

Variations of the superficial venous Pattern in cubital fossa among First Year Medical Students of SKIMS Medical College, Srinagar by using the Tourniquet in Right Upper limb and its importance in Laboratory Medicine

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Abstract

Aim: The aim of this study was to observe pattern of superficial veins in cubital fossa in first year MBBS students in SKIMS medical college, Srinagar. **Material and methods:** After applying tourniquet in right arm and taking a proper consent, the study was conducted in 100 first year MBBS students with equal participation of males and females. In a proper supine position, tourniquet was applied about 10 cm above the elbow joint for about 2 to 3 minutes until all the veins of the upper limb (especially around cubital fossa) became prominent. After that, pattern of veins was observed in the cubital fossa and photographs were taken with a digital camera. **Results:** We found four types of patterns of superficial veins in right cubital fossa in our subjects. Median cubital vein joining cephalic to basilic vein (Type I) was most common pattern seen in both males and females (45%). Type 3 i.e Cephalic vein running from lateral to medial side to join basilic vein was second most common pattern seen in cubital fossa in both genders (31%). Type 2 pattern i.e Median antebrachial vein joins basilic vein with no communication between cephalic and basilic vein was noticed in 17% in our subjects. Type 4 pattern i.e median antebrachial vein dividing into median cephalic and median basilic veins in cubital fossa to join the cephalic and basilic veins respectively, was least type of pattern seen in both males and females (7%). Statistically, the pattern of different types of superficial veins in cubital fossa was non-significant when compared to males to females. **Conclusion:** To avoid complications, knowledge of the patterns of superficial veins in cubital fossa is essential for medical professionals and Laboratory technicians since they play important role for diagnostic and therapeutic procedures.

Keywords: cubital fossa, superficial veins, variations

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Introduction

The major superficial veins of the upper limb i.e the cephalic vein, basilic vein and the median cubital vein shows variations in their course. Basilic and cephalic veins begin their path from around the wrist and continue towards the upper region of the forearm.

These superficial veins are the most common site for venepuncture. The arrangement of the superficial veins in the cubital fossa, varies from person to person and different patterns of superficial cubital veins have been reported in various races. The knowledge about the anatomical variations in the course of these superficial veins is important to be kept in mind to avoid complications such as hematoma, and sensory changes that can occur by mispuncture in various medical procedures. Although there are number of variations of the superficial venous system in the cubital fossa, it has been classified into several types by investigators, some of the patterns resembling the alphabetical letters like M, N and I. Most of them have classified the courses of the superficial veins into four or six types. [1-5] The purpose of this study was to observe the various variations in superficial vein patterns in cubital fossa and to report the most common pattern noted in our first year MBBS students.

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Material and Methods

The Study was conducted in SKIMS Medical College in which 100 of Ist Year MBBS students participated [50 males and 50 females]. Consent was taken from all the participants. We exposed right upper limbs of all participants. In a proper supine position, tourniquet was applied about 10 cm above the elbow for about 2 to 3 minutes. After applying tourniquet, we asked them to do active exercises till all the veins became visible for observation. After that, pattern of veins was observed. Pattern of veins was studied in a detailed manner and photographs were taken with a digital camera.

Types of superficial venous arrangement

The cubital veins are classified into four main groups based on previous study with following criteria: [6]

Type 1: Median cubital vein arise from cephalic vein a few centimeters below elbow joint and passes obliquely upward to medial side to join basilic vein a few centimeters above

elbow joint and receives tributaries from the front of the forearm.

Type 2: Median antebrachial vein joins basilic vein without establishment of communication between cephalic and basilic vein.

Type 3: Cephalic vein runs from lateral to medial where it joins basilic vein and receives tributaries from the front of the forearm; no proximal cephalic vein.

Type 4: Median antebrachial vein divides into median cephalic and median basilic veins in cubital fossa which joins cephalic and basilic veins, respectively.

