

Original Research Article

A cross sectional study to measure prevalence of DVT in subacute and chronic spinal cord injury patients without any chemical prophylaxis

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ABSTRACT

Background: Prevalence of DVT in patients with sub-acute and chronic SCI has only been reported in a limited number of studies. Knowing the incidence of thromboembolic events in the sub-acute and chronic rehabilitation phase is important to estimate disease risk and facilitate evidence based prevention. We sought to determine the prevalence of DVT in patients of subacute and chronic phases post spinal cord injury without any chemical prophylaxis.

Methods: Between June 2016 and April 2018, all cases of sub-acute and chronic spinal cord injury, undergoing rehabilitation at our centre were studied. Patients with pre-existing coagulopathy/hypercoagulable state/ bleeding diathesis or on medications for these conditions, tobacco smokers, chronic alcoholics and obese individuals were excluded from the study. All patients enrolled in the study were given mechanical DVT prophylaxis and followed institutional rehabilitation protocol. They were evaluated at 3 months, 6 months and 9 months by clinical examination and CDFI for any evidence of DVT.

Results: Out of 60 patients studied, 04 patients developed DVT (3 in ASIA grade A and 1 in ASIA grade B patient). 75% (3 cases) of the cases were detected in the first 3 months and only one case was detected between 3-6 months post Spinal cord injury. The prevalence of DVT in our study, in subacute and chronic cases of spinal cord injury was 6.67%.

Conclusions: Our study is in concurrence with the existing literature about the low prevalence of DVT in Southeast Asian population which doesn't warrant DVT chemoprophylaxis in subacute and chronic SCI cases.

Keywords: Spinal cord injury, Sub-acute, Chronic, DVT, Chemoprophylaxis, CDFI, SCI

INTRODUCTION

Deep venous thrombosis (DVT) is a well-known complication of an acute spinal cord injury (SCI). However, the prevalence of DVT in patients with sub-acute and chronic SCI has only been reported in a limited number of studies. Knowing the incidence of thromboembolic events in the sub-acute and chronic rehabilitation phase is important to estimate disease risk and facilitate evidence based prevention. Although both pharmacological and non-pharmacological modalities of thromboprophylaxis exist for acute SCI patients,

chemical thromboprophylaxis is not recommended in the sub-acute and chronic rehabilitation phase. While both invasive and non-invasive methods to diagnosis DVT exist, duplex ultrasound is most acceptable to surgeons as a non-invasive method and venography is considered to be the gold standard.^{1,2} Over the period of time, compression ultrasonography has emerged as the non-invasive method of choice for the evaluation of patients with clinically suspected DVT because of its excellent accuracy and wide availability.³⁻⁵ We sought to determine the prevalence of DVT in patients of subacute and chronic phases post spinal cord injury without any chemical prophylaxis.

METHODS

Cases of sub-acute and chronic spinal cord injury, undergoing rehabilitation at our centre after initial spinal stabilization procedure were studied between June 2016 and April 2018. The institutional ethics committee clearance was taken prior to commencement of the study. It was a cross sectional, observational study.

For a study with 95% confidence level, with prevalence of DVT considered as 7.9%⁶ and 7% absolute error, the sample size calculated was 60.

Inclusion criteria

All the patients with sub-acute and chronic spinal cord injury (at different levels) undergoing rehabilitation at our hospital (three months post injury).

Exclusion criteria

Exclusion criteria were patients with pre-existing DVT; acute SCI patients (<3 months post injury); patients with pre-existing coagulopathy/ hypercoagulable state/ bleeding diathesis; patients taking warfarin/ Dipyridamole/ Ticlopidine/ Clopidogrel or any other anticoagulant prior to injury; BMI >35 kg/m²; patients with lower limb fractures along with SCI; smokers and alcoholics.

At the time of admission, a detailed baseline evaluation of the patient was done, including features suggestive of DVT (swelling of the lower limbs, redness, warmth, pain, and tenderness), risk factors for DVT and any past history of DVT. The severity of the SCI was determined by American Spinal Injury Association (ASIA) classification. The details of pre-admission DVT prophylaxis and comorbidities were obtained from the past medical records. The subjects were also subjected to duplex ultrasound scan. All patients enrolled in the study were given mechanical prophylaxis in the form of pneumatic compression devices and graduated compression stockings along with early mobilization. Rehabilitation protocol included gradual active and passive range of motion exercises, tilt table, ambulation using parallel bars and walking with calipers. Patients, subsequently, were evaluated at 3 months, 6 months and 9 months using clinical examination and CDFI to detect DVT. Patients who were detected to have DVT during the study were started on treatment as per standard DVT treatment protocol.

