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Evaluation of the Suffering Rate of Deep Thrombosis in Patients with Upper Extremity Immobilization

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ABSTRACT

A few studies have been performed about risk factors DVT of upper extremity, especially of Immobilization, in this study, we have considered the risk of developing DVT upper extremity in patients under Immobilization.
Methods: This was a prospective cross-sectional study and 488 patients entered the studied, who have undergone Immobilization after upper extremity trauma in the years 1390 to 1393 for more than 4 weeks at Imam Hussain hospital. Only patients who were in the age group of 30 to 60 years, were in the study, also, patients with a history of cancer, coagulopathy, and central catheterization, were excluded. After the surgery, patients were followed up for 6 months, patients who showed signs of DVT, were studied by D-Dimer and Doppler sonography.
The results: 34 Percent of patients were female and the rest of the patients were male, 31% had undergone open surgery, 61 % had undergone closed surgery and 8 percent had undergone closed reduction. 17% of patients had suffered from diabetes, and 22 percent had glucose intolerance. The most common symptom, edema was the most common symptom among the patients. Of the 10 patients with clinical signs associated with DVT, Seven patients showed average possibility of clinical signs for UEDVT and 3 patients showed extremely strong symptoms for UEDVT that of these, based on Doppler sonography, only two patients with strong symptoms, had suffered from UEDVT. Finally, based on our findings, developing UEDVT among patients with upper extremity Immobilization, 004/0 with Confidence interval is 95 percent (009 / 0-001 / 0).
Conclusion: The population under the study that had undergone Immobilization, showed a higher risk for the suffering, without any risk factor for the development of UEDVT, further studies are recommended.
Keywords: Deep Thrombosis, Upper Extremity Immobilization,

INTRODUCTION

The suffering rate of arterial thrombosis about 1 percent for aging, showed 0.1% increase (1). Upper extremity deep vein thrombosis, includes approximately four percent of the total arterial thrombosis. (2) Pulmonary embolism, superior vena cava syndrome and post thrombotic syndrome is considered to be the most important complications of arterial thrombosis of the upper extremity.

The known risk factors for thrombosis of the upper extremity deep Vein Thrombosis (UEDVT) differ from the known risk factors for lower extremity DVT and pulmonary embolism. (3) Central Venous Catheter (CVCS) included, 7 to 41 percent of the UEDVT In various studies. Effort relates compression and thoracic outlet (Paget–Schroetter syndrome) are known as other dedicated risk factors of UEDVT. (4) Risk factors such as cancer, by using oral contraceptive of pregnancy and thrombophilia, increase the risk of lower extremity DVT and pulmonary embolism, and also lead to increase the risk of UEDVT. (5)

Most studies that have examined the risk factors of UEDVT, have been limited in size, and many of the known risk factors for the lower extremities DVT, and pulmonary embolism like surgery, injury, immobilization, Hormone Replacement Therapy (HRT), travel and obesity have been neglected. (6)

Immobilization is considered as a part of the treatment plan for patients with organ damage, the study of its fixed effect in lower extremity DVT, make sense as a risk factor for UEDVT. However, apart from a few small studies, this issue has not examined, and these small studies have failed to show a connection between the two. (7)

This study will attempt, by considering all known risk factors for DVT UEDVT upper extremity and pulmonary embolism, will examine the fixed effects separately. It is hoped that this study will be a start in recovery, though a small one, in the prevention condition of upper extremity deep vein thrombosis.

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METHOD

This was a prospective cross-sectional study and 488 patients entered the studied, who have undergone Immobilization after upper extremity trauma in the years 2011 to 2014 for more than 4 weeks at Imam Hussain hospital. Only patients who were in the age group of 30 to 60 years, were in the study, also, patients with a history of cancer, coagulopathy, and central catheterization, were excluded.

After the surgery, patients were followed up for 6 months, patients who showed signs of DVT, were scored based on Constant method and the colleagues (table 1), and patients who had a moderate to high risk of DVT, were studied by D-Dimer and Doppler sonography. However, in this study, no patient had undergone catheterization.

Table 1- scoring of UEDVT probability based on clinical symptoms

Indwelling venous catheter	1 point
Localized pain	1 point
Unilateral pitting edema	1 point
Other diagnosis at least as plausible	– 1 point
≤ 0	low clinical probability (rate of thrombosis: 13%)
1	intermediate clinical probability (rate of thrombosis: 38%)
≥ 2	high clinical probability (rate of thrombosis: 69%)

RESULTS

A total of 510 patients were enrolled in the study, that 22 patients were excluded because of heart disease and the use of anticoagulants, chronic kidney disease and chronic rheumatologic diseases. 45% of the patients were in the age range of 30 to 40 years, 37% of the patients were in the age range of 40 to 50 years, and 18% of the patients were in the age range of 50 to 60 years. (Table 2)

34 Percent of patients were female and the rest of the patients were male, 31% had undergone open surgery, 61 % had undergone closed surgery and 8 percent had undergone closed reduction. 17% of patients had suffered from diabetes. (Table 2)

Table 2. Demographic characteristics of the studied population

95% CI	%	N	Variable
			Age
498/0-0/408	45%	221	30-40
0/33-0/418	37%	182	40-50
0/142-0/211	18%	85	60-50
			Sex
0/298-0/384	34%	166	Female
0/61-0/7	66%	322	male
			Upper extremity surgery
0/375-0/275	31%	154	Open surgery
0/572-0/66	61%	301	Closed surgery
0/044-0/089	8%	33	Correction without surgery
			Stability method
0/25-0.15	20%	98	Sling and swathe
0/50-0/40	44%	214	Long arm cast
0/40-0/30	36%	176	Short arm cast
	2%	10	Clinical symptoms of suspected DVT
0/001-0/009	0/004	2	A definitive diagnosis of DVT
			Diabetes status

Of the 10 patients with clinical signs associated with DVT, Seven patients showed average possibility of clinical signs for UEDVT and 3 patients showed extremely strong symptoms for UEDVT that of these, based on Doppler sonography, only two patients with strong symptoms, had suffered from UEDVT.

Finally, based on our findings, developing UEDVT among patients that are undergone Upper Extremity Immobilization, 004/0 with Confidence interval is 95 percent (009 / 0-001 / 0). 2 patients of all the studied patients suffered from UEDVT that one of the cases was a 55 year old woman with diabetes who have had a clavicle fracture, and another case was about a man with BMI> 30, who had proximal humerus fracture.

Table -3- D-Dimer and Doppler ultrasound in patients with clinical signs of UEDVT

percent	number	variable
		level D Dimer
50%	5	Under 250
50%	5	Under 250
		Doppler ultrasonography
20%	2	Existence of DVT in Upper Extremity
20%	8	Normal flow of blood through arteries and veins

Table 4 - Clinical signs and symptoms in patients with suspected DVT

Number of patients (Total = 10)	Clinical signs and symptoms in patients with suspected DVT
	signs
8	**pain**
6	**Inflation (shoulders, neck or arms)**
5	**Paracentesis**
3	**Prurities**
4	**Tenderness vein**
	symptoms
2	**Fever**
4	**Edema**
2	**Cyanosis end**
3	**Dilated cutaneous vein**

Table-5 - D-dimer condition results of sonography and clinical probability of UEDVT

DVT Based on sonography	D-dimer Unnatural		
----	----	478	**With low clinical probability**
0	2	7	**Intermediate clinical probability**
2	2	3	**Severe clinical probability**

DISCUSSION AND CONCLUSION

In recent years UEDVT event cannot be considered as a rare problem, of course most of the cases related to UEDVT often are associated with cancer and central catheter (1), in this connection, studies have been carried out and UEDVT relationship, especially with the cases like cancer and central catheter, has proven (5). However, a number of variables that related to lower extremity DVT, had fixed effect in increasing the developing of the disease, and is discussed and disagreed by the scientists

Upper extremity Immobilization is one of the cases. Some scientists have predicted the increasing risk of UEDVT suffering in the patients (8) While Martineli and colleagues (7) In their large study failed to prove a significant association in this connection, Of course this is not specifically focused on patients with Immobilization, and focus on other variables such as blood coagulation or chronic illness, has reduced the power of these studies in relation to the investigation of Immobilization as a risk factor of UEDVT.

The study specifically examined the patients who had undergone immobilization, the patients who were hospitalized, in almost all cases, because of trauma, did not have other risk factors for developing DVT. All the patients were between 30 and 60 years, so that the effect of age reduces as one of the increasing factors in developing upper extremity DVT. Also, all patients who had a history of cancer or central catheters were excluded.

As a result of conducted surveys only 2 of the 500 patients had a fixed upper extremity DVT, that we obtained suffering of 0.004 with a 95% confidence interval (015 / 0-0001 / 0) in this study, However, a higher suffering was

not obtained than the suffering in the general population (1) and the studied power and sample size cannot prove the higher rates in patients with immobilization.

Previously Blom et al. (8) have reported the risk of developing UEDVT, approximately as 7 times or greater in their studied patients, compared to the controlled group. Of course Martineli and colleagues (7) did not report a significant association about the immobilization, which these findings do not have good reliability and validity, because of limited people immobilization in this study (approximately 50 individuals under immobilization).

Compared to the study (9) that investigated the suffering rate among hospital patients, it has mentioned around 0:09 sufferings among hospitalized patients, this suffering was higher than that of patients in our study, mostly due to the elimination of cancer patients with a history of central venous catheters in our study.

Pain is the most common symptom in patients under study and inflation was the most common symptom in the patients. These findings were similar to prandoni and colleagues (10) in 1997. Based on the scoring of Constant and colleagues (13) in estimating the probability of UEDVT, the most important factors of the clinical predictors, aside from central catheterization, was pain and Pitting Edema. In this study, only the patients that had a score higher than 2, (with the high probability of UEDVT suffering) by the use Color Doppler, showed proven DVT.

Conclusion

The population under study that had undergone Immobilization, without any risk factor for the development of UEDVT, did not show a higher risk for suffering, further studies are recommended.

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