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EPIDEMIOLOGY AND PREVALENCE OF DEEP VENOUS THROMBOSIS IN PATIENTS WITH SPINAL CORD INJURY

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ABSTRACT

Deep Venous Thrombosis and its sequela pulmonary embolism are leading causes of morbidity and mortality in patients with spinal cord injury. However, little has been reported in Asian population. This study was designed to determine prevalence of Deep Venous Thrombosis among patients with Spinal Cord Injury in Pakistan who were admitted in Paraplegic Centre Peshawar. This was a retrospective study conducted at Paraplegic Centre Peshawar, Pakistan. Before data collection, permission was taken from administration of Paraplegic centre. The data was collected by principal investigator from medical records of SCI patients admitted in the rehabilitation Centre. Medical records of 1142 SCI patients admitted to Paraplegic centre from July 2011 to July 2016 were reviewed in order to identify those patients who were diagnosed with Deep Venous Thrombosis either at the time of initial presentation to paraplegic centre or during inpatient rehabilitation in Paraplegic centre. The prevalence of Deep Venous Thrombosis among patients with spinal cord injury admitted to Paraplegic Centre was 2.7% (n=31). Out of these 31 patients, 19 (61.3%) were male and the remaining 12 (38.7%) were female. Of these 31 patients, 18 (58.1%) patients developed DVT prior to admission to Paraplegic centre while remaining 13 (41.9%) patients were diagnosed with DVT during inpatient rehabilitation. Majority of the patients who developed DVT had complete transaction spinal cord at different levels; 2 (6.5%) patients at cervical, 24 (77.4%) patients at Thoracic and 3 (9.7%) patients at lumbar. Only one (3.2%) patient was diagnosed with bilateral lower limb DVT while in the rest of patients, 17 (54.8%) patients had left lower limb DVT and 13 (41.9%) patients had right lower limb DVT. Out of these 31 patients, 25 (80.6%) patients were having pressure sores while the skins of the remaining 6 (19.4%) patients were intact. The prevalence of DVT seems to be lower in our cohort as compared to other countries, but large trials and prospective studies are required to truly determine the prevalence of DVT in Pakistan. Thromboprophylaxis, screening and early detection of DVT should be a part of initial management of patients with SCI in our setups.

Key words

DVT, paraplegia, spinal cord injury, tetraplegia,

INTRODUCTION

Deep Venous Thrombosis (DVT) and its sequela pulmonary embolism are life threatening secondary problems in patient with Spinal cord injury(SCI)^(1, 2). They are not only leading causes of morbidity and mortality but are associated with incredible healthcare costs in SCI patients⁽³⁾. DVT and its complications are the 3rd major cause of death in SCI survivors⁽⁴⁾. Patients with SCI are at high risk of developing DVT endothelial injury and venous stasis⁽⁵⁾. In SCI patients adjusted hazard ratio for DVT was 2.46-fold higher compared to general population⁽⁶⁾.The prevalence of DVT in SCI patients varies from 5% to 26% in different countries⁽⁷⁾.

Prevention of DVT in SCI patients is one of the major challenges for health care professionals ⁽⁸⁾. Thromboprophylaxis is commonly practiced in western countries in acute SCI patients while in Pakistan, thromboprophylaxis is not routinely performed due to the fact that DVT is not common in southeast asian population ^(9, 10).Early detection of DVT is significantly necessary to prevent further complications potentially caused by DVT (11).

Though it is believed that incidence of DVT is considerably lower in Asian population, yet recent studies demonstrated that risk of DVT in Asian's is similar to that of westerns^(4, 12, 13). Incidence of DVT in SCI patients was 43% in Korea, 21% in Japan and 3% in India ^(7, 12, 14). Previous research studies reported that

occurrence of DVT among SCI patients in Pakistan ranges from 2% to 12%^(10, 15, 16). Mahmood et al. conducted a prospective observational study on 50 SCI patients and reported that incidence of DVT among SCI patients was 12% (n=6) (15). A retrospective study conducted by Tauqir et al. on 194 earthquake victims reported that 2% (n=3) SCI patients were diagnosed with DVT(16). Another prospective observational study conducted by Rathore et al. on sample size of 187 earthquake survivors reported that 4.8% (n=9) SCI patients developed DVT(10).

In Pakistan, the study of DVT among SCI patients received limited attention and only three studies were conducted in Pakistan in this area^(10, 15, 16). Moreover, the sample sizes of all three mentioned studies were small and two of them were carried out in specific population (patients who sustained injury to spinal cord during earthquake). Therefore, there was a dire need to conduct this study in order to determine prevalence of DVT among SCI patients in Pakistan. By knowing prevalence of DVT in SCI patients and complications associated with it, thromboprophylactic measures can be introduced in health care facilities. The aim of this was to determine prevalence of DVT among SCI patients in Pakistan.

METHODS

This was a retrospective study conducted at Paraplegic Centre Peshawar, Pakistan. Before data collection, permission was taken from administration of Paraplegic centre. Inclusion criteria for study were Pakistani SCI patients, admitted to Paraplegic centre from July 2011 to July 2016. Exclusion criteria were foreign SCI patients, and/or SCI patients re-admitted to paraplegic centre. A list of 1501 patients with SCI who were admitted to Paraplegic centre from July 2011 to July 2016 was retrieved. From the list 1142 Pakistani patients with SCI were identified and were included in the study. Remaining 359 patients were excluded because they were either not Pakistani citizen or they were re-admitted patients. Data of 1142 SCI patients were thoroughly reviewed in order to identify those patients who were diagnosed with DVT either at the time of initial presentation to the Paraplegic Centre or during inpatient rehabilitation in the centre. Records of these patients were reviewed by primary researcher under the supervision of trained medical personnel of the Paraplegic Centre. Demographic information, cause of injury, neurological level, ASIA impairment scale,

information regarding DVT and other co-morbidities were recorded in Excel sheet 2007. Data was analyzed using SPSS version 20.

