

Comparison of Efficacy Compressive Stockings with Heparin in Prevention of Deep Vein Thrombosis in Stroke Patients

Nastaran Majdi-Nasab,*¹ Gholamreza Shamsaei,¹ Asal Faraji,¹ Reza Haj-Manoochehri,¹ Vahid Abbasi¹

1. Department of Neurology, Ahwaz Jundishapur University of Medical Sciences, Ahwaz, Iran

Article information	Abstract
<p>Article history: Received: 7 Feb 2011 Accepted: 23 Apr 2011 Available online: 5 Nov 2012 ZJRMS 2013; 15(4): 73-75</p> <p>Keywords: Stroke Deep vein thrombosis Graduated compression stocking Heparin</p> <p>*Corresponding author at: Department of Neurology, Ahwaz Jundishapur University of Medical Sciences, Ahwaz. E-mail: n.madjinasab@gmail.com</p>	<p>Background: The present study is carried out to make a comparison between two pharmacological (heparin) and physical (compression stockings) in the prevention of deep vein thrombosis in lower limb of the patients suffered from acute stroke.</p> <p>Materials and Methods: In this investigation as a clinical trial, the effectiveness of the above methods on 100 patients with the stroke was compared in two groups of 50 persons.</p> <p>Results: Three patients in physical group and two patients in pharmacological group got deep vein thrombosis that showed no significant difference between two groups.</p> <p>Conclusion: In spite of no significant relationship and due to less incidence of thrombosis in heparin group, it is more reasonable to use pharmacological methods.</p>

Copyright © 2013Zahedan University of Medical Sciences. All rights reserved.

Introduction

The stroke is a common neurological disease with a global expansion as a main cause of disabilities and the third reason for deaths around the world. The mortality rate of this disease is especially high in Eastern Europe and Asia. Among the effects of the stroke during hospitalization is an increased risk of Deep Vein Thrombosis (DVT) in which due to relative immobility of the patients, there is paresis or plegia in the patients' limbs as well as possible incidence of coagulation disorders in such patients [1].

DVT incidence following a stroke in the patients admitted to the hospital has been reported as 12-40 percent based on whether they receive prophylaxis or not. Prophylaxis method used and the time to start physiotherapy play an important role in determination of DVT incidence level 2-4. Incidence of Pulmonary embolism resulted by thrombosis is 0.5-3.5 percent and the related mortality has been reported up to 37 percent [5]. Pulmonary embolism will cause increased mortality rate during the first week after the stroke [6].

To prevent DVT, physical (compression stockings) and pharmacological (heparin) methods may be used [7]. although there are good evidences based on which thrombosis prevention anticoagulant treatments will cause reduced risk for such disease; however, usefulness of such drugs should be examined due to their even small but definite and serious risk for associated hemorrhages, while physical methods have no risk of hemorrhage and may be used effectively for the patients with bleeding disorders and/or anticoagulant treatment are contra indicated for any reason [8]. The purpose of this study is to compare two physical and pharmacological methods to

prevent the incidence of DVTs in the patients suffered from an acute stroke.

Materials and Methods

In a clinical trial study, 100 patients suffered from the stroke (including hemorrhagic or ischemic) and admitted to neurology ward of Golestan Hospital in Ahwaz, were selected and divided into two groups of 50 persons. There was no limitation of age and gender in the selection of the groups; both groups should be homogenous. Hemiparetic patients with maximum muscle strength in their lower limbs about 3.5 were selected. The patients, who needed to use anticoagulant medicine during their hospitalization, were excluded from the study.

In the first group, subcutaneous heparin with a dose of 5000 unit per 12 hours was used to prevent DVT and in the second group, compression stockings were used gradually during the hospitalization period. This heparin was made in Iran by Caspian Co. and the compression stocking were fabricated by Sigvaris Co. in Switzerland. According to clinical examinations, the size of the patients' leg round was measured, and then paretic leg size was compared with that of healthy leg; in case of any symptom occurrence, it was considered as DVT using Well's clinical criteria and it was continued up to the patient's release time. Doppler ultrasound of leg veins was used to confirm diagnosis.

The patient's demographic characteristics and other required information were collected by questionnaire. The data so collected were analyzed through SPSS-17 software. To compare qualitative statistics, Chi-square

test was used and to compare quantitative statistics, *t*-test was applied and $p \leq 0.05$ was considered statistically acceptable. Since the treatment in both groups was completed based on standard protocols, then there was no special ethical consideration. However, the researchers undertook to be always accessible and to begin necessary treatment in case of any possible complication.

