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## THE STUDY OF DORSAL VENOUS ARCH OF HAND IN LIVING ADULT MALES IN UDAIPUR DISTRICT OF RAJASTHAN

Charu Taneja<sup>1</sup>, Mohd.Younus<sup>2</sup>, Deepak S.Howale<sup>1</sup>

<sup>1</sup>Dept.of Anatomy, Geetanjali Medical College and Hospital, Udaipur, Rajasthan

<sup>2</sup>Dept.of Anatomy, Al Ameen Medical College, Bijapur, Karnataka

E-mail of Corresponding Author: bsntshrm83@gmail.com

### ABSTRACT

In this study, the present observation is only a preliminary study of hand veins- that is formation of Dorsal Venous Arch, Cephalic Vein and Basilic Vein which will be helpful to reduce complications especially at the Anatomical snuff box. The veins of the hand especially cephalic vein are selected for introducing canula of intra venous infusion set. This position of infusion needle with canula helps the patient to have an easy movement of hand. But while introducing the needle the synovial sheaths of the tendons or radial artery in anatomical snuff box must not be pricked by needle. We studied 100 local individuals of age group 25-50 years. Tourniquet is placed above the wrist. As every clinician requires a sound knowledge of variations of veins of hand is felt essential as such an attempt is made to observe the dorsal venous arch/network in at least 100 individuals to give an opinion.

**Key words:** Living Adult male, Tourniquet, Dorsal Venous Arch.

### INTRODUCTION

Mammal's Human cardiovascular system is highly developed and consists of 3 sub-systems namely Arterial, Venous and Lymphatic. Arteries are thick walled tubes carrying oxygenated blood to all parts of the body, while veins and lymphatics are thin walled tubes draining blood from all parts of the body to Kidney, Liver, Lungs and Heart for filtration, analysis, purification & pumping respectively. Veins and lymphatics collect blood which is rich in metabolic endproducts, with Carbondioxide & diverts the blood towards the heart that is into the right atrium. The composition of the blood present in arteries and veins differs, majorly because of the presence of RBC with Carboxy

Haemoglobin in veins. The great Flemish Anatomist Andrea's Vesalius<sup>1</sup> who is considered as "Father of Modern Anatomy" argued & clarified with demonstration that "There is a circulatory system with two separate systems that is Arterial & Venous system" during 1540's. English physician William Harvey<sup>2</sup> in 1653 was the first scientist to elaborate the work of Andreas Vesalius and expressed that there is "Circulation of blood and that there is anastomosis between Veins & Arteries Separately .The whole circulatory system is connected to heart & lungs".I am thankful to Principal of Geetanjali Medical College & Hospital and HOD of my Department,Dr.L.K.Jain who helped me a lot in my work.

## MATERIALS AND METHODS

Dorsal Venous Arch of 100 individuals were considered for the present study that is 200 hands were observed. All the individuals selected were of labour and farmer category that is those who are hard working. Individuals were all of Low socio-economic level. The age groups considered were between 25-50 years. Other materials required for the study are:-

- (i) Tourniquet (ii) Cotton Towel
- (iii) Pick pen marker – blue colour
- (iv) Kodak Digital Camera (Easy share)
- (v) Soaps (vi) Towels

### Method:

Individuals were asked to wash their hands, with soap provided. Hands were wiped with a cotton towel, provided. Palmar and Dorsal surfaces were observed for any skin infections. Individuals with any change in skin texture were not considered. Tourniquet is placed 3 cm proximal or above the anterior distal crease of the wrist. A photograph of each hand with prominent Dorsal Venous Arch was taken within 2 minutes. Immediately the veins were coloured with blue sketch pen and photographs were taken, within 5 minutes, to avoid inconvenience to the individual. Tourniquet is removed subsequently from the hand. Same procedure is repeated to the both hands. 10-12 individuals were observed at a time. Photographs were all observed in detail.

### Observations:

The Veins of the hand, forearm and cubital fossa are given importances as they are superficial and can be easily blocked at the arm to make them prominent. Especially at forearm and cubital fossa the veins perforate the deep fascia to open into deep veins, a situation which helps to fix the veins. The hand veins i.e. Dorsal venous arch /network are superficial and can be made prominent by putting a tourniquet at

the wrist. But these veins cannot be fixed as they are situated in a modified loose areolar fascia, and the vein slips while introducing the needle. The veins of the hand especially cephalic vein are selected for introducing canula of intra venous infusion set. This position of infusion needle with canula helps the patient to have an easy movement of hand. But while introducing the needle the synovial sheaths of the tendons or radial artery in anatomical snuff box must not be pricked by needle. As every clinician requires a sound knowledge of variations of veins of hand is felt essential as such an attempt is made to observe the dorsal venous arch/network in at least 100 individuals to give an opinion. The following observations were carried out in 100 individuals:

#### 1) Dorsal Venous Arch-Formation-Normally-Table-I

All the veins are formed at the sides of terminal phalanx and coursed along the lateral side of fingers accompanying digital arteries.

