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Study of Variations in the Bifurcation of Brachial Artery in Andhra Pradesh Population

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Abstract

32 male cadavers were selected to study the variation of bifurcation of brachial artery. Measurement were taken from (a) tip of the Acromion process of scapula to tip of the middle finger (b) Position of brachial artery was measured from epicondyle of humerus to the point of bifurcation of brachial artery. All the measurements were taken by tailors tape. The mean value of length right upper limb was 73.66 (SD ± 0.38) and mean length of point of brachial artery from epicondyle of Humerus was 4.29 (SD ± 0.01) and mean value of length left upper limb was 73.61 (SD ± 0.35) and point bifurcation of artery mean value was 4.28 (SD ± 0.02), correlative co-efficient study of upper limb was 0.73, '*t*' test value was 5.8 and '*p*' value was highly significant (p <0.01) of left limb was 0.84 '*t*' test value was *t*.84 and *p* value was highly significant (p <0.01). This study was quite helpful to orthopedic surgeon, physician to predict the point of bifurcation by knowing length of upper limbs and *vice versa*, so that they can preserve the brachial artery and its branches and take proper use like pulsation or recording blood pressure.

Keywords: Brachial artery; Olecranon process; Acrimony process.

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Introduction

As Brachial artery is continuation of axiliary artery beyond the lower border of the Teresmajor muscle usually it divides opposite to the neck of the radius in anterior cubital fossa as radial and ulnar Artery.[1,2] As the ulnar artery is longer and deeper begins a little below the bend of the elbow and passing oblique down wards reaches the flexor carpi ulnaris muscle in its middle third and takes part in superficial and deep palmar arches. The radial artery is smaller in caliber than ulnar it passes along the radial side of the foramen to the wrist takes parts in the completion of superficial and deep palmar arches.[3]

Brachial artery and its branches is important to avoid serious complication while arterio venous fistulae, aneurysm and abscess drainage in cubittal fossa and during amputation traumatic fracture, thrombo-obliterens.[4] In addition to this brachial artery is used to record blood pressure and brachial pulsation. Hence attempt was made to correlate the length of upper limb with position of bifurcation of artery in the cadavers.

Materials and Methods

32 (thirty two) male dissected cadavers preserved in the dissection hall were studied length of the right and left upper limb was measured. Tip of Acrimion process of scapula to the tip of the middle finger. Bifurcation of Brachial artery was measured from epicondyle of Humerus to bifurcation of brachial artery. These measurements were taken by Tailors

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tape.

The obtained findings were studied statistically by correlative co-efficient equation by SP Software of 2007.

The duration of this study was about three years.

Results

***Table 1*:** Average length of right upper limb and length position of bifurcation of brachial artery to epicondyle of humerus, mean value of length of right upper limb 73.66 (SD ± 0.38) and mean length of brachial artery from epicondyle of humerus was 4.29 (SD ± 0.38).

***Table 2*:** Average length of left upper limb and length of position of brachial artery, mean length left upper limb was 73.61 (SD ± 0.35) and mean length of position bifurcation brachial artery was 4.28 (SD ± 0.01)

Table 1: Average Length of Right upper limb and length of position of bifurcation of brachial Artery from Epicondyle of Humerus in Male cadavers.

No. of Cadavers-32

	Length of Right Upper Limb (*cm*)	Length of Position of Bifurcation of Right Brachial Artery
Mean	73.66	4.29
SD	0.38	0.01

Table 2: Average Length of Left upper limb and length of position of bifurcation of brachial Artery from Epicondyle of Humerus in Male cadavers.

No. of Cadavers-32

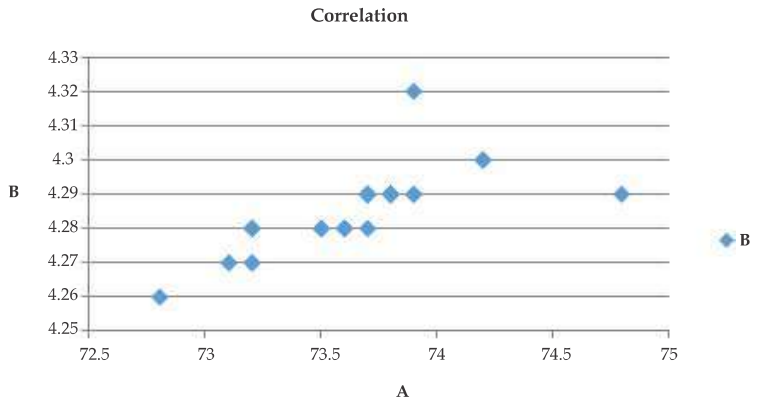
	Length of Left Upper Limb (*cm*)	Length of Position of Bifurcation of Left Brachial Artery
Mean	73.61	4.28
SD	0.35	0.02

***Table 3*:** Correlative co-efficient of length of right upper limb was 0.73 '*t*' test value was 5.8 and *p* value was lightly significant ($p < 0.01$).

