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Observation on the Anatomical Patterns of Superficial Cubital Veins in the Population of Mithilanchal

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Background: *The superficial cubital veins being located superficially and easily accessible veins of great importance to the healthcare professionals, being the most common site for venepuncture, catheterization or cannulation. In the upper limb the superficial venous return occurs through two or three major superficial veins which are extremely variable, these include the cephalic, basilic, medial cubital and antebrachial veins and their tributaries.*

Objective: *The main objective of this study is to observe the Anatomical patterns of superficial cubital veins in the people of Mithilanchal and compare this study to that of previous study.*

Materials and methods: *Forty living subjects and ten cadavers were studied irrespective of their age and sex, so a total of 100 samples were studied. Judgement sampling technique was employed. At the midarm level torniquet was applied such that the superficial veins became conspicious and visible, which was diagrammatized and photographed with a camera.*

Results: *The arrangement of superficial cubital veins was divided into six groups, having ten subtypes of pattern of arrangement of veins. The most common pattern observed was the median antebrachial vein dividing into median cephalic and median basilic vein and these are joined together to the cephalic and basilic vein,with some variations.*

Conclusion: *This knowledge about the anatomy and variations of superficial cubital veins help in easy and safer access for the health professionals during venepuncture.*

Keywords: *Cubital fossa, cephalic vein, basilic vein, superficial veins*

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I. Introduction

The veins draining the upper limb as elsewere in the body are divided into two groups- Superficial and deep veins. The superficial veins are located in the superficial fascia and are easily accessible. Being easily accessible, they are frequently used by the clinicians for drawing blood samples or for giving intravenous injections. The deep veins lie deep to muscles and accompany arteries as venae comitantes and are more or less constant in position. Both superficial and deep veins have valves but they are more numerous in deep veins. The superficial venous return from the upper limb follows two or three major superficial veins, which are extremely variable. The superficial veins include the cephalic, basilic, median cubital and antebrachial veins and their tributaries. Most of these veins originate in the subcutaneous tissue on the dorsum of the hand from the dorsal venous network.(7) The cubital fossa is an area of transition between the anatomical arm and the forearm. It is located as a depression on the anterior surface of the elbow joint. The cubital fossa is triangular in shape. Laterally it is bounded by the medial border of brachioradialis muscle, medially by the lateral border of pronator teres muscle, superior border is bounded by a hypothetical line between the epicondyles of the humerus and apex of the cubital fossa pointing downwards, formed by the meeting point of medial and lateral borders. The floor of the fossa is formed proximally by the brachialis and distally by the supinator muscle. The roof consists of skin and fascia, and is reinforced by the bicipital aponeurosis. Within the roof runs the superficial cubital vein. The pattern of veins in the cubital fossa varies. Pattern present may be M shaped, N shaped or H shaped, but may it be whatever pattern, the superficial veins crosses superficial to the brachial artery from which it is separated by the bicipital aponeurosis. Due to considerable amount of fat overlying the veins in the obese person, it becomes difficult to visualize the veins. No studies have been carried out to determine the patterns of arrangement of veins over the cubital fossa of people of Mithilanchal. Therefore, this study was conducted to determine the Anatomical patterns of superficial cubital veins in the people of Mithilanchal.

II. Material and methods

This study was conducted on 40 living subject and 10 cadavers, total of 100 samples including right and left arms, in Darbhanga Medical College, Laheriasarai from October 2015 to December 2017. This is a descriptive type of observational study. All the medical staff and MBBS students of Mithilanchal only were included in this study. Amongst them those with prominent superficial veins were included in the study and excluded were those with thick subcutaneous tissue layer or having cut or wound within the cubital region.

Procedure for data collection

The subject was made to sit down with arms placing on the table. Now a tourniquet was tied at the mid-arm level and left for few minutes for the veins to become engorged and visible. The tourniquet should be tied in such manner that it may not hamper the radial pulse. Now when the veins are prominent and visible, it is diagrammatized and then photographs are taken with camera and the patterns of arrangement of superficial cubital veins are recorded. In this manner the patterns of venous arrangement is recorded in subsequent arms. For prominent and clear visualization of veins following techniques can be applied:-

- Before application of tourniquet, hold the arms pointing downwards.
- To enhance the venous return towards the proximal part of the arm, clench the fist on and off.
- To promote vasodilation, massage the forearm and gently tap the tissue.
- The veins were visualized in daylight or fluorescent tube to prevent any false positive result.

Types of superficial venous arrangements

According to the classification of del Sol et al, the superficial cubital veins are classified into six main groups and subgroups, having some minorvariations (3)

TYPE A- The superficial veins in this type shows "M" pattern of arrangement. It shows two types of variations:

- Type A_1- Here the median antebrachial vein divides into median cephalic and median basilic vein and these are joined together to the cephalic and basilic vein forming a typical "M" shaped pattern.
- Type A_2- In this pattern the median cephalic vein does not link with the cephalic vein.

TYPE B- In this type, the superficial cubital veins shows "N" shaped arrangement. It has three subtypes:-

- Type B_1- In this pattern cephalic vein emerges from the median cubital vein, which joins the basilic vein.
- Type B_2-In this pattern of arrangement the cephalic vein continues superomedially as median cubital vein, which drains into the basilic vein, median antebrachial vein drains into basilic vein, and proximal cephalic vein does not exist.
- Type B_3-In this pattern of arrangement cephalic vein is present.

TYPE C- In this type, the superficial veins are arranged in "H" shaped pattern.

TYPE D- In this type, only the cephalic veins and the basilic veins are present and there is no communication between them.

