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Technical Notes

Technical note: In Mexico, the majority of 147 traumatic spinal cord injuries occurred in the thoracic spine for young males

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ABSTRACT

Background: Traumatic spinal cord injury (TSCI) is a devastating problem typically associated with multi-organ disorders. Studies regarding TSCI and their attendant comorbidities are scarce from developing countries.

Methods: The electronic files of 147 patients with TSCI (2017–2018) were reviewed; 78% of patients were males averaging 38 years of age. The following variables associated with the TSCI included age, sex, etiology of trauma, vertebral level, fracture classification, Frankel grade, treatment, complications, and mortality.

Results: Of interest, most cases involved thoracic injuries with attendant chest trauma resulting from falls from substantial heights.

Conclusion: In Mexico, the majority of TSCI occur in young males (average age 38) who have sustained falls from significant heights resulting in thoracic fractures with a high frequency of chest injuries. By providing such information for developing countries, we may develop future strategies to TSCI in vulnerable populations.

Keywords: Epidemiology, Incidence, México, Spinal cord injury, Traumatic

INTRODUCTION

Traumatic spinal cord injuries (TSCIs) are catastrophic. They typically occur in young adult males, their reported incidence varies depending on the country studied; 20.7–83.0/per million residents/year in America, 8.0–130.6 in Europe, 10.0–77.0 in Oceania, and from 14.6 to 246 in Asia.[3] However, there are few TSCI statistics available from developing countries. Here, in Mexico, we evaluated 147 consecutive TSCI patients treated from 2017 to 2018 (i.e., a "developing country").

MATERIALS AND METHODS

We reviewed the electronic files of 147 patients treated from 2017 through 2018, who sustained TSCI. A detailed analysis of the multiple epidemiological and clinical variables was performed that included age, sex, affected vertebral level, associated injuries, Frankel Grade, and treatment.

The statistical analysis was performed by two independent researchers. All information was collected in a Microsoft Excel spreadsheet (Office 2016, Microsoft) and then analyzed with IBM SPSS (Version 21, IBM).

Clinical data

Of the 147 cases, 78% (115) were male, and 22% (32) were female, averaging 38.61 and 37.03 years of age, respectively [Table 1 and Figure 1]. Other data, such as marital status, educational background, and scholarship, were also analyzed [Table 1]. The most common etiology of TSCI was a fall from a height greater than 1 m (53.74%) followed by motor vehicle accidents (30.61%) and succeeded by lower-level falls (7.48%) [Table 2 and Figure 2]. Most lesions involved the thoracic spine (40.13% [59] of the cases) followed by the lumbar (30.61% [45]) and the cervical spine (43 cases corresponding to 29.25%) [Figure 3]. In 40% of cases, patients had associated injuries (i.e., thoracic lesions, most of whom had an attendant hemothorax). Cranioencephalic trauma and thoracic limb injuries each occurred in 12.92% of cases, while subdural hematomas and clavicular fractures were the next most common injuries [Table 3].

Table 1: Demographic characteristics of patients with traumatic spinal cord injury.

	2017	2018	Total
Gender			
Male	48	67	115
Female	16	16	32
Age (Years)			
0–15	1	5	6
16–30	28	29	57
31–45	13	20	33
46–60	14	14	28
61–75	7	15	22
76–	1	0	1
Marital status			
Married	33	32	65
Unmarried	31	51	82
Scholarship			
Any	4	7	11
Elementary school	25	26	51
Middle school	24	23	47
High school	6	14	20
Technical	2	2	4
College degree	2	3	5
Unknown	0	8	8
Occupation			
Peasant	10	19	29
Housewife	10	12	22
Student	11	8	19
Unemployed	7	9	16
Bricklayer	4	9	13
Merchant	5	6	11
Other	17	20	37

RESULTS

Frankel and AO spine classification

Most patients were classified as Frankel, Type E (TSCI: 42.17% [62]), followed by Type A 28.57% (42), Types C, D, and B [Table 4]. According to the AO spine classification system, most cases were Type C 36.22% (46) followed by Type B 34.64% (44) and Type A 29.13% (37).