#### Formation:

The arch is majorly formed by the union of digital vein of the thumb, digital veins of little finger and 3 metacarpal veins.

#### 2) Dorsal Digital Veins Of Middle 3 Fingers -Table-II:

Lengths were measured from middle of middle phalanx till the formation of metacarpal veins at the inter digital cleft.

#### 3) Metacarpal Veins -Table-III:

These veins are formed at the interdigital cleft by the fusion of 2 dorsal digital veins of adjacent fingers i.e. index – middle, middle- ring & ring-little fingers.

#### 4) Position Curvature Of Dorsal Venous Arch –Table-IV:

The position of the dorsal venous arch varied from individual to individual and in both hands of the same individual.

#### 5) Cephalic vein-Formation-Table-V

The Normal formation of cephalic vein has been observed to be by the joining of dorsal

digital vein of thumb (fused or unfused) joins with the dorsal digital vein of index finger with the lateral end of dorsal venous arch and continues upwards as cephalic vein.

#### 6) Basilic vein-Formation-Table-VI

Formation of Basilic vein is observed on both hands of all the individuals Normally this vein is formed by the fifth dorsal digital vein from medial side of little finger joining with the medial end of the dorsal venous arch to form the Basilic vein.s

**TABLE-I: DIGITAL VEINS OF THUMB AND LITTLE FINGER**

Total No of Hands		Length of 5 <sup>th</sup> vein		Length of thumb vein	
Right	Left	Right	Left	Right	Left
100	100	3.2-8 cm in 52 hands	4.2-9.6 cm in 56 hands	3.2-8 cm in 48 hands	3-4.6 cm in 44 hands

**TABLE-II: DORSAL DIGITAL VEINS OF MIDDLE 3 FINGERS**

Total No. of Hands		Length of dorsal digital vein of middle 3 fingers	
Right hand	Left hand	Right hand	Left hand
100	100	3.5-4 cm	3-3.5 cm

**TABLE-III: META CARPAL VEINS**

Total No of Hands		Normal		At the head of metacarpal		At the shaft of metacarpal		At the base of metacarpal	
RT	LT	RT	LT	RT	LT	RT	LT	RT	LT
100	100	69 (69%)	85 (85%)	23 (23%)	08 (8%)	07 (7%)	05 (5%)	01 (1%)	02 (2%)

**TABLE-IV: POSITION & CURVATURE OF DORSAL VENOUS ARCH**

Total No of Hands		Middle of hand with distally convex		oblique towards medially		Oblique towards laterally	
RT	LT	RT	LT	RT	LT	RT	LT
100	100	65 (65%)	51 (51%)	19 (19%)	23 (23%)	16 (16%)	26 (26%)

**TABLE-V: CEPHALIC VEIN-FORMATION**

Total No of Hands		At 1 <sup>st</sup> inter digital cleft		At anatomical snuff box		At lateral end of wrist	
RT	LT	RT	LT	RT	LT	RT	LT
100	100	53 (53%)	51 (51%)	36 (36%)	31 (31%)	11 (11%)	18 (18%)

**TABLE-VI: BASILIC VEIN-FORMATION**

Total No of hands		Site of formation at middle of shaft of 5 <sup>th</sup> metacarpal bone		At the base of 5 <sup>th</sup> metacarpal		At medial end of wrist	
RT	LT	RT	LT	RT	LT	RT	LT
100	100	57 (57%)	41 (41%)	39 (39%)	46 (46%)	04 (4%)	13 (13%)

## DISCUSSION AND CONCLUSION

The present study accepts that veins especially superficial Veins of hand vary from individual to individual & in the same individual on both sides. The following are few concluding opinions and suggestions after observing many patients from different hospitals. All aseptic measures must be implemented. Needles must not be introduced into the veins at the wrist or dorsum of the hand. The tip of the needle should not pierce the synovial sheaths of tendons especially when Cephalic Vein is selected, as such situations may lead to synovitis, with restricted movement of the thumb at a later stage. Injury to periosteum of metacarpals or carpal bones must be avoided as the veins of Dorsal venous arch are difficult to fix. Cannula must not be retained in the vein for more than 24 hrs as far as possible. Endothelial scraping of the vein may lead to cellular reaction & cause pain to patient leading to Phlebitis. Such a site of the endothelium initiates Thrombus formation followed by other complications like Embolus formation.

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