RESULTS

The study included 60 spinal cord injury patients who were initially managed at various tertiary care hospitals by spinal stabilization surgery and were transferred to this hospital for rehabilitation. All the patients enrolled for the study were serving soldiers and there were no female subjects. 8 Patients had associated disease conditions

which were considered to be risk factors for DVT (Table 1).

Table 1: Comorbidities increasing risk of DVT.

Comorbidity	Number of patients (N)	%
Hypertension	5	8.4
Diabetes mellitus - type 2	2	3.3
Hypertension+diabetes - type 2	1	1.6

Table 2: ASIA grading of patients.

ASIA grading	Number of patients	Incidence of DVT
A	29	3
B	16	1
C	14	0
D	01	0
E	00	0
Total	60	4

The patients were assessed for the level of spinal cord injury and severity as per ASIA grading system. Out of 60 patients, 29 were grade A, 16 were grade B, 14 were grade C, 01 was grade D and none were grade E. Of the 04 patients detected to have DVT, 03 were ASIA grade B and one was of ASIA grade A (Table 2).

Table 3: Clinical and radiological evaluation at 3 months, 6 months and 9 months post SCI.

Symptoms	At 3 months	At 6 months	At 9 months
Swelling	8	3	3
Redness	5	4	2
Swelling and redness	3	2	0
DVT confirmed by CDFI	3	1 (New case)	0

Table 4: Total number of (CDFI confirmed) new DVT cases detected as per time since injury.

Time	Number (%)
3 months	3 (75)
6 months	1 (25)
9 months	0
Total DVT cases detected in study	4

Evaluating patients clinically as well as radiologically at 3, 6 and 9 months post injury; we found the following observations (Table 3). Total new DVT cases detected in our study were 04. Out of 4 DVT cases detected during our study, 3 cases were detected in first 3 months; 1 case was detected at 6 months post injury and none of them were detected 9 months post injury (Table 4).

DISCUSSION

Although much has been debated about the incidence of DVT in acute SCI patients, the problem of DVT in sub-acute and chronic SCI is rarely discussed.⁶ The guidelines as per the consortium for spinal cord medicine and ACCP suggest the use of chemical and mechanical prophylaxis for prevention of DVT in acute spinal cord injury patients.^{7,8} But in cases of subacute and chronic spinal cord injury who are undergoing rehabilitation or admitted for various medical ailments, the chemical prophylaxis for DVT is difficult to supervise. Hence the patients are at risk of developing DVT in sub-acute or chronic phase of spinal cord injury.

This study was designed to evaluate the prevalence of DVT in sub-acute and chronic spinal cord injury patients undergoing rehabilitation, who were not given any form of chemical prophylaxis and were managed only with mechanical prophylaxis in the form of early mobilization, pneumatic compression devices and graduated compression stockings for DVT.

The prevalence of DVT in our study, in subacute and chronic cases of spinal cord injury, is found to be 6.67% which is comparable to the data in existing literature.⁹

In case of SCI, the prevalence of DVT also varies from population-to-population and from country-to-country. The prevalence of DVT in western population has been found to vary from 14-100% whereas the reported prevalence of DVT in SCI patients of Asian origin is low as has been found in our study.¹⁰⁻¹⁴ Serial colour Doppler examination revealed that 3 out of 60 (5%) of our patients had DVT during early subacute stage following spinal cord injury, 01 out of 57 (1.6%) patients had DVT during late sub-acute stage of spinal cord injury and none had DVT during chronic period of spinal cord injury.

This study adds further evidence to support the belief that the prevalence of DVT in Southeast Asian patients with SCI is lower than the reported incidence in the West.¹⁰⁻¹⁴ Hence, it may not be appropriate to generalise the DVT prophylaxis recommendations for Caucasians (SCI patients) to people from other parts of the world.

The patients who developed DVT during the course of study were managed with standard DVT treatment protocol. None of the patients in our study developed venous thromboembolism.

CONCLUSION

DVT and Venous thromboembolism (VTE) are one of the most frequent & serious complications following spinal cord injury. In our study the use of mechanical measures was found to be effective in preventing DVT in patients undergoing rehabilitation after spinal cord injury. Our study is in concurrence with the existing literature about the low prevalence of DVT in Southeast Asian population

which doesn't warrant DVT chemoprophylaxis in subacute and chronic SCI cases. However, in view of the limited number of patients studied over a limited period of time, a study with a larger sample size and a longer duration may help arrive at a more concrete conclusion.

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