A STUDY OF VARIATIONS IN THE PATTERN OF SUPERFICIAL VEINS ON THE UPPER EXTREMITY IN DAKSHINA KANNADA POPULATION

NIDHI .S¹, BINDHU.S² & BLESSINA SUGANDHI³

^{1,3}Tutor, Department of Anatomy, Yenepoya Medical College, Karnataka, India

²Additional Professor, Department of Anatomy, Yenepoya Medical College, Karnataka, India

ABSTRACT

Introduction

Knowledge about the variations in the superficial veins on the dorsum of the hand is clinically important from the standpoint of venepuncture, transfusion, cardiac catheterization, formation of arterio-venous fistulas for vascular access and is also of forensic significance. It also reduces the Iatrogenic complications.

Objectives

To study and document the differences in the pattern of superficial veins on the upper extremity.

Materials and Methods

Sample size- In present work 100 students were taken in Dakshina Kannada district, between the age group of 18-20 years. A tourniquet was tied in the proximal part of the forearm to make the veins prominent. The variations in the superficial veins on the dorsum of the hand and middle of the arm were observed and documented.

Results & Conclusion

The present study performed in 100 participants in DK population and it was found that the oblique vein was present in 23% of participants and accessory cephalic vein was present in 15% participants. Superficial veins of the dorsum of the hand were regularly changeable in existence as well as arrangement. The knowledge of variations of superficial veins was clinically significant in various revascularization processes, specifically reconstructive microsurgery along with arterial bypass surgery and intravenous injection or treatment.

KEYWORDS: Oblique vein, Accessory cephalic vein, Tourniquet, Upper extremity

Received: Jul 18, 2020; **Accepted:** Aug 08, 2020; **Published:** Dec 29, 2020; **Paper Id.:** IJMPSAUG20209

1. INTRODUCTION

A knowledge about the variations in the superficial veins on the dorsum of the hand & middle of the fore arm are clinically important from the standpoint of venepuncture, transfusion, cardiac catheterization, formation of arterio-venous fistulas, for vascular access and is also of forensic significance as a measure of identification. It also reduces the occurrence of iatrogenic complications (Kanthi G.M., 2012, Gaither B. Everett, 1969). Superficial veins of the middle upper extremities were regularly changeable in existence as well as arrangement (Vasudha TK, 2013). Upper extremity vein thrombosis (UE-VT) was most frequent pathology as well as yet little studied. In the 2020s, it reported 10% of all scenarios of venous thrombosis. That was primarily described through growing use of central venous catheters (CVC) also in specific the use of PICC LINE (Peripherally Inserted Central Catheter – Line) (Moore,

1999). The superficial venous drainage of the digits was through the dorsal digital veins that pass along the sides of fingers. They join to form the dorsal digital metacarpal veins that plays a key role in the formation of the dorsal venous network in the region of the head of metacarpal bone. This is joined by the dorsal digital vein from the radial side of index finger as well as through 2 dorsal digital veins of the thumb on its lateral side. On the medial side it gets a dorsal digital vein from the ulnar side of the thumb. The dorsal digital venous plexus is then drained by the cephalic as well as basilic veins on the radial along with ulnar sides respectively (Kanthi G.M., 2012, Chaurasia B.D., 2004). The cephalic vein winds upwards from the dorsal venous network round the radial border of the forearm, courses linking the deltoid along with pectoralis major to join the axillary vein under the level of the clavicle. The basilic vein continues as the axillary vein in the bottom boundary of the teres major muscle. The axillary vein becomes the subclavian vein at the outer border of first rib (Grey's Anatomy, 1980). Venipuncture was conducted for significantly five purposes: (1) to get blood for diagnostic reasons; (2) to observe levels of blood elements; (3) to provide therapeutic therapies such as medications, nutrition, or chemotherapy; (4) to take out blood because of surplus levels of iron or erythrocytes (red blood cells); or (5) to gather blood for transfusion. The superficial veins of the forearm were generally selected for venepuncture, called basilic, cephalic as well as median cubital veins at the antecubital fossa. These veins were proposed as they were well assisted by muscle along with connective tissue, visible as well as simple to palpate (Judy C.Arbiq, 2008). The superficial veins were clinically significant in revascularization processes, especially in reconstructive microsurgery as well as arterial bypass surgery and intravenous injection or treatment (Nikola Vucinic, 2015).