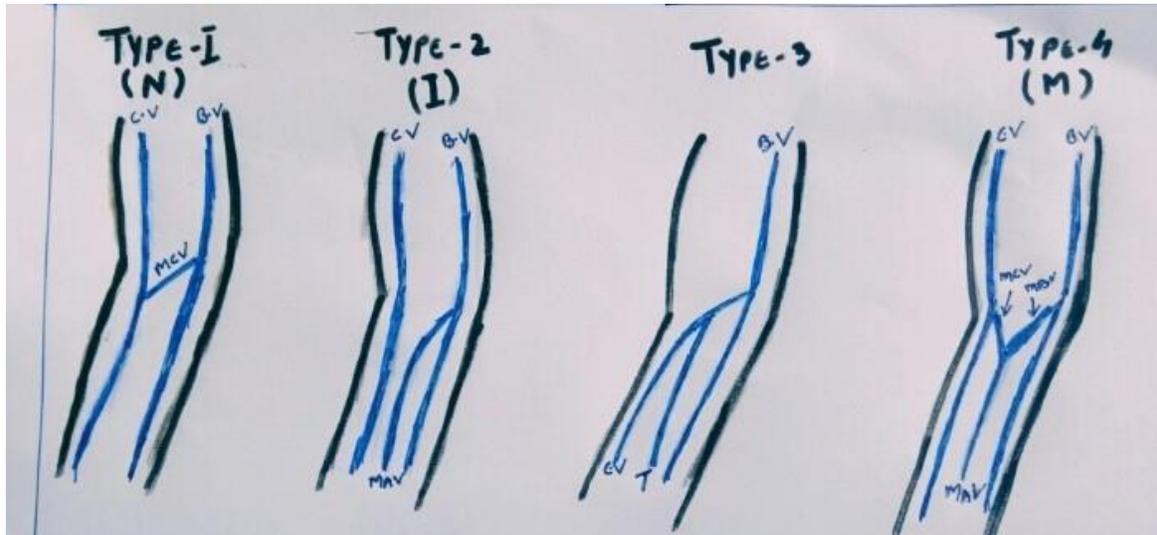


Fig 1: Four types of veins pattern in cubital fossa
(CV=Cephalic vein,BV-basilic vein,MAV=Median anticubital vein,MCV=Median cubital vein,T=Tributaries)

Results

After visualization of superficial veins in right cubital fossa, we found four types of pattern of superficial veins in cubital fossa in our subjects (table 1,).Median cubital vein joining cephalic to basilic vein (Type I) was most (45%) common pattern seen in both males (23%) and females (22%). Type 3 pattern was second most common

pattern observed in both genders (31%). Type 2 pattern was detected 17 subjects (17%). Type 4 pattern was least type of pattern noticed in males and in females (7%). Statistically, the pattern of different types of superficial veins in cubital fossa was non-significant when compared to males to females (p>o. o5).

Table 1: Observation of venous patterns in the Cubital Fossa.

Gender	Type 1	Type 2	Type 3	Type 4	P value
	Male(n=50)	23 (46%)	8 (16%)	15 (30%)	
Female(n=50)	22 (44%)	9(18%)	16 (32%)	3 (6%)	

Values are in numbers (n) and percentages (%)

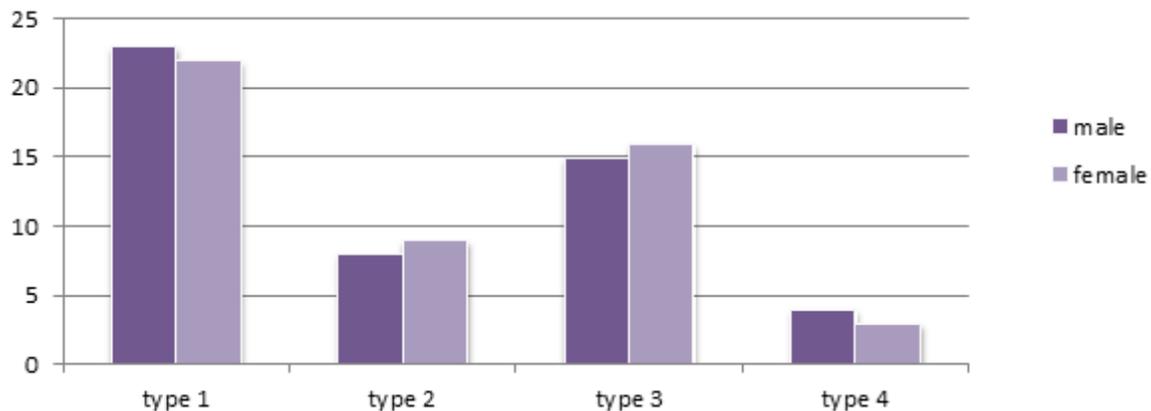


Fig 2: Histogram comparing the various types of pattern in numbers (percentage) in male and female subjects

