

COMPARISON OF EARLY AND DELAYED MOBILITY IN DEEP VENOUS THROMBOSIS FOR DEVELOPMENT OF POST THROMBOTIC LIMB

Iftikhar Ahmed, Muhammad Irfan Khan, Muhammad Tariq Khan, Sarwar Alvi, Mujahid Zulfiqar Ali, Nauman Imtiaz Khan

Combined Military Hospital, Peshawar Pakistan

ABSTRACT

Objective: To determine better modality of management of deep venous thrombosis comparing early and delayed mobilization in adequately anti coagulated patients.

Study Design: Quasi-experimental study.

Place and Duration of Study: Combined Military Hospital, Peshawar, from Jan 2015 to Dec 2016.

Methodology: Sixty patients of deep venous thrombosis were recruited in the study in strict compliance with the inclusion and exclusion criteria. Patients were randomized using random number table into two equal groups. In group A patients were mobilized on second day after adequate anti coagulation. In group B patients were mobilized about 2 weeks after they were adequately anti coagulated after the first episode of deep venous thrombosis. All the patients were followed up for 2 years after the development of deep venous thrombosis for development of post thrombotic syndrome according to Villalta scale. Frequency of development of post thrombotic syndrome was calculated for each group.

Results: Chi square test was applied to test the significance of development of post thrombotic syndrome in both the groups. The *p*-value was calculated and was found to be >0.022 which was significant.

Conclusion: Early mobilization after first episode of deep venous thrombosis in adequately anti coagulated patient is better than delayed mobilization as far as development of post thrombotic syndrome is concerned.

Keywords: Delayed mobilization, Deep venous thrombosis, Early mobilization, Post thrombotic syndrome, Villalta scale.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Deep venous thrombosis is a serious condition affecting most commonly the lower limbs^{1,2}. If not treated adequately can lead to early life-threatening complications like pulmonary embolism³ and can impair quality of life by delayed development of postthrombotic syndrome⁴. Post thrombotic syndrome is diagnosed by the development of typical signs and symptoms including cramps, heaviness, pain, pruritus, paraesthesia, swelling of the limb, redness, varicose veins and venous ulcers^{5,6}. Most of the cases of post thrombotic syndrome develop during the first two years of deep venous thrombosis irrespective of the aetiology⁷. It impairs the quality of life and results in loss of work hours. Risk factors for the

development of post thrombotic syndrome are proximal deep venous thrombosis, recurrent deep venous thrombosis in the same leg, poor anticoagulation in the first month after development of deep venous thrombosis, increased age and obesity^{7,8}. Post thrombotic syndrome can be prevented by good control of anticoagulation⁹, elastic compression stockings¹⁰ and early mobilization of the patient after adequate anti coagulation has been achieved rather than prolonged bed rest.

Prevention is better than cure is very true for this condition because once developed it is difficult to treat. Treatment options include elevation of the limb, elastic compression stockings and wound care for the venous ulcers. Varicose veins are not to be operated upon as these are the only channels available for the return of the venous blood from the limb to main blood stream.

Correspondence: Dr Muhammad Irfan Khan, Classified Vascular Surgeon, Combined Military Hospital Peshawar Pakistan

Email: irfan1373@yahoo.com

Received: 24 Jan 2019; revised received: 31 Jan 2019; accepted: 20 Feb 2019

The purpose of the study was to compare early mobilization after adequate anticoagulation and delayed mobilization in a patient of DVT and find out the better modality of dealing with deep venous thrombosis regarding the development of post thrombotic syndrome out of the two.

METHODOLOGY

This quasi experimental study was carried out in Combined Military Hospital, Peshawar, which is a tertiary care hospital, from January 2015 to December 2016. Sixty patients with lower limbs deep venous thrombosis diagnosed through duplex ultrasonography were included according to inclusion criteria. Patients were randomly divided into two groups using random number tables. Group 'A' patients diagnosed to have lower limb DVT were mobilized on second day after adequate anticoagulation and group B patients underwent mobilization after about two weeks. Patients from both the groups were followed for 2 years after the initiation of treatment for the development of post thrombotic syndrome according to Villalta scale.

Patients above 20 year of age, patients of either sex, patients having first episode of deep venous thrombosis and patients who were willing to undergo the study were included in the study.

Patients who developed second episode of deep venous thrombosis during the follow up period, patients with varicose veins and arterial insufficiency were excluded from the study.

