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## ANATOMICAL VARIATIONS OF SUPERFACIAL VEINS IN ANTECUBITAL FOSSA

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### ABSTRACT

**Background:** End Stage Renal Disease (ESRD) is a clinical situation of irreversible decline in renal function in a way that can cause permanent dependence on alternatives like dialysis (Haemo or peritoneal dialysis) or kidney transplant. In the present study, we aimed at evaluating the anatomical variations of the veins in cubital region to have a better venous access. **Methods:** In this descriptive cross-sectional study, 699 patients visiting the Vascular Surgery Department of Razi Hospital (in Rasht) for applying dialysis were evaluated by means of color Doppler sonography to show the exact cubital anatomy. **Results:** According to this research, 4 anatomical variations were described around the cubital region: Type A (438 cases – 62.7%): presence of cephalic and basilic veins joining through a perforating vein, Type B (13 cases-1.9%): presence of cephalic and basilic veins without any perforans, Type C (41 cases-5.9%): presence of the basilicvein and no cephalic vein, Type D (207 cases -29.6%): presence of cephalic vein and no basilicvein. In 92.6% of patients a perforating vein was found in exploration. **Conclusions:** knowing of anatomical variations of cubital fossa can help us for better design of AV fistula creation for dialysis patients.

**Key words: ESRD, Anatomical Variations, Cubital Region, Dialysis Access**

### INTRODUCTION

End Stage Renal Disease (ESRD) is a clinical situation of irreversible decline in renal function in a way that can cause permanent dependence on alternatives such

as dialysis (Haemo or peritoneal dialysis) or kidney transplant [1]. The total incidence rate of ESRD is about 260 cases in one million people and the number of patients

has a 6% increase annually [2]. Over 15,000 people suffer from ESRD in Iran and the number of new cases is said to be 3175 patients per year. Over the past 40 years, alternative treatments like dialysis and kidney transplant saved hundreds of lives of people with ESRD [1]. So progress in having better vascular access for patients is important. The most common type of this access is achieved through arteriovenous fistulas (AVFs) and if not possible, vascular prosthesis might help [3,4]. There are some problems surgeons may face when performing to get vascular access like congenital lack of appropriate superficial veins, losing the vessels due to frequent venous cannulation and not using the AVFs by the right method. It seems ligating the perforating vein which connects superficial veins of the cubital region to the deep veins is extremely necessary to improve the preparation of the arteriovenous fistulas even it might help treat the steal syndrome in patients [5], thus knowing the exact anatomical characteristics of the veins in cubital region and their variations could help improve the surgical techniques to achieve optimal results from the surgeries [6]. In the present study, we aimed at evaluating the anatomical variations of the veins in cubital region.

#### **MATERIAL & METHODS**

In this cross-sectional descriptive study, patients visiting the Vascular Surgery

Department of Razi Hospital in Rasht city for applying dialysis fistulation since January to June were evaluated by means of color Doppler sonography. Among patients those without appropriate distal vascular access became candidates for cubital region fistulation. The cubital region was explored in these patients only by one surgeon and after the surgery the anatomies of the veins of the area were documented. A total number of 699 patients were totally evaluated. After collecting data from all patients based on the assessing variables, they were analyzed by means of Chi-square and SPSS version 16.

#### **RESULT**

699 patients who visited Vascular Department of Razi Hospital in Rasht for placing arteriovenous fistula in cubital region for dialysis underwent surgery by the same surgeon and were enrolled in the study. According to this research, 4 anatomical variations were described around the cubital region:

Type A: (438 cases – 62.7%): Presence of cephalic basilica veins joining through a communicating vein.

Type B: (13 cases-1.9%): Presence of cephalic and basilica vein without any communicating vein.

Type C: (41 cases-5.9%): Presence of the basilic vein and no cephalic vein.

Type D: (207 cases -29.6%): Presence of cephalic vein and no basilic vein. ( Table 1) There was no significant statistical relationship between the anatomical variation of the veins and the gender of the patients (P=0.066). There was no significant statistical difference in frequency distribution of the different anatomical variations of veins among the left and right hand (P=0.21). Perforating veins were observed in 647 patients (92.6%) during exploration while 52 patients had no perforating veins. The distribution frequency of the presence of perforating vein was the same for both hands.

#### DISCUSSION:

Over 15000 patients suffer from ESRD in Iran and numerous new cases are increasingly adding to this figure. It seems all of these patients need vascular access for dialysis; however, wrist region is counted as the most appropriate area for placing AVF in most patients. Applying AVF in this area is sometimes not possible due to reasons including age, obesity, diabetics, and frequent vascular access, thus using cubital region veins can be helpful in seriously ill patients [5]. Although anatomy of cubital fossa veins is described in anatomy texts but many variations influence the design of AV fistula surgery in end stage renal disease

patients. This study aims to describe this variations.