In-hospital complications

Notably, 19% (28 patients) of patients sustained in-hospital complications: pulmonary (14%), urinary tract infections (2%), decubitus ulcer (2%), and deep venous thrombosis (two cases) [Table 5].

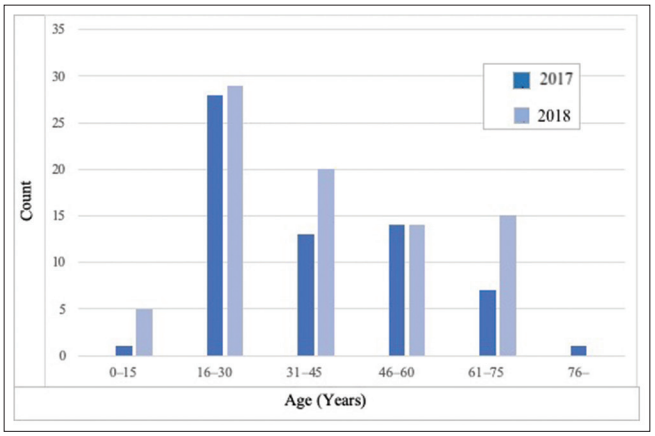

Figure 1: Distribution histogram between age and number of cases.

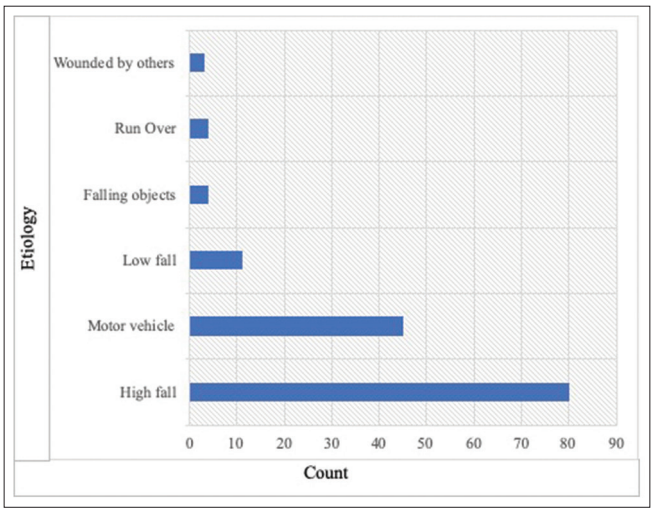

Figure 2: Distribution histogram of the etiology of the 147 traumatic spinal cord injury patients.

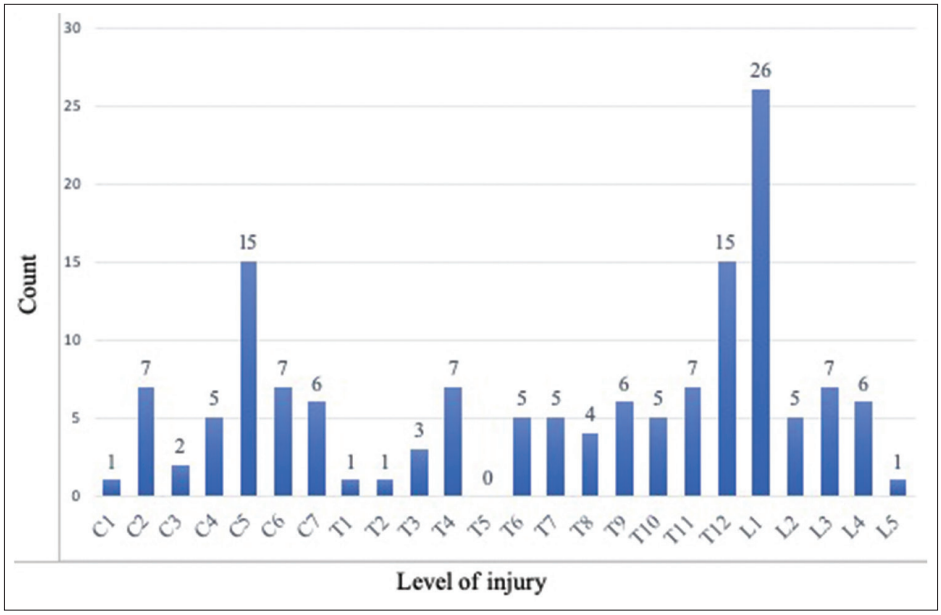

Figure 3: Distribution histogram of the injury level of 147 traumatic spinal cord injury patients.