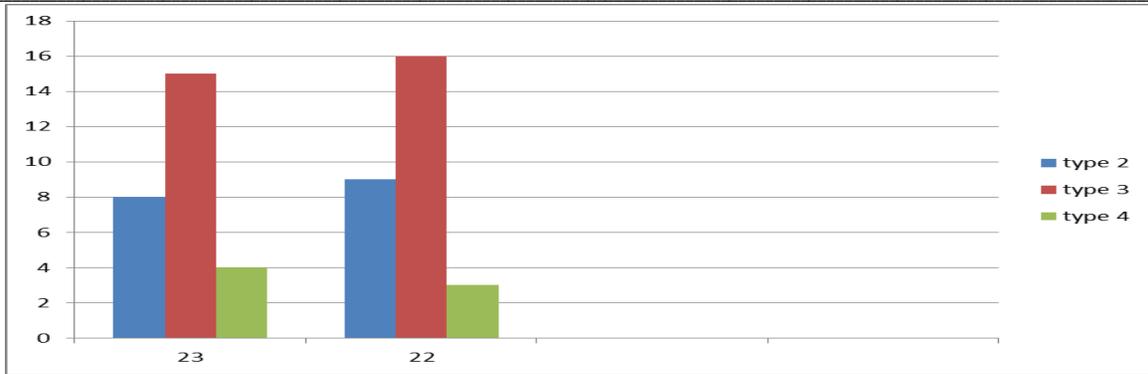


Fig 3: Showing different patterns of superficial veins in cubital fossa
 (CV= cephalic vein, MCV= median cubital vein, BV=basilic vein, MAV= median antecubital vein, MBV= median basilic vein, T=Tributaries mcv=median cephalic vein)

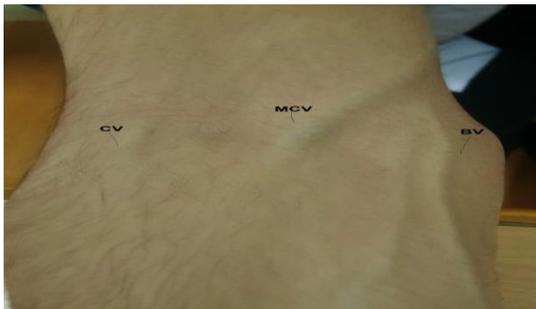


Fig 4a:Type 1 pattern (N-pattern)



Fig 4b:Type 2 pattern



Fig 4c:Type 3 pattern



Fig 4d:Type 4 pattern(M- pattern)

Discussion

The veins of the upper limb can be divided into superficial and deep veins in relation to the deep fascia. Both superficial and deep veins have valves and these veins are interconnected to each other.[7] Superficial veins of cubital fossa i.e a depression on the anterior aspect of the elbow[8] is the common site for drawing blood samples and for giving intravenous injections under emergency conditions.[8] The arrangement of the superficial veins in the cubital fossa varies from one individual to other [9,10,11,12] and the occurrence of different patterns has been reported in various races. [13,14,15,16] Four different patterns in the superficial veins in the cubital fossa were reported in our study, with type 1 pattern in which the Median Cubital Vein runs from cephalic vein on lateral side to join the basilic vein on medial side being most common pattern in both genders. Type 4 pattern where the median antibrachial vein divides into median cephalic and median basilic vein in the cubital fossa to join the cephalic and basilic vein respectively was the least common

pattern seen. The results of our study also showed that gender influence was not significant on venous pattern of the right cubital fossa of upper limb.

The same results showing type 1 to be the most common and the type 4 to be the least common variation was reported by Abebe et.al and Azhar et al in their study.[6,17]

Wasfi FA and their coworkers on their biostatistical study on the arrangement of the superficial veins of the cubital fossa observed type 1 pattern in majority of participants followed type 3 and type 2. [18] Our finding was in line with reports conducted in Jordanians (48.5%) (Faraj and Eman), Malaysians (68%) (Dharap et al.) and Koreans (50.1%) (Hyunsu et al.) in which they reported type1 pattern with high percentage.[19,20,21]The frequency of venous pattern was also comparable to the previous cadaveric study in Asians in which the frequencies of type 1, 2, 3 and 4 were described to be 41.7%, 56.7%, 1.7% and 0% respectively. [22]

The different variation noticed can be attributed to the embryological development of the superficial veins of the upper limb. The superficial veins start developing during 6 week of intra uterine life from capillary plexus which develops at the terminal margin of the developing limb bud. Later on the plexus of veins breaks up by outgrowth and differentiation of digits and forms the superficial ulnar and basilic veins in arm.

The cephalic vein originally crosses the clavicle and terminates in the external jugular vein as is the rule in apes, but later ends in the axillary vein, below the clavicle.[23]

Genetic and hydrodynamic factors play an important role in the final patterns of veins which results in the different patterns observed.[24]

Conclusion

The knowledge about the arrangement of superficial veins in the cubital fossa is vital for health professionals who approach these superficial veins especially under emergency conditions. The knowledge of variations of basilic and cephalic veins decrease the incidence of complications associated with different medical procedures.

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