In this research study, we found out the perforating veins are present in 92.6% of patients. ligation of this vein in AV fistula surgery decreases the risk of steal syndrome and venous hypertention. Sometimes this vein after ligation can be used for creation of anastomosis if there is not suitable another vein. Due to the numerous benefits of ligating the perforating veins in AV fistula procedure of the cubital region , in majority of the patients , this vein can be ligated or used for anastomosis in the procedure [5]. The total 4 anatomical variations were observed in our study. The most common form of variation was type A (62.7%) which was seen in 60.4% of men and 65% of women. Some studies were done on this objects by researchers and the findings of them were summarized and compared in (Table 2). [6, 7, 8, 9]. This research helps us for better designing of AV fistula surgery. In many cases in whom we have no suitable vein in wrist we can use cubital fossa for AV fistula surgery so this research helps us for better designing of this surgery.

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Table1- Variations Of Basilic and Cephalic Veins in the Cubital Region in our study

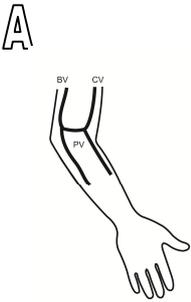
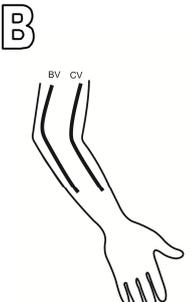
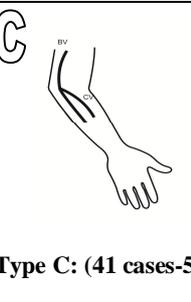
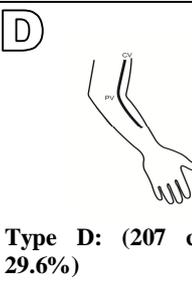
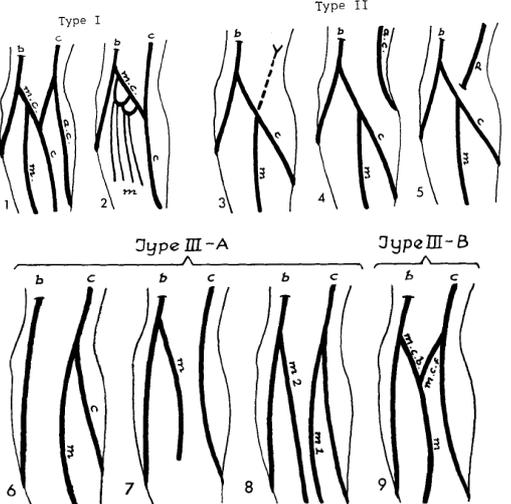
variety	No	Figure	
Type A : The Most Common Type B : The Most Uncommon	699	 <p>Type A: (438 cases – 62.7%)</p>	 <p>Type B: (13 cases-1.9%)</p>
		 <p>Type C: (41 cases-5.9%)</p>	 <p>Type D: (207 cases - 29.6%)</p>

Table 2 : Different Variations Of Basilic and Cephalic Veins in the Cubital Region in studies

Study	Sample Size	Method Of Study	No Of Variations	Similarity	Difference	Figure
Halim A ( India )	536	Turnicute and Explore	3	Type A: The Most Common  Type B :the Most Uncommon	*Method Of Study	
			Type I= A (67.5%)			
			Type II= B (19.5%)			
			Type III= C, D (12.5%)			

<p>Singh Jay Datta (Nigeria)</p>	<p>300</p>	<p>Turnicate and Physical exam</p>	<p>5 Describes variations of communicating vein</p>	<p>Type A: The Most Common Type B :the Most Uncommon</p>	<p>*Method Of Study *Survey The Subtype</p>	
<p>Del Sol (South America)</p>	<p>300</p>	<p>Explore And Physical exam</p>	<p>4 I, II=A III= B , D IV=D</p>	<p>Type A: The Most Common</p>	<p>*Method Of Study *Survey The Subtype</p>	
<p>S.M.Alamshah (Ahvaz, Iran)</p>	<p>103</p>	<p>Explore And Physical exam</p>	<p>5 A,E=C A=44.66% E=2.29% B=A (30.1%) C=C (18.44%) D=D (3.88%)</p>	<p>-----</p>	<p>*Type D : The Most Common *Survey the cephalic vein ONLY</p>	
<p>H.Hemmati (Rasht, Iran)</p>	<p>699</p>	<p>Explore And Physical exam</p>	<p>4</p>	<p>Type A : The Most Common Type B : The Most Uncommon</p>		<p>Type A: (438 cases – 62.7%) Type B: (13 cases-1.9%) Type C: (41 cases-5.9%) Type D: (27 cases -29.6%)</p>