***Table 4*:** Correlative co-efficient of length of left upper limb study was 0.84 '*t*' test value was 8.4 and *p* value was highly significant ($p < 0.01$).

Table 3: Correlative co-efficient of Length of Right upper limb with position of bifurcation of brachial Artery from Epicondyle of Humerus in Male cadavers.

	Length of Right Upper Limb (*cm*)
Correlation co-efficient	0.73
Test statistic	$t = 5.85$, $p < 0.01$



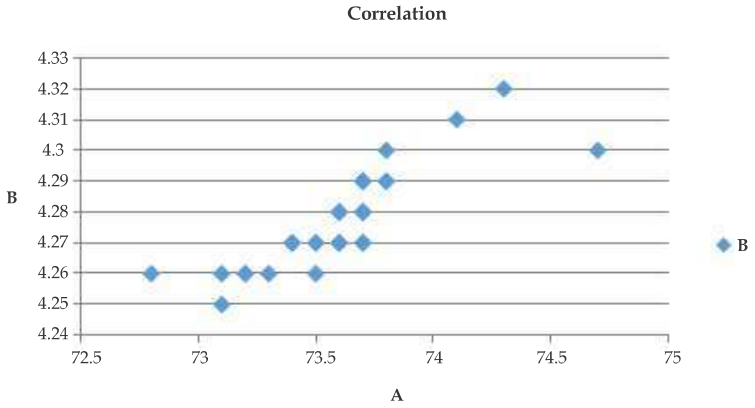
A: Length of Right Upper Limb (*cm*)

B: Length of Position of Bifurcation of Right Brachial Artery

Statistically highly significant positive correlation observed between Length of Right Upper Limb and Length of Position of Bifurcation of Right Brachial Artery ($p < 0.01$).

Table 4: Correlative co-efficient of Length of Left upper limb with position of bifurcation of brachial Artery from Epicondyle of Humerus in Male cadavers

	Length of Left Upper Limb (*cm*) Vs Length of Position of Bifurcation of Left Brachial Artery
Correlation co-efficient	0.84
Test statistic	$t = 8.47$, $p < 0.01$



A: Length of Left Upper Limb (*cm*)

B: Length of Position of Bifurcation of Left Brachial Artery

Statistically highly significant positive correlation observed between Length of Left Upper Limb and Length of Position of Bifurcation of Left Brachial Artery ($p < 0.01$).

Discussion

The present study of variation in the bifurcation of brachial artery in Andhra Pradesh population (cadaveric study). Mean value length of upper limb was 73.66 (SD ± 0.36) and mean length of position of bifurcation of brachial artery was 4.29 (SD ± 0.01) (**Table 1**)and mean length of left upper limb (UL was 73.61 *cm* (SD ± 0.35) and, mean length of position of bifurcation of Brachial artery 4.28 *cm* (SD ± 0.02) (**Table 2**) correlative co-efficient of length of right UL was 0.73 *t* test value was 5.85 and *p* value was highly significant ($p < 0.01$) (**Table 3**). Correlative co-efficient of length of left UL was 0.84 '*t*' test value was 8.47 and *p* value was highly significant ($p < 0.01$) (**Table 4**). These findings were more or less in agreement with previous studies. [5,6,7]

These variations could be due to the arterial system of the body seek shortest and most direct course to reach their objective that course is partly determined by mechanical convenience. The main arteries of the limbs run along the flexor surfaces where they are less likely to be exposed to tension in movement of the adjacent joints. They avoid passing through actual muscular tissue which would compress them during contraction. Hence they bifurcate to avoid tension created by joints and muscular contraction as well. Moreover the angle at which branches leave the main artery depends to considerable extent on hemodynamic pressure.[8]

In addition to that as brachial artery is muscular medium size artery. Hence it can be hypothesized that the muscular tissue in their walls enable them under the influence of autonomous nervous system.[9] Contract and dilate and so to regulate the distribution of blood to the areas which they supply and whenever there's more demand or more area to be supplied hence bifurcation might have occurred to meet the challenge of blood supply to larger areas.

This study of variation of bifurcation will be quite useful to internal arterio-venous fistulae was established in chronic renal failure for repeated vine puncture to access the blood stream.

Moreover following injury of arm particularly of the elbow joint injure to brachial artery. Hence bifurcation has surgical importance too.[10]

Conclusion

The present study of variation in the bifurcation of brachial artery will be useful to orthopedic surgeon, physician, cardiologist, radiologist and anatomist as well. But this study demands further genetic,

embryological, nutritional and bio-mechanical studies because exact mechanism of formation of angiogenic cells in fetal life is still unclear.

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