Results

The age average of the patients under study was 70.5 in heparin group and 68.5 in the compression stockings group; there was no statistical significant difference between two groups. The specification of the patients is shown in table 1. Frequency of factors' risk is seen in figure 1 Eighty-eight persons out of 100 patients (88%) had ischemic stroke and another 12 persons (12%) had hemorrhagic stroke. There was no statistically significant difference between two groups in terms of paretic or plegic direction and no statistical relationship exist between two groups in terms of muscle strength and hospitalization days.

Five patients were diagnosed as suffered from DVT during their hospitalization, two (4%) of which were in heparin group and 3 ones (6%) in compression stockings group. No significant difference was found between two groups in terms of prevention method and DVT occurrence. In all the patients suffered from DVT, Thrombosis was confirmed by Doppler ultrasound of lower limbs arteries.

DVT event time in the patients was 4, 6, 7 and 9th days after the stroke occurrence. In 2 patients, DVT was occurred on 6th day after the stroke and in all DVT patients, the stroke was ischemic. Eight out of 100 patients (8%) were dead during their hospitalization.

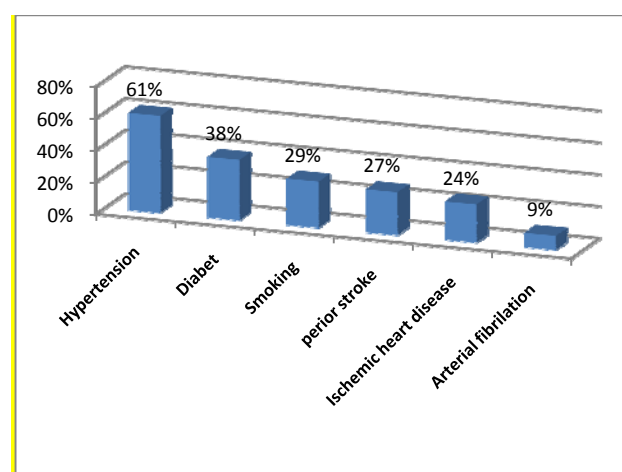


Figure 1. Frequency of risk factors in the patients under study

Table 1. The specification of the patients under study

		Heparin	Compression stocking	Total	<i>p</i> -Value
Sex	Female	25	20	45	0.422
	Male	25	30	55	
Race	Persian	31	32	50	0.50
	Arab	19	18	50	
Educational level	Non educated	46	45	91	0.50
	Guidance high	4	5	9	

Discussion

In this study, there was no statistically significant difference between two groups for age and gender that is indicative of homogeneity of both groups. As compared with other investigation, our study indicated that the stroke is epidemiologically more common in the decades of 6 and 7. Hypertension, heart diseases, diabetics and cigarette are among most common risk factors of the stroke occurrence; the existing difference between the occurrence rates of such risk factors in different studies is due to various life styles around the world.

In this investigation, out of 100 patients, 5 persons (5%) had DVT during their hospitalization including 2 ones (4%) in heparin group and 3 persons (6%) in the compression stockings group; there was no statistically significant difference between two groups. DVT was happened in all the patients within 9 days after the stroke occurrence (days 4, 6, 7 and 9) and all the patients were suffering from ischemic stroke; this results are consistent with those achieved by Muir et al. [9].

In an investigation carried out by Wasay et al. [10] on 458 patients suffered from ICH, to prevent DVT, compression stockings used lonely and along with heparin were compared; heparin was not preferable to the compression stockings. Tan et al. [11] have found in their study on 44 patients with the stroke, DVT occurrence after one week was 2.4% and after one month was 4.8%; both patients had ischemic stroke. It is whilst this occurrence was reported as 5.01% in an investigation conducted by Chua et al. [12] on 419 Asian patients.

Meshkini et al. [13] examined in their study 45 patients suffered from traumatic brain injury in Tabriz divided into three groups of 15 people. Then, three physical (intermittent pneumatic compression device), heparin (5000 units every 12 hours as subcutaneously) and enoxaparin (40 mg daily as subcutaneously) methods for DVT prevention were compared. In this investigation, no significant difference was found between absolute physical prevention and heparin groups, between absolute physical prevention and enoxaparin groups and between heparin and enoxaparin groups.

In a study carried out by Kamran et al. [14], mechanical methods were compared with heparin in the patients with ischemic stroke (5000 unites every 12 hours). In the first group, heparin was used and in the second group, heparin and compression stockings were utilized. The results of his study are indicative of a more than 40 times reduction of thrombosis occurrence in the second group patients compared to those in the first group. Roderick et al showed that reduced risk of thrombosis occurrence happened by using mechanical compression methods was 2/3 as compared to that in the control group and this risk was decreased to 1/2 by using pharmacological and mechanical methods simultaneously.

