A CADAVERIC STUDY OF THE LENGTH OF THE BRACHIAL ARTERY AND ITS CLINICAL CORRELATION

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ABSTRACT

The brachial artery is the major artery of the upper limb. It starts in continuation with the axillary artery at the distal border of teres major muscle. The vessels of the upper limb are frequently used for cardiac catheterization and awareness of variations in the branching pattern may prevent any inadvertent injury. To evaluate the prevalence of anatomical variability of brachial artery and enumerate its impact on the clinical implications. We used 50 upper limbs from embalmed human cadavers irrespective of age and sex in our study. The body was placed in supine position with upper limb abducted 90° and the palm facing upwards. The

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skin incisions were made by the help of Cunningham manual. The length of brachial artery was measured by using an inch tape. The length of the brachial artery measured had a mean 10.13 ± 0.89 inches with a minimum value 8.1 inch and maximum value 13.0 inch. A sound anatomical knowledge of the brachial artery can aid certain procedures such as cardiac catheterization. The brachial artery is derived from the axial artery. It takes its origin from the inferior border of the tendon of teres major muscle and terminates at the level of the neck of the radius by bifurcating into radial and ulnar arteries. The same fact is observed in the present study. No anomalies were observed in the present study.

KEYWORDS: Axillary artery, Brachial artery, Cardiac catheterization, Hemostasis.

INTRODUCTION

The word "Brachial" is derived from the Greek word "Brachion" meaning shorter, brachium also means 'arm'. The brachial1 artery is the most important artery of the upper limb. It begins as a continuation of the axillary artery at the distal border of teres major muscle (1). The artery is superficial in its course in the arm and lies in the antero-medial aspect of the arm (2).

The branches of the brachial artery are profunda brachii artery, superior and inferior ulnar collateral arteries, nutrient artery to the humerus and muscular branches in the arm (3).

The vessels of the upper limb are repeatedly used for cardiac catheterization and awareness of such variations may prevent any inadvertent injury.

Knowledge of higher division of brachial artery is also important for all cases of traumatic amputation and revascularization techniques. It has to be remembered that the bifurcation of the brachial artery is the most common site for embolism and a higher bifurcation would result in a larger area of ischemia than expected hence, the higher division seeks a greater clinical significance (4). During forearm flap elevation, the radial artery can be mistaken for superficial vein and ligated causing a vascular disorder in the hand. On the other hand, the presence of a superficial ulnar artery can be advantageous, since it can be used to supply blood to the forearm flap and can be utilized for an easier ulnarbasilic arterio-venous fistula in mid-forearm. The knowledge of existence of these variations helps in fast and easy elevation of forearm flap (5-6).

Attention has to be given to the branching pattern of brachial artery while treating the cases of aneurysms and abscess drainage in the region of axilla, arm and cubital fossa (7).

The brachial and antebrachial arteries are the arteries of choice for making an Arterio-venous fistula involving the radial artery and the cephalic vein in wrist region for dialysis to treat chronic renal failure. They are the first and best choice of the treatment for dialysis because they last longer and need less maintenance (8).

A Sound knowledge of the anatomy of brachial artery is important for orthopaedicians, to achieve hemostasis during operative procedure, as it may also lead to Volkmann's ischaemic contracture (9).



Fig 1: Right Upper Limb Showing Brachial in **Relation to Median and Musculo Cutaneous Nerve**

MATERIALS AND METHOD

In the present study, upper limbs from embalmed human cadavers were taken. The body was placed in supine position with the palm facing upward and the upper limb was abducted at 90° and the palm facing upwards.

The skin incisions were made:

- From suprasternal notch to the xiphoid process. i.
- From the tip of xiphoid process, incision was taken ii. upwards and laterally to the nipple encircling the areola around the nipple and continued along the anterior fold of axilla to the arm.
- iii. In the arm, incision was taken downwards for about 10-12 cm and1then transversely across the front of arm to its lateral border.
- iv. Another incision was taken from the upper border of sternum along the clavicle to its acromial end.
- Skin flaps were reflected along the incisions v. taken, beginning in the median plane.
- vi. Upper incision taken along the groove between the pectoralis major and deltoid.
- vii. The length of brachial artery was measured by an inch tape.

OBSERVATIONS & RESULTS

The length measured for 50 cadavers had a mean 10.13±0.89 inch with a minimum value 8.1 inch and maximum value 13.0 inch thus length lies within the range 13.0 - 8.1 inches. There were 34% cadavers in which the length of brachial artery varied within the range 8.0 - 9.9 inches. Among 60% cadavers the

length of brachial artery varies within the range 10.0 -11.9 inches in 60% cadavers. A range of 12.0 - 13.9inches was observed in the remaining 6% cadavers.



Fig 2: Measurement of the Length of the **Brachial** Artery

Ranges between,

Length Range	Mean	SD	Minimum	Maximum
8.0 - 9.9 inch	9.44	0.51	8.1	9.9
10.0 - 11.9 inch	10.26	0.48	10.0	11.9
12.0 - 13.9 inch	12.67	0.58	12.0	13.0
Total	10.13	0.90	8.1	13.0

Table 1: Distribution of Lengths of Brachial Artery

DISCUSSION

The present study was conducted to establish the length of the brachial artery, taking a measurement from the point of its origin to its termination in its branches.

Normally the brachial artery bifurcates at the neck of the radius 2 to 3 cm below the crease of the elbow into two terminal branches namely ulnar and radial arteries. Common interrosseous artery arises from ulnar artery. In the study of Bilodi AK and Sanikop MB the difference was found in the terminations of brachial arteries in two limbs of the same body (10). A study conducted by Patnaik, V.V.G et al in the year 2002 estimated the length of brachial artery to be 26.29 cm which divided into its terminal branches 2.99 cm distal to intercondylar line (11). In the year 2010 Namani S et al mentioned a high division of brachial artery at the anteromedial surface of the humeral shaft, between brachialis and medial head of triceps (12). In 2011 Rossi Junior et al conducted a study on 56 cadavers where they found a high division of brachial artery

located in the upper 1/3 in both arms (8). Akamatsu et al found the bifurcation of the brachial artery in the proximal portion of the middle third of the arm (14). In 2014 Preeti sonje, Neelesh kanaskar et al conducted a study of the variations in the branching pattern of Brachial artery at D.Y.Patil Medical College, Pune. 50 upper limbs were studied for the variant pattern of brachial artery and found that the origin of Radial artery in 2% of cases was higher than usual, high origin of ulnar artery was found in 4 % of cases (15). In 2016 Deepa T.K and Martin k. john studied the anatomical variation in termination of brachial artery and found higher division of brachial artery at mid arm level into its terminal branches with superficial course of radial artery (15). In our study the length of the artery ranged from 8.1 inch to 13.0 inch. No previous study was found which estimates the predictive length of the brachial artery. But some studies estimated the average length of this artery and its variation as well.

CONCLUSION

The brachial artery is the major artery of the upper limb. An accurate anatomical knowledge of the vasculature will help surgeons, radiologists and orthopaedicians to avoid mishaps during various procedures such as forearm flap elevation, aneurysms and abscess drainage in the region of axilla, arm and cubital fossa (7). coronary intervention procedures etc. In the present study, maximally in 60% cadavers the length of Brachial artery was found to be within the range 10.0–11.9 inch. Whereas there were 34% cadavers in which the length of brachial artery was found to be within the range 8.0-9.9 inch.

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