Table 2: Etiology of trauma.

Etiology	*n*	%
High fall	80	54.42
Motor vehicle	45	30.61
Low fall	11	7.48
Falling objects	4	2.72
Run over	4	2.72
Wounded by others	3	2.04

Table 3: Associated injuries in patients with TSCI. TBI: Traumatic brain injury.

	n	%
Chest trauma	28	19
TBI	19	12.92
Upper members	19	12.92
Lower members	9	6.12
Facial trauma	3	2
Abdominal trauma	3	2

Table 4: Relationship between the affected level and Frankel classification.

	Frankel grading					
	A	**B**	**C**	**D**	**E**	**Total**
Cervical	15	5	6	3	14	43
Thoracic	25	3	5	5	21	59
Lumbar	2	0	8	9	26	45

Table 5: In-hospital complications in patients with TSCI. UTI: Urinary Tract Infection. DVT: Deep Vein Thrombosis.

	n	%
Pneumonia	21	14.28
UTI	3	2
Decubitus ulcer	3	2
DVT	2	1.36
Delirium	1	0.68

Nonsurgical versus surgical management

Of the 147 cases, 74.2% (109) required surgery consisting of posterior instrumentation (46.25%) and 360 fusions (27.89%). The remaining 25.8% were managed non surgically [Figure 4]. The mortality rate included five patients; two died before surgery and three after surgery [Table 6].

DISCUSSION

This is a retrospective descriptive study aimed at defining preventive strategies for spinal trauma. Is it generally knows that TSCI exerts a substantial financial burden on patients and society.[5] Such epidemiological research of TSCI coming from developing countries (i.e., Mexico) is rare compared with developed countries.[6,8] Our population of young males (average age 38) appears to be at the greatest risk of TSCI compared with other countries such as Holland, where the average age of those affected is 62 years[9] and Finland, where the average age is 58.7 years.[4] Most patients are males worldwide.[9] The main etiology of the trauma in our study was falls from a substantial height (e.g., present in more than half of the cases [53.74%]), whereas in developed countries, most are due to motor vehicle accidents.[1] Most of our patients had thoracic TSCI (40.13%), whereas most international series

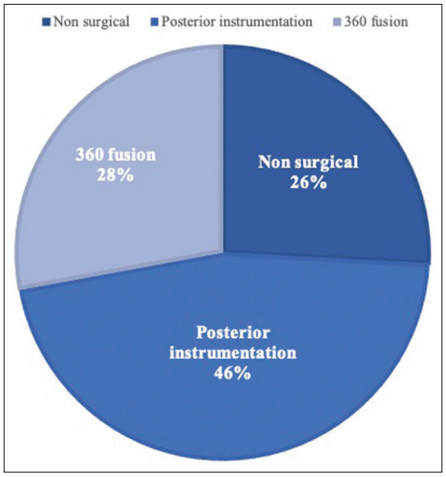

Figure 4: Nonsurgical versus surgical management in patients with traumatic spinal cord injury.

Table 6: Characteristics of deceased patients.

	n
Gender	
Male	4
Female	1
Age (Years)	
0–15	
16–30	2
31–45	2
46–60	
61–75	
76–	1
Injury level	
Cervical	3
Thoracic	2
Lumbar	0
Etiology	
Motor vehicle collisions	3
High fall	2

cite cervical trauma.[2] Similar to international cases series,[7] pulmonary complications were the predominant in-hospital adverse events.

CONCLUSION

TSCI affects mostly young males who have fallen from a substantial height. The majority of lesions are thoracic and are accompanied by a hemothorax, with nearly 75% warranting surgery.

Knowledge of the cause of TSCI in Mexico and the associated factors should allow us to design a preventive program and better prepare our medical and surgical resources to treat these patients.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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