1.1. Accessory Cephalic Vein

This vein is seen as an extension from the middle of the dorsal venous arch. It courses up and below the elbow provides away a branch that joins the cephalic vein. Further it moves upwards and ends by joining the cephalic vein below the deltopectoral groove. (Fig-1), (Fig-3) (Kanthi G.M., 2012, Chaurasia B.D., 2004).

Figure 1: Showing accessory cephalic vein

1.2. Oblique Vein

A large vein arising from the ulnar end of the dorsal venous arch, and passing obliquely proximally and radially over the dorsal surface of the wrist to break off in the cephalic vein. (Fig-2), (Fig-3) (Kanthi G.M., 2012, Chaurasia B.D., 2004).

Figure 2: Showing oblique vein.

Figure Figure 3: Showing accessory cephalic and oblique vein.

2. MATERIALS AND METHODS

The present study was done on 100 individuals, 50 females and 50 males, from Dakshina Kannada population in India, between-18-20 years. Informed consent and parameters like Age, Sex of the students were taken.

A tourniquet was tied in the proximal part of the forearm, 4cms below the elbow and tight fist was made to make the veins prominent, Right and Left hand of the students were taken. Dorsal venous network on the dorsum of both the hands and middle of the arms were studied. (Fig-4).

Variations in the superficial veins on the dorsum of the hand and middle of the forearm arms were noted. The statistical analysis was done by chi square test.

Figure 4: Showing dorsal venous network.

3. RESULTS

Out of 50 males and 50 females, variations in the superficial veins on the upper extremity of the hands are noted and tabulated (Table No-1). Out of 50 males, including their right and left hands, in 30 hands oblique vein was found, and accessory cephalic vein in 20 hands (Fig-5). Out of 50 females, oblique vein was found in 15 hands and accessory cephalic in 9 hands (Fig -6).

Table 1: Variations in the superficial veins on the dorsum of the hand in males and females

	MALES	FEMALES	TOTAL
OBLIQUE	30	15	45
ACCESSORY CEPHALIC	20	9	29
NORMAL	50	76	126
TOTAL	100	100	200

Chi square test value is 16.686. $p < 0.001$. The study is highly significant.

This shows that the variations in the superficial veins on the upper extremity was more commonly seen in males than in females and oblique vein variation was more commonly seen than accessory cephalic, in both males and females.

Figure 5: Percentage of variations in the superficial veins on the dorsum of the hand and middle of the arm in males. Oblique vein was found in more hands than accessory cephalic vein

Figure 6: Percentage of variations in the superficial veins on the dorsum of the hand and middle of the arm in females. Oblique vein was found in more hands than accessory cephalic vein.

Out of 100 right hands, 26 of them were oblique and 14 were accessory cephalic. (Table No-2), (Fig-7). Out of 100 left hands, 25 of them were oblique and accessory cephalic was 14. (Table No-2), (Fig-8).

Table 2: Variations in the superficial veins on the dorsum of the right and left hands

	Right hand	Left hand	Total
Oblique	26	25	51

Accessory cephalic	14	14	28
Normal	60	61	121
Total	100	100	200

Chi square test value was 0.012. $p > 0.05$. Therefore, study is not significant. There was no variation seen between the right and the left hand.

Figure 7: Percentage of variations in the dorsum of the right hand. Oblique vein was found in more hands than accessory cephalic vein.

Figure 8: Percentage of variations in the dorsum of the left hand. Oblique vein was found in more hands than accessory cephalic vein.

