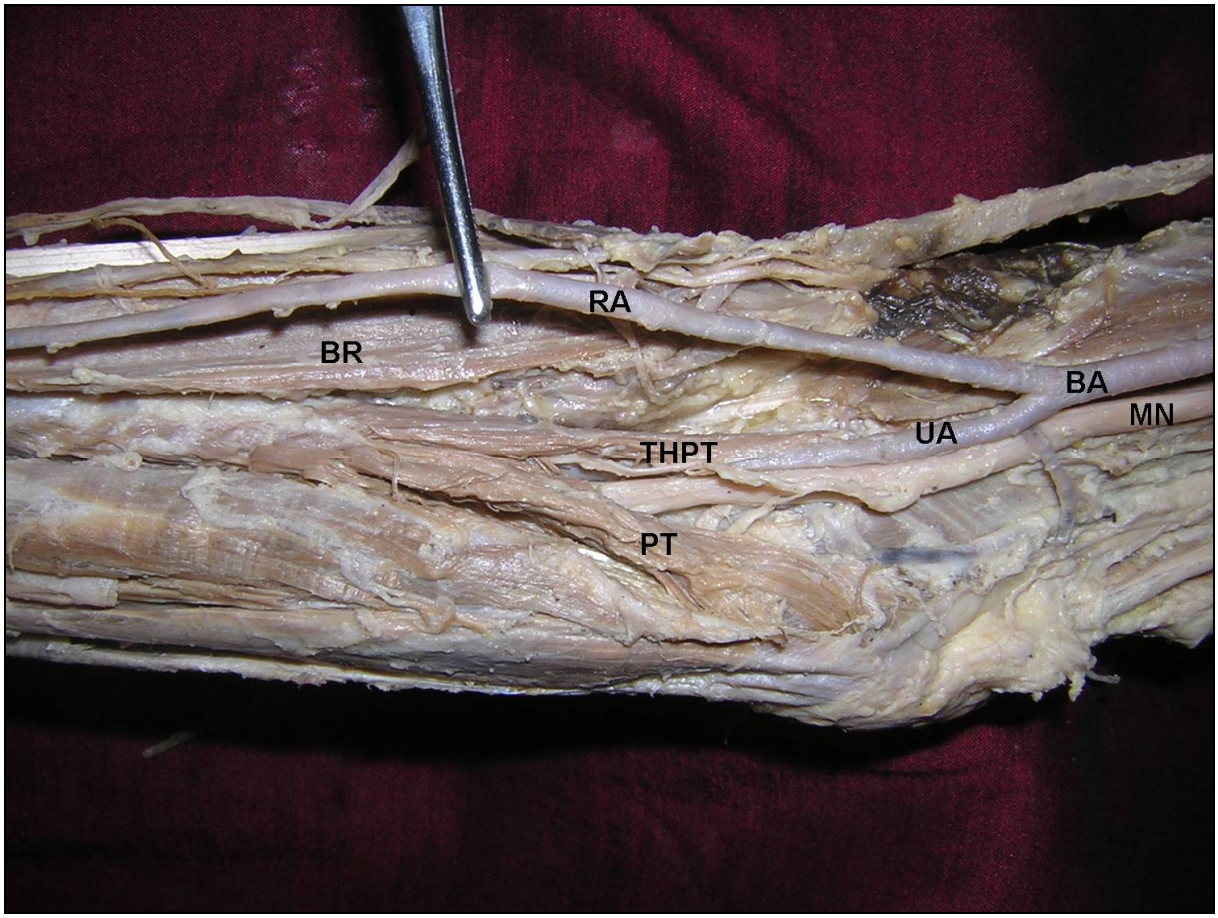

Figure 1. Dissection of the right cubital fossa showing the high origin of the ulnar artery and its entrapment by the third head of the pronator teres muscle. (BA – brachial artery; MN – median nerve; UA – ulnar artery; RA – radial artery; BR – brachioradialis; PT – pronator teres; THPT – third head of pronator teres)

DISCUSSION

Muscular and vascular variations are very common in the upper limb. Most of the variations are not significant clinically and they may go unnoticed. One of the common variations of the brachial artery is its high level of bifurcation. Brachial artery may be absent and radial and

ulnar arteries may come directly from the axillary artery (Ciervo et al, 2001). Brachial artery may bifurcate at higher or lower levels than normal. Radial artery is known to take origin at a higher level and pass superficially in the arm to reach the forearm (Celik et al, 2001). A case of origin of radial artery from the axillary artery has been reported by Okoro and Jiburum (2003). A case where the occurrence of the superficial brachial artery and its bifurcation in the cubital fossa has been recorded (Yoshinaga et al, 2003). Vollala et al (2008) have reported a trifurcation of the brachial artery. Ulnar artery may take high origin from the brachial artery and may pass superficial to pronator teres muscle. The incidence of the superficial ulnar artery is about 0.7 to 7% (Senanayake et al, 2007). Dartnell et al (2007) have reported the presence of superficial ulnar artery in 4.2% of cases. The high origin of ulnar artery from the brachial artery has been reported in 1.33% of cases by Mc Cormack et al (1953).