In Paraplegic centre diagnosis of DVT is confirmed on the basis of clinical signs and positive result on color Doppler ultrasound/duplex ultrasound.

RESULTS

The mean age of the included 1142 patients was 32.3 ± 14.6 years. A big proportion of the included patients (75.7%, n=864) were male population while 24.3% (n=278) patients were female. The number of married patients was high (61.6%, n=703) compared to the unmarried patients (38.4%, n=439). Majority of the patients were laborers (21.6%, n=247) and uneducated (47.6%, n=544). Most of the patients were from Khyber Pakhtunkhwa (89.5%, n=1022) while 10.5% (n=120) patients were from other provinces of Pakistan. Fall from height (29.9%, n=341) was reported to be the most common cause of SCI in these patients. Based on color Doppler ultrasound/duplex ultrasound and clinical signs, out of total 1142 SCI patients admitted to Paraplegic centre, 31 (31/1142; 2.7%) patients were diagnosed with DVT.

Of these 31 patients who had DVT, 18 (18/31; 58.1%) patients developed DVT prior to admission to Paraplegic centre while remaining 13 (13/31; 41.9%) patients were diagnosed with DVT during inpatient rehabilitation. In the total 31 patients who had DVT, 29 (29/31; 93.5%) patients had complete transaction of spinal cord while only 2 (2/31; 6.4%) patients had incomplete transaction of spinal cord. Majority of the patients who developed DVT had complete transaction at different levels: 6.5% (n=2) patients at cervical, 77.4% patients (n=24) at Thoracic and 9.7% (n=3) patients at lumbar. A small number of patients (6.5%, n=2) had incomplete transaction at lumbar region. More than half (54.9 %, n=17) of the patients who developed DVT were managed surgically (spine fixation) while 45.1% (n=14) patients were managed conservatively. Only one patient (3.2%) was diagnosed with Bilateral lower limb DVT while in the rest of patients, 17 (54.8%) had Left lower limb DVT and 13 (41.9%) patients had Right lower limb DVT. Out of these 31 patients, 25 patients (80.6%) were having pressure sores while the skins of the remaining 6 patients (19.4%) were intact. One of these patients died during inpatient rehabilitation with no exact cause of death.

Table 1: Table showing demographic details of the patients who developed DVT

	Parameters	Number of patients
Gender	Male	19(38.7%)
	Female	12 (61.3%)
Cause of injury	Fall from height	14 (45.2%)
	Fire arm injury	7(22.6%)
	Others	10(32.2%)
Marital status	Married	22 (71.0%)
	Unmarried/Single	9 (29.0%)
Education	Uneducated	16 (51.6%)
	Educated	15 (48.4%)
Profession	Laborer	6 (19.3%)
	House wife	12 (38.8%)
	Others	13(41.9%)

DISCUSSION

SCI patients are generally considered at high risk of developing DVT. Prevalence of DVT in SCI patients ranges from 5% to 26%(7).The commonly held view among clinician is that DVT is a problem in Caucasian populations(5). However studies conducted in Asian countries reported high prevalence of DVT among SCI patients in Asians as well. Prevalence of DVT among SCI patients in Asian population ranges from 3% to 43% (4, 7, 12, 14).

The prevalence of DVT among SCI patients admitted to Paraplegic centre was somewhat comparable to other studies conducted in Pakistan (10, 15, 16). Nevertheless, this prevalence is relatively low as compared to studies conducted in other countries which reported prevalence of DVT among SCI patients up to 43%(12). Differences in race, genetics, climate and diet are considered important factors for the low prevalence of DVT in Asian and African countries(5, 15).Besides, these factors the low prevalence of DVT in current study can be explained by the fact that in Paraplegic centre, Peshawar ultrasound is recommended only to those patients who present with clinical sign and symptoms. As research studies reported that Clinical signs are unpredictable in the diagnosis of DVT in SCI patients(5). Consequently, there is chance that asymptomatic DVT patients might have been missed. The prevalence might be somewhat high if both symptomatic and asymptomatic SCI patients were scanned for DVT.

Research studies reported that occurrence of DVT is higher in complete SCI patients as compared to incomplete SCI patients (5, 10, 15). Results of current study were not different and found that in the total 31 patients who had DVT, 29 (29/31; 93.5%) patients had complete SCI while only 2 (2/31; 6.4%) patients had incomplete SCI. Complete SCI patients are immobilized for longer period of time which leads to venous stasis and it was reported that venous stasis is one of the major risk factor for developing DVT(5). In this study, majority of the patients who were diagnosed with DVT were having pressure sores. Pressure sores are common among SCI patients (17). lifetime prevalence of pressure sores in SCI patient is about 80%(18). In a study conducted by Rathore et al. more than half (66.6 %) of the patients were having pressure sores(10).

CONCLUSION

The prevalence of DVT seems to be lower in our cohort as compared to other countries, but large trials and prospective studies are required to truly determine the prevalence of DVT in Pakistan. Thromboprophylaxis, screening and early detection of DVT should be a part of initial management of patients with SCI.

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Aatik Arsh; Study concept and design, protocol writing, data collection, data analysis, manuscript writing, manuscript review

Haider Darain; Study concept and design, data collection, data analysis, manuscript writing, manuscript review

Syed Muhammad Ilyas; Study concept and design, data collection, data analysis, manuscript writing, manuscript review