Those patients who were diagnosed to have deep vein thrombosis diagnosed through duplex ultrasonography using Toshiba Nemio Doppler Ultrasound machine, according to inclusion and exclusion criteria were included in the study after approval by the hospital ethical committee and informed verbal consent from the patients.

Sixty patients of deep venous thrombosis were recruited in the study in strict compliance with the inclusion and exclusion criteria. Patients were randomized by coin toss method into two equal groups. Group A was subjected to early

mobilization after adequate anticoagulation. Group B was subjected to delayed mobilization after anticoagulation. Patients in both the groups were followed up for 2 years for the development of post thrombotic limb diagnosed by the clinical criteria according to Villalta scale 16. Frequency of development of post thrombotic limb was calculated for each group.

Data analysis was done using SPSS version 18. Continuous variables were presented by mean \pm SD. Categorical variable i.e., development of post thrombotic syndrome for each group was presented in terms of frequency and percentage. Frequency of development of post thrombotic syndrome for both the groups was calculated separately and compared. Chi square test was used to compare frequency of development of post thrombotic syndrome in both groups to determine whether the difference was of statistical importance or not. The *p*-value ≤ 0.05 was taken as significant.

RESULTS

In group A post thrombotic syndrome developed only in 1 patient whereas 7 patients in group B developed post thrombotic syndrome. All the patients in both the groups were males. Age of the patients ranged between 20 to 60 years with mean 35 ± 4.47 years.

Patients in both the groups recovered from first episode of deep venous thrombosis without

Table: Development of post thrombotic limb.

| Patients | Post Thrombotic Syndrome | | <i>p</i> -value |
|----------|--------------------------|------------|-----------------|
| | Present | Absent | |
| Group A | 1 (3.3%) | 29 (96.7%) | 0.022 |
| Group B | 7 (23.3%) | 23 (76.7%) | |

any immediate complications. Patients were kept on oral anticoagulants like warfarin to keep their INR between 2.0 and 3.0 and were followed fortnightly for development of post thrombotic syndrome for 2 years and frequency of development of post thrombotic syndrome was calculated. Chi square test was applied to test the significance of frequency of development of post

thrombotic syndrome in both groups. p -value was calculated and was found to be 0.022 (table).

These results are statistically significant indicating that early mobilization after adequate anticoagulation is better than delayed mobilization as far as the development of post thrombotic syndrome is concerned.

DISCUSSION

The study was conducted on patients of deep venous thrombosis of lower limbs who were adequately anti coagulated and were followed up for 2 years for the development of post thrombotic syndrome after they were divided into 2 groups. Patients in group A (early mobilization) developed post thrombotic syndrome much less than those in group B (delayed mobilization), indicating that early mobilization leads to lesser number of cases of post thrombotic syndrome as compared to those patients who were mobilized late. Early mobilization with adequate anticoagulation after acute deep venous thrombosis is safe and there is no increased risk of pulmonary embolism with early mobilization¹¹⁻¹⁴.

Anderson *et al* found that early mobilization after adequate anticoagulation also reduces the frequency of development of post thrombotic syndrome which is presented as persistent swelling of the limb, pain, heaviness, varicose veins and skin changes ranging from hyperpigmentation, induration and ulcerations¹⁰.

Pikovsky and Robinovich found that post thrombotic syndrome is a major late complication of deep venous thrombosis and is better prevented than cured. Post thrombotic syndrome leads to loss of work hours and major disability to the patient in his daily life activities¹¹.

Study conducted by Strief *et al* showed that incidence of post thrombotic syndrome can be reduced by early mobilization after adequate anticoagulation in deep venous thrombosis without any increase in the incidence of pulmonary embolism¹⁴.

Another study conducted by Michiels *et al* shows that incidence of post thrombotic syndrome can be minimized by adequate anticoagulation and prevention of recurrent deep venous thrombosis^{15,16}.

Villalta scale was developed to classify the severity of post thrombotic syndrome and has been proven to be of value in diagnosing the patients with post thrombotic syndrome with proven deep venous thrombosis¹⁷.

Another study showed that post thrombotic syndrome can be prevented also by the application of compression stockings along with adequate anticoagulation and early mobilization. Whereas there are studies that do not agree with the above strategy¹⁸.

In our study, patients were managed both by early and delayed mobilization. In group A, managed by early mobilization, out of 30 patients, 1 patient developed post thrombotic syndrome in 2 years follow up, whereas in group B, 7 patients developed post thrombotic syndrome. This difference is statistically significant. This proves that early mobilization is better than delayed mobilization after adequate anticoagulation in proven deep venous thrombosis as far as the development of post thrombotic syndrome is concerned without added risk of pulmonary embolism.