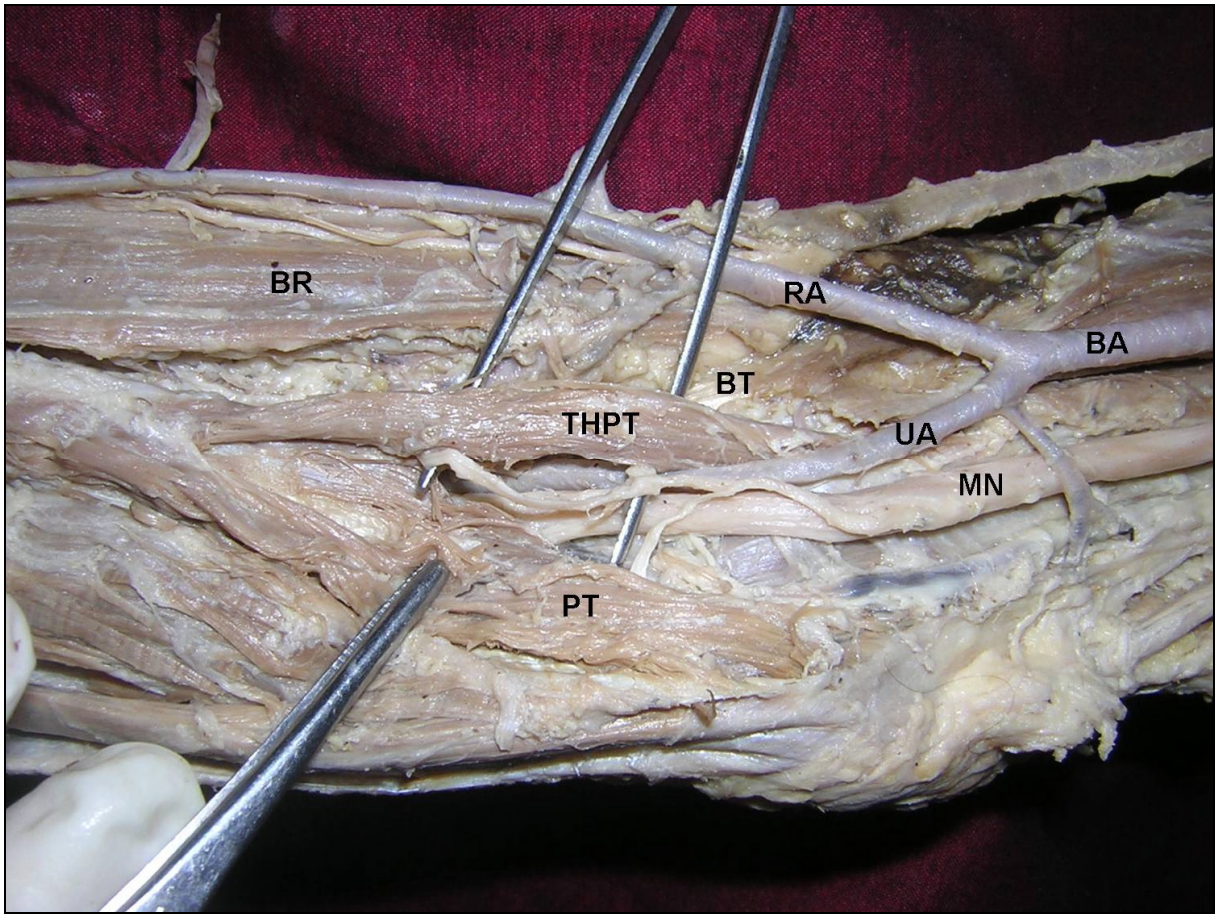

Figure 2. Closer view of the dissection of right cubital fossa showing the high origin of the ulnar artery and its entrapment by the third head of the pronator teres muscle. (BA – brachial artery; MN – median nerve; UA – ulnar artery; RA – radial artery; BR – brachioradialis; PT – pronator teres; THPT – third head of pronator teres; BT – biceps tendon)

Presence of accessory slips and complex origin of these slips are the reported variations of pronator teres in the past. The accessory slips may arise from the medial intermuscular septum, supracondylar process, biceps brachii muscle, or the brachilais muscle (Macalister, 1875; Thane, 1892; Le Double, 1897; Salmons, 1995). The high-origin of pronator teres from the Struthers' ligament coexisting with a variation of the musculocutaneous nerve has been reported by Jelev and Georgiev (2009). Nayak et al, (2008) have reported a supernumerary muscle crossing the brachial artery and joining the humeral head of the pronator teres. Accessory slips in the region of cubital fossa may compress the brachial artery and median nerve (Biswas et al, 2010). An anatomical case of abnormal brachialis muscle and its possible role in the compression of

brachial artery and median nerve has been reported by George and Nayak (2008). Entrapment of the ulnar artery in the cubital fossa is not common. However, its entrapment in the hand has been reported (Cho, 1978).

In summary, the high level of bifurcation of brachial artery and the entrapment of the ulnar artery in the cubital fossa, observed in the present case may be clinically significant. The ulnar artery may be compressed by the entrapped muscle, which may lead to improper perfusion of the distal part of the forearm. Since brachial artery bifurcated at a higher level and ulnar artery was surrounded by muscle fibres, it may cause difficulties in recording the blood pressure and may lead to wrong diagnosis. The knowledge of these concurrent arterial and muscular variations around the cubital fossa is also important for the orthopedic and plastic surgeons.

ACKNOWLEDGEMENTS

Authors wish to thank Ms. Pallavi Rao, Assistant Professor at Manipal Institute of Communication, Manipal University, Manipal, for her technical assistance.

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