4. DISCUSSIONS

Ronald A. Bergman from Sweden discovered a substantially correctly noticed vein arising from the ulnar end of the dorsal venous arch, and passing obliquely proximally and radially over the dorsal surface of the wrist to break off in the cephalic vein, which is the oblique vein. In 47% of 300 individuals, oblique vein was identified. An adjunct cephalic vein has identified to emerge in the ulnar end of the dorsal venous arch nearly 28% (Berry, 1908).

But according to present study done in India, out of 100 individuals, oblique vein was found in 23% and accessory cephalic vein was found in 15%. (Table No-3).

Table 3: Comparison between similar study with other author

	Oblique vein	Accessory cephalic vein
Present study	23%	15%
Ronald A. Bergman	47%	28%

Giridhar M. Kanthi, during routine dissection noted an accessory cephalic vein in the Indian male cadaver of an estimated age of 50 years, which arose from the ulnar end of dorsal venous network and draining into cephalic vein (Kanthi G.M., 2012).

5. CONCLUSIONS

To perfect the technique of venepuncture, we must have a better knowledge of the arteries, veins as well as connected nerves within the forearm. Venepuncture if conducted skillfully, cautiously and correctly, will give high standard blood samples without creating discomfort to the sufferers. It is difficult to access the veins in case of variations (Judy C. Arbique, 2008). It can result in movement of needle in the wrong directions, puncturing in the wrong areas and causing damage to the structures related to that area. Consequently, the understanding of the anatomical differences could support to decrease the happening of the iatrogenic problems. It is also of forensic significance as a measure of identification. The vena cephalica in specific, taken with effective valves, can effectively act the role of vessel implant (Jasinski, 2003).

6. REFERENCES

1. Kanthi G.M. et al. *Superficial Venous variations of the Upper Limb - A Case Report*. Jnana Srotas. 2012; 7.
2. Chaurasia, B. D. (2004). *Human anatomy* (p. 53). CBS Publisher.
3. Berry, R. J. A., & Newton, H. A. S. (1908). *A study of the superficial veins of the superior extremity in 300 living subjects*. Anat Anz, 33(5), 591-601.
4. Naaz, Farah, and Noman Khan. "Medical tourism in India: Perspective of Unani medicine." *Journal of Ayush: Ayurveda, Yoga, Unani, Siddha and Homeopathy* 5.3 (2016): 52-60.
5. Everett, G. B., & Allen, G. D. (1969). *Intravenous therapy--a review of site selection and technique*. Anesthesia progress, 16(9), 280.

6. Mahrous, A., et al. "Cooling Via Human Forearm for Multiple Sclerosis." *International Journal of Mechanical Engineering (IJME)* 4.6 (2015): 1-12.
7. Judy C.Arbiq BHS, ART (CSMLS), MLT (CSMLS), CLS (NCA), et al (2008). *Venipuncture Part 1-Anatomy of the arm and vein location*.
8. *Gray's Anatomy*, Elsevier Churchill Livingstone, 36th Edition: 752-753.
9. Vučinić, N., Erić, M., & Macanović, M. (2016). Patterns of superficial veins of the middle upper extremity in Caucasian population. *The journal of vascular access*, 17(1), 87-92.
10. Moore, K. L., & Dalley, A. F. *Clinically Oriented Anatomy*, 1999. Baltimore: Williams and Wilkins, 51-3.
11. ARQUEZ, HUMBERTO FERREIRA. "Bilateral variations in patterns of branching of the axillary artery and presence of communications between median and musculocutaneous nerves." *International Journal of General Medicine and Pharmacy* 3.2 (2014): 71-78.
12. Vasudha, T. K. (2013). A study on superficial veins of upper limb. *National Journal of Clinical Anatomy*, 2(04), 204-208.
13. Yadav, Devendra, and Abhishek Gaikwad. "Comparison and testing of tensile strength for low & medium carbon steel." *International Journal of Mechanical Engineering (IJME)*, 4 (5), 1 8 (2015).
14. Jasiński, R., & Poradnik, E. (2003). Superficial venous anastomosis in the human upper extremity-a post-mortem study. *Folia morphologica*, 62(3), 191-199.