This study agrees with the findings of Anderson and colleagues that early mobilization after adequate anticoagulation is better than delayed mobilization in prevention of post thrombotic syndrome¹.

This study has its shortcoming in terms of data, which is qualitative and not quantitative. The objective of our study is to determine the better method of dealing with deep venous thrombosis to prevent the delayed sequel as post thrombotic syndrome.

CONCLUSION

This study has demonstrated that early mobilization after adequate anticoagulation is a better method of managing deep venous

thrombosis than delayed mobilization as far as the development of post thrombotic syndrome in the long term is concerned.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

- Anderson CM, Overend TJ, Godwin J, Sunderji A. Ambulation after deep vein thrombosis: A systematic review. *Physiotherapy Canada* 2009; 61(1): 133-40.
- Hattab Y, Küng S, Fasanya A, Ma K, Singh AC, DuMont T. Deep Venous Thrombosis of the Upper and Lower Extremity. *Crit Care Nurs Q* 2017; 40(3): 230-36.
- Hansson P, OWelin L, Tibblin G, Eriksson H, Deep vein thrombosis and pulmonary embolism in the general population: the study of men born in 1913. *Arch Intern Med* 1997; 157(1): 1665-70.
- Ten Cate-Hoek A J. Prevention and treatment of the post-thrombotic syndrome. *Res Prac Thrombosis Haemostasis* 2018; 2(2): 209-19.
- Kahn SR. The post-thrombotic syndrome. *Hematology. American Society of Hematology. Edu Prog* 2016; 1(1): 413-18.
- Kahn SR, Comerota AJ, Cushman M. American Heart Association council on peripheral vascular disease, council on clinical cardiology, and council on cardiovascular and stroke nursing. The postthrombotic syndrome: evidence-based prevention, diagnosis, and treatment strategies: a scientific statement from the American Heart Association. *Circulation* 2014; 130(18): 1636-61.
- Kahn SR. The post-thrombotic syndrome. *Hematology. American Society of Hematology. Edu Prog* 2010; 2(10): 216-20.
- Giannoukas AD, Labropoulos N, Michaels JA. Compression with or without Early Ambulation in the Prevention of Post-thrombotic Syndrome: A Systematic Review. *Eur J Vasc Endovasc Surg* 2006; 32(2): 217-21
- Kahn SR, Galanaud JP, Vedantham S, Ginsberg JS. Guidance for the prevention and treatment of the post-thrombotic syndrome. *J Thromb Thrombolysis* 2016; 41(1): 144-153
- Liu Z, Tao X, Chen Y, Fan Z, Li Y. Bed rest versus early ambulation with standard anticoagulation in the management of deep vein thrombosis: A meta-analysis. *PLoS ONE* 2015; 10(1): e0121388.
- Pikovsky O. Prevention and treatment of the post-thrombotic syndrome [Internet]. *Thrombosis Research* 2017. Available from: <http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L617497679%0A> (Accessed Mar 2017).
- Kahn SR, Comerota AJ, Cushman M. The postthrombotic syndrome: evidence-based prevention, diagnosis, and treatment strategies: a scientific statement from the American Heart Association. *Circulation* 2014; 130(18): 1636-61.
- Kearon C, Akl EA, Ornelas J. Antithrombotic therapy for VTE disease: CHEST guideline and expert panel report. *Chest* 2016; 149(2): 315-352.
- Streiff MB, Agnelli BG, Connors BMJ, Crowther BM, Eichinger BS, Lopes BR, et al. Guidance for the treatment of deep vein thrombosis and pulmonary embolism. *J Thromb Thrombolysis* 2016; 41(1): 32-67.
- Kahn SR. How I treat postthrombotic syndrome. *Blood* 2009; 114(21): 4624-31.
- Michiels JJ. Diagnosis of deep vein thrombosis and prevention of deep vein thrombosis recurrence and the post-thrombotic syndrome in the primary care medicine setting anno. *World J Crit Care Med* 2015; 4(1): 29-39.
- Kanaan AO, Lepage JE, Djazayeri S, Donovan JL. Evaluating the role of compression stockings in preventing post thrombotic syndrome: A review of the literature. *Thrombosis* 2012; 2012: 694851.
- Mol GC, Van-De-Ree MA, Klok FA, Tegelberg MJAM, Sanders FBM, Koppen S, et al. One versus two years of elastic compression stockings for prevention of post-thrombotic syndrome (OCTAVIA study): Randomised controlled trial. *Br Med J* 2016; 1(1): 353-59.