TYPE E- In this type the superficial veins runs superomedially from the lateral to the median aspect of the forearm.It has two subtypes:-

- Type E_1-In this pattern the cephalic vein runs from lateral to medial aspect where it continues as the basilic vein.
- Type E_2- In this pattern a number of veins run superomedially from the lateral aspect of the arm.

TYPE F- In this type the median antebrachial vein is doubled.

III. Results

Table.1. Distribution of superficial veins per type in living subjects

Type	Right	Left	Total	Percentage
A	16	12	28	35
B	13	10	23	28.75
C	1	1	2	2.5
D	1	2	3	3.75
E	11	9	20	25
F	2	2	4	5

Table.2. Distribution of superficial veins per sub type in living subjects

Type	Subtype	Right	Left	Total	Percentage
A	A_1	14	10	24	30
	A_2	2	2	4	5
B	B_1	6	2	8	10
	B_2	3	4	7	8.75
	B_3	4	4	8	10
C	C_1	1	1	2	2.5
D	D_1	1	2	3	3.75
E	E_1	3	1	4	5
	E_2	8	8	16	20
F	F_1	2	2	4	5

Table.3. Distribution of superficial veins per type in Cadavers

Type	Right	Left	Total	Percentage
A	4	3	7	35
B	3	2	5	25
C	0	1	1	5
D	1	0	1	5
E	2	2	4	20
F	1	1	2	10

Different patterns of arrangement of superficial cubital veins in people of Mithilanchal were seen. Of the 100 samples observed from 40 right arms, 40 left arms of the living subjects and 10 right arms and 10 left arms of the cadavers were observed and noted down. Type A which is "M" shaped pattern of arrangement of superficial veins at the cubital fossa was the most commonly observed superficial veins. In the living subjects 16 right arms and 12 left arms had this pattern. So, a total of 28 arms, i.e 35% of the studied subjects had this pattern of arrangement. On the other hand, when studied in cadavers 4 right arms and 3 left arms had this pattern with a total of 7 arms and 35% had type A pattern of arrangement. Subtype A1 is the typical M shaped pattern, which was seen in 14 right arms and 10 left arms with a total of 24(30%). Subtype A2 was seen in 2 right arms and 2 left arms with a total of 4arms i.e 5% have this pattern of arrangement.

Type B arrangement in living subjects was seen in 13 right and 10 left arms with a total of 23(28.75%) arms, whereas in cadavers 3 right and 2 left arms, with total of 5(25%). Subtype B1 variation was seen in 6 right arms and 2 left arms with total of 8(10%). Subtype B2 was seen in 3 right arms and 4 left arms with total of 7(8.75%). Subtype B3 was observed in 4 right and 4 left arms with total of 8(10%).

Type C was observed in 1 right and 1 left arm with total of 2(2.5%) in living subjects whereas in cadaver it was observed in only 1 left arm. Subtype C1 was seen in 2(2.5%) of the studied cases.

Type D pattern in living subjects was seen in 1 right arm, 2 left arms with total of 3(3.75%), whereas in cadavers this pattern was seen in 5% of cases. Subtype D1 was seen in 3.75% of cases.

Type E pattern in living subjects was seen in 11 right and 9 left arms with total of
20(25%), whereas in cadavers 2 right arms and 2 left arms with total of 4(20%). Subtype E1 was seen in only 5% of the cases, whereas subtype E2 was seen in 20% of cases.

Type F pattern in living subject was seen in 2 right and 2 left arms, with total of 4(5%), whereas in cadavers 10% was elicited. Subtype F1 showed 5% of this arrangement.

Fig.1. Showing Type A arrangement in living subject

Fig.**2**.Showing Type A arrangement in cadevar

Fig.3.Showing Type B arrangement in living subject

Fig.4.Showing Type B arrangement in cadaver

Fig 5. Showing Type C arrangement in living subject

Fig 6.Showing Type D arrangement in living subject

Fig 7.Showing Type E pattern in living subject

Fig 8. Showing Type F pattern In living subject

IV. Discussions

An analysis on the superficial cubital veins in the people of Mithilanchal was made from the observation obtained from 40 people and 10 cadavers in the department of Anatomy. The most common pattern observed was type A or "M' 'pattern of arrangement in which the median antebrachial vein, dividing into median cephalic and median basilic veins, which joins the cephalic and basilic vein respectively, with a variation. Here it was seen in 35% in both living subjects as well as in cadavers. This type was common to, as study done by A Halim and S.H.H. Abdi (1974) which acounted for 67.5% [4]. Vasudha T.K (2013) stated the pattern found in 88% of cadavers and 96% of the living subjects [11]. SP Singh et al (1982) [7], F.A.Wasfi et al (1986) also observed as type A the most common pattern[13]. This common encounter was by chance. This is in contrast to the study done by Sol calderon et al (1988), Sohier et al (1962,1964),who did not find type A as the common pattern [9,10]. Type B or "N" shaped pattern of arrangement was the second most common pattern observed here which accounted for 28.75% in living subjects and 25% in cadavers. This was in contrast to the study done by HyunsuLee,Sang-Hoon-Lee et al(2015)[5], Kaissar-Yammine et al (2014)[6,14], L.FarajAlBustami et al(2014)[1], A.S.Dharap et al (1994)[2], who in their study stated this pattern of arrangement as the most common. Whereas this study was in agreement to those done by U.U. Ukoha et al (2013)[11], A Halim et al (1974), in which type B was second most common pattern found[4]. Type E pattern was the third most common pattern seen, whereas Type C, Type D and Type F pattern was not very prominent and rarely seen,and further research is yet to be done by the other researchers.

V. Conclusion

The patterns of arrangement of superficial cubital veins should be made evident to all the people related to medical profession, so as to ensure immediate and correct intervention without causing any damage to the underlying structures.

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