

Epidemiology Profile of Traumatic Spine Injury of a Spinal Cord Service in the State of Espírito Santo

Avaliação do perfil epidemiológico do traumatismo raquimedular de um serviço de coluna do estado do Espírito Santo

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Abstract

Objective To analyze the epidemiological profile of patients with traumatic spinal cord injury (SCI) undergoing surgical procedures in the state of Espírito Santo, Brazil.

Methods A cross-sectional, descriptive study was performed based on the analysis of 70 medical records of patients who underwent surgery due to traumatic SCI in the state of Espírito Santo, Brazil.

Results Males comprised 79% of the patients. The average age of the occurrence of the traumatic SCI was 44 years; automobile accidents were the main cause of trauma (44%). Half of the patients had lesions in the cervical region, and 46% were classified as Frankel A, according to the Frankel scale. In the first 60 days after surgery, the main complication presented by the patients was urinary tract infection (UTI). Half of the patients were from the metropolitan area.

Conclusion Patients undergoing surgery for traumatic SCI in the state of Espírito Santo are predominantly men, with a mean age of 44 years, with cervical spine injury due to car accidents, from the metropolitan area, and whose main complication was UTI.

Keywords

- epidemiology
- spinal cord injuries

Resumo

Objetivo Analisar o perfil epidemiológico dos pacientes com traumatismo raquimedular (TRM) submetidos a procedimentos cirúrgicos no estado do Espírito Santo, Brasil.

Métodos Foi realizado um estudo transversal e descritivo, baseado na análise de 70 prontuários de pacientes submetidos a procedimento cirúrgico em decorrência de TRM no estado do Espírito Santo, Brasil.

Resultados Um total de 79% dos pacientes era do sexo masculino. A média de idade foi de 44 anos, sendo acidente automobilístico a causa principal de trauma (44%). Metade dos pacientes apresentou lesão em região cervical, e 46% foram classificados

Palavras Chave

- epidemiologia
- traumatismo raquimedular

como Frankel A, de acordo com a escala Frankel. Nos primeiros 60 dias após a cirurgia, a principal complicação apresentada pelos pacientes foi infecção do trato urinário (ITU). Metade dos pacientes era proveniente da região metropolitana do estado.

Conclusão Os pacientes submetidos a procedimento cirúrgico por TRM no estado do Espírito Santo são predominantemente homens, com idade média de 44 anos, lesão da coluna cervical por acidente automobilístico, e provenientes da região metropolitana. A principal complicação apresentada foi ITU.

Introduction

Traumatic spinal cord injuries (SCIs) comprise spinal injuries in any part of the spinal column that contains the spinal cord.¹ They may result in motor, sensory, sphincter and autonomic dysfunction below the level of the lesion. The evaluation of neurological lesions is established by the Frankel scale, and they are graded as complete lesion, incomplete lesion and normal function.² The severity of the lesion is classified as complete or incomplete according to the norms established by the American Spinal Cord Injury Association (ASIA), the complete lesion corresponding to the total absence of motor and sensory functions below the level of the lesion.³

The complications of SCIs include pulmonary complications, spasms, pain and urinary tract infections (UTIs), among others. The most common cause of death in these patients is pneumonia.^{4,5} Several studies indicate that UTI is the most common complication, followed by pain and spasms.³ The prevalence of pain after a SCI varies considerably, and is seen in about one-half to two-thirds of the patients.⁵

There is no official notification of SCI cases. However, it is estimated that the annual incidence is 21 patients per million inhabitants.⁶ In developing countries, the incidence is 25.5 cases per million every year.⁷ Men are most affected,^{7,8} corresponding to 82.8% of all cases. The average age is 32.4 years in developing countries.⁷ Since SCIs affect mostly young and economically active people, they end up interrupting the individual's professional activity at the peak of the potential for economic gain, generating a high cost to society.^{7,9}

The two main causes of SCIs pointed out in international studies are automobile accidents and falls (41.4% and 34.9% respectively), followed by violence and sports accidents.^{7,10} National studies diverge from classic statistics, having gunshot wounds in second place among the causes of SCIs, followed by falls and cold steel wounds.⁹

The adequate time for surgical intervention after a SCI remains controversial. Several studies did not show a clear improvement in the neurological prognosis; however, there is evidence of clinical safety in early surgical intervention.^{11–14}

Brazil's currently available epidemiological data are relatively scarce and conflicting with the literature.^{9,15} Therefore, we have proposed to evaluate the epidemiological profile of patients with SCIs submitted to a surgical procedure in the state of Espírito Santo.

Materials and Methods

A cross-sectional, descriptive study was performed based on the analysis of 70 records of patients submitted to a surgical procedure due to SCIs in the state of Espírito Santo from February 2011 to February 2015.

The selected patients were admitted to several private and public hospitals in the state of Espírito Santo, and were referred by the central regulation of beds or by spontaneous demand. The following variables were analyzed: age, gender, patient origin, fracture level, neurological level, trauma mechanism and complications in the first 60 days after surgery.

Data were collected and distributed in projections using the Microsoft Excel (Microsoft Corporation, Redmond, WA, US) software to evaluate the distribution of each analyzed piece of data. The percentiles and absolute numbers of affection of each analyzed event were considered.

Results

A total of 70 records were analyzed, and 79% of them corresponded to male patients ($n = 55$). The mean age was 44 years, ranging from 14 to 75 years. Young people (20–24 years old) constituted 32% of the cases, followed by adults (31–59 years old; 28%); young adults (25–30 years old; 20%); adolescents (10–19 years old; 12%); and the elderly (over 60 years old; 8%) (► **Table 1**).

Among the trauma mechanisms, automobile accidents represented 44% of the total, followed by gunshot wounds (GSWs), which corresponded to 27% of the cases. Falls and dives occupied the third and fourth places respectively (► **Table 2**). Half of the patients in the sample presented lesions in the cervical region, and 26%, in the thoracolumbar region. The thoracic segment was the third most affected

Table 1 Sample distribution by age

Age (years)	Classification (Brazilian Ministry of Health)	%
10–19*	Adolescent	12
20–24*	Young	32
25–30*	Young adult	20
31–59*	Adult	28
≥ 60*	Elder	08

Note: *Standard deviation.

Table 2 Sample distribution by injury mechanism

Injury mechanism	Total of patients (70)	%
Gunshot wound	19	27
Automobile accident	31	44
Fall	15	22
Diving	5	7

site, and the lumbar segment was affected in only 4% of the cases (►Table 3).

According to the Frankel scale, 46% of the patients were classified as Frankel A. Frankel C was the second most frequent classification, with 19 cases, followed by Frankel E, B and D, with 9, 8 and 2 cases respectively (►Table 4).

During the first 60 days after surgery, the patients were checked for the presence of complications. Out of the 70 patients, 36 had complications during this period. The most frequent was UTI, with 18 cases, followed by the presence of pressure ulcer, which occurred in 10 cases. A total of 4 patients developed pneumonia, and 1 had cardiac complications. During the first 2 months after surgery, 3 patients had an association of UTI and eschar (►Table 5).

As to the origin, 35 patients came from the metropolitan region of the state capital of Vitória. The others came from the central region (18 patients), the southern region (4 patients) and the northern region (7 patients) of the State of Espírito Santo. A total of 6 patients came from other states (►Table 6).

Discussion

Spinal cord injury is a disease that presents a devastating potential not only for patients and families, but also for the economy, since it involves a huge financial health cost.¹⁵

Table 3 Sample distribution by injury level

Injury level	Total of patients (70)	%
Cervical	35	50
Thoracic	14	20
Thoracