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The Investigation of Relationship between Height and Deep Vein Thrombosis

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ABSTRACT

According to Virsho triad, the blood stasis plays an important role in venous thrombosis, and it seems that their height affects the risk of venous thrombosis. For this reason, considering the pressure difference between the upper and the lower extremities, to assess the relationship between height and the risk of DVT in a case - control study, we have devoted this study. In a study conducted in two groups of 70 patients, with upper extremity DVT (30 patients) and chronic DVT (40 patients) and 50 control groups were examined. The two groups of case and control were matched in terms of age and gender, and questionnaires were completed for each of the groups based on the contents of the records and documents. This information includes age, gender, height, weight, location of DVT (proximal or distal of food and the proximal or distal of hand), respectively. After removal of confounding factors, in the study of the height difference between the study groups, the difference between the control group (9.87 ± 165.12) compared to DVT group (8.03 ± 169.48) was statistically significant (P = 0.009). In the study of height differences in varied groups, the height differences among patients with upper extremity DVT, (7.78 ± 165.23) compared to lower extremity DVT (6.68 ± 172.67) was statistically significant (P <0.001). The height difference between the control groups was statistically significant compared to DVT groups. The height differences between the patients with upper extremity DVT compared to lower extremity DVT was significant.

Key words: Upper extremity, lower extremity, embolism, thrombosis, height

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INTRODUCTION

Venous thromboembolism [VTE] includes deep venous thrombosis, and it is a complication of pulmonary embolism [1] and the prevalence in the general population is 1 to 3 cases per 1,000 people, and the risk increases with aging [2]. Of long-term complications, we can name recurrent thromboembolism, post phlebitis syndrome and pulmonary hypertension [3]. It is estimated that in 2010, about 900,000 cases of venous thromboembolism occurred in the United States that a third of them died and the remaining 4% of were suffering from pulmonary hypertension [4]. It is estimated that 25-50% of patients with deep venous thrombosis syndrome are disposed to thrombosis, in the future [4]. Venous thromboembolism [VTE] is the third most common cardiovascular disorder after heart attack and stroke, in the world [5 and 6]. The disease is a preventable cause of hospital mortality [7]. Venous thromboembolism [VTE] contains a range of, from deep venous thromboembolism and venous sub-segmented thromboembolism to venous thrombosis threatening extremities and embolism fatal to pulmonary [8]. The severity of symptoms depends on the size and location of venous thrombosis, so that venous thrombosis in the Aylyofemoral proximal venous, are more disposed to make early and late morbidities [9]. Risk factors include high age, cancer, lack of physical activity, infectious diseases, past history of venous thromboembolism, pregnancy and postpartum, trauma, hospitalization, obesity, hormone therapy, and hereditary thrombophilia [factor V Leiden and mutation G20210A Protormebin] [10 and 11]. Symptoms of deep venous thrombosis [DVT] includes swelling and pain in the extremities, which are not specific and can also be seen in other diseases [10]. That's why the scoring system "Velez" is used for clinical suspicion and the compression ultrasonography is usually used for the diagnosis [12]. In addition to ultrasonography, other methods such as ultrasound contrast [the gold standard], MRI and CT-Scan is used in the diagnosis of venous thrombosis [13 and 14]. Of drugs used in the prevention and treatment of thromboembolic are

aspirin, heparin, enoxaparin [heparin, low molecular weight], antagonist of vitamin K, direct inhibitor of thrombin and direct inhibitors of factor 10 active [15 and 16].

But in most cases, the recommended treatment includes administration of a low molecular weight heparin for 5 days [before the introduction of low molecular weight heparin, Unfractionated heparin was administered intravenously for 7-5 days] in combination with vitamin antagonists K [warfarin, Asnokomarol and fonProkomon] for 3 to 6 months, in certain cases up to a year's treatment with vitamin K antagonist is also recommended [17, 18]. The triad Virsho, blood stasis plays an important role in venous thrombosis, and; therefore, their height also affect the dynamics of the venous pressure. For this reason, it seems that their height affect the risk of venous thrombosis [19-23]. According to the information obtained, the determination of the relationship between height and incidence of venous thromboembolism has been reported in a few papers. For this reason, in this study, considering the pressure difference between the upper and lower extremities to assess the relationship between height and the risk of DVT in a case - control study was conducted.