The results of our study was relatively similar to those conducted on the patients with acute stroke and one reason for the mentioned contradictions might be a difference in DVT diagnosis method as well as racial differences with all other areas.

The authors of the present study believe that in spite of the lack of statistical difference between two groups, heparin is preferred to using compression stockings, due to lower DVT occurrence following the use of heparin. Making use of compression stockings in the patients suffered from acute stroke will be an opportunity that is better to be used as required. It is suggested to use Doppler ultrasound in order to accurately diagnose the thrombosis. In general, it may be concluded that simultaneous use of two aforementioned methods will have the uttermost effect on the prevention of DVT; however, to prove such hypothesis, further studies should be conducted.

References

- Bradley WG, Daroff RB, Fenichel GM, editors. Neurology in clinical practice: 5th ed. USA: Taylor & Francis Company; 2008:1165.
- Wilson RD, Murray PK. Cost-effectiveness of screening for deep vein thrombosis by ultrasound at admission to stroke rehabilitation. Arch Phys Med Rehabil 2005; 86(10): 1941-8.
- Pambianco G, Orchard T, Landau P. Deep vein thrombosis: Prevention in stroke patients during rehabilitation. Arch Phys Med Rehabil 1995; 76(4): 324-30.
- Sioson ER, Crowe WE, Dawson NV. Occult proximal deep vein thrombosis: It's prevalence among patients admitted to a rehabilitation hospital. Arch Phys Med Rehabil 1988; 69(3 pt 1): 183-5.
- Warlow C, Ogston D, Douglas AS. Deep venous thrombosis of the legs after stroke: Part II-Natural history. Br Med J 1976; 1(6019): 1181-83.
- Silver FL, Norris JW, Lewis AJ and Hachinski VC. Early mortality following stroke: A prospective review. Stroke 1984; 15(3): 492-6.
- Brunnicardi F, Andersen D, Billiar T, editors. Schwartz's Principles of surgery. 8th ed. USA: McGraw-Hill Press; 2005.
- Naccarato M, Chiodo Grandi F, Dennis M and Sandercock PA. Physical methods for preventing deep vein thrombosis in stroke. Cochrane Database Syst Rev 2010; (4): CD001922.
- Muir KW, Watt A, Baxter G, et al. Randomized trial of graded compression stockings for prevention of deep-vein thrombosis after acute stroke. QJM 2000; 93(6): 359-364.
- Wasay M, Khan S, Zaki KS, et al. A non-randomized study of safety and efficacy of heparin for DVT prophylaxis in intracerebral hemorrhage. J Pak Med Assoc 2008; 58(7): 362-4.
- Tan SS, Venketasubramanian N, Ong PL and Lim TC. Early deep vein thrombosis: Incidence in Asian stroke patients. Ann Acad Med Singapore 2007; 36(10): 815-20.
- Chua K, Kong KH, Chan SP. Prevalence and risk factors of asymptomatic lower extremity deep venous thrombosis in Asian neurorehabilitation admission in Singapore. Arch Phys Med Rehabil 2008; 89(12): 2316-23.
- Meshkini A, Salehpour F, Shakeri M and Khorasanian M. [The comparison between the effects of intermittent pneumatic compression device used alone or in combination with low dose heparin or enoxaparin in prevention of deep venous thrombosis in the patients with severe head trauma] Persian. Med J Tabriz Univ Med Sci 2008; 29(3): 105-110.
- Kamran SI, Downey D, Ruff RL. Pneumatic sequential compression reduces the risk of deep vein thrombosis in stroke patients. Neurology 1998; 50(6): 1683-8.
- Roderick P, Ferris G, Wilson K, et al. Towards evidence-based guidelines for the prevention of venous thromboembolism: Systematic reviews of mechanical methods, oral anticoagulation, dextran and regional anesthesia as thromboprophylaxis. Health Technol Assess 2005; 9(49): iii-iv, ix-x, 1-78.

Acknowledgements

This paper has been prepared from a thesis completed by Ms. Asal Faraji for obtaining specialized Ph.D. in internal neurology diseases which has been registered in research Dept. at Jundishapur University of Medical Sciences under the code u-88267.

Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

No conflict.

Funding/Support

Ahwaz Jundishapur University of Medical Sciences

Please cite this article as: Majdi-Nasab N, Shamsaei G, Faraji A, Haj-Manoochehri R, Abbasi V. Comparison of efficacy compressive stockings with heparin in prevention of deep vein thrombosis in stroke patients. Zahedan J Res Med Sci (ZJRMS) 2013; 15(4): 73-75.