MATERIALS AND METHODS

In a case-control study, started from September 2012 till April 2013 for 8 months, the patients with a diagnosis of deep vein thrombosis [acute or chronic] referred to Imam Khomeini Hospital in Urmia had a case of if having and lack of Inclusion and exclusion criteria, were enrolled to be studied. The sample for the case-group in the sequential method and for the control-group in targeted practices were made, according to which the similar studies were not made in Iran, and the other studies are related to European Countries who have higher range of tallness, therefore based on the Pilot studies, the height of 30 patients with deep vein thrombosis and 20 patients without thrombosis were measure as a control, and calculating the average height of in order, 178.29 and 175.48 respectively in the case and control group at 17.24 and 19.47 in the case and control group, the sample volume were calculated based on comparison formula between two average of 37 patients in each group. In this study, the number of at least 70 patients with deep vein thrombosis in each group were selected for the case group. Also the number of at least 50 people who for various reasons other than deep vein thrombosis and venous thromboembolism, in the Ear, throat, nose or eye section of Imam Khomeini Hospital, were admitted for the targeted practices, were selected as the control group. The Inclusion criteria including upper or lower extremity of deep vein thrombosis, are certainly diagnosable through laboratory tests such as d-dimer or ultrasound. Exclusion criteria included those whose laboratory findings such as d-dimer were positive but their diagnosis by ultrasound was not confirmed, or patients who have symptoms of DVT, but their diagnosis was not determined by ultrasound or laboratory, as well as those who lack an extremity of four. The two groups of case and control were matched for age and gender and were analyzed. Sampling method in the case group was based on simple random sampling method with gradual entry, and in the control group was based on purposive sampling. The questionnaire for each of the group members of case and control was completed, based on the contents of the records and documents that included age, gender, height, weight, location of DVT [proximal or distal of foot or the proximal or distal of hand]. In the end, the data from this study were analyzed by the use of SPSS16 software.

RESULTS

Table 1- Demographic characteristics of subjects

59[49.1%]	male	gender
61[50.9%]	female	
21	minimum	age
89	maximum	
55.88±9.06	mean	
145	minimum	height
186	maximum	
167.66±9.06	mean	

In the conducted study, 70 patients in both groups, with upper limb DVT [n=30] and chronic DVT [n = 40] and 50 patients of control group were examined. In total, 59 of patients were male and 61 of them were female, who were in the age range 21 to 89 years with a mean age of 9.06 ± 5.88 years. In the conducted studies, the mean of height of the patients was obtained as 167.66 ±9.06. Comparing the confounding factors in the DVT group with control group indicated no significant difference in gender of two groups [P=0.60]. After comparing the age of two groups, it was found that the mean age in control group is 55.20±17.18, while it is 56.37±15.56 in case group, indicating that this difference is not significant[P=0.69]. Investigating the height differences of studied groups indicated the difference between the control group [165.12±9.87] and DVT group [169.48± 8.03] was significant [P=0.009]. Additionally, comparing the confounding factors between upper limb DVT and lower limb DVT patients indicated that there is no significant difference in gender of two groups [P=0.74]. Comparing the age in the upper limb DVT group, the mean

of 55.53±17.69 was obtained, that it was not significantly different from the mean age of lower limb DVT group [P=0.69].

Table 2- Comparing DVT group with control group.

gender	Control group	Case group	P.value
male Female	26 24	37 33	0.60
height	165.12±9.87	169.48±8.03	0.009
age	55.20±17.18	56.37±15.56	0.69

Table 3 - Comparison of patients in upper limb DVT group with lower limb DVT group

gender	Lower limb DVT	Upper limb DVT	P.value
male female	20 20	13 17	 0.74
height	172.67±6.68	165.23±7.78	0.001
age	57±13.95	55.53±17.69	0.69

DISCUSSION AND CONCLUSION

The height difference between the control groups compared to DVT was statistically significant. The height difference between the patients with DVT of the upper extremities compared with DVT of the lower extremities was also significant.

In a prospective study, the incidence of venous thromboembolism in men compare to women was 1.55 [1.06 for DVT and to 0.6 for venous emboli] which shows the higher proportion of men per their tallness, while by matching the height between men and women, the incidence of venous thromboembolism was not higher in men than in women [25]. In another prospective study, in which patients were matched in terms of mobility, it was found that in men with a height of 195-200 cm and above 200 cm, respectively 2.9 and 3.8 times, the risk of venous thrombosis were higher than men with height of 165-170 cm, and also in women with height of 185 cm, the risk of first venous thrombosis and recurrent respectively were 1.5 and 3 times higher than women with a height of 165-170 cm [while sedentary lifestyle was slightly more common in tall men and women] [26]. In a prospective study, it was found that in men with a height of more than 181 centimeters, the incidence of venous thromboembolism was 1.99 times more than in men with height of less than 173 cm, and finally, they came to this conclusion that only for tall men, height is a risk factor for venous thromboembolism [P: 0.002 for men, and P: 0.2 for women] [24]. Also in the tall men, [over 182 cm] and the obese [BMI> = 30] the risk of venous thromboembolism is 5 times more than men with short [less than 172 cm] and normal weight [BMI <25], while in tall Women, [over 168 cm] and obese women, the risk of venous thromboembolism is 3 times higher than in women with short height [less than 158 cm] [27].

CONCLUSION

Limited studies have been done on the effect of height on the incidence of venous thromboembolism, but it seems that height increase will increase risks of the disease, although it is recommended that further studies be done in this area and in how the height affects the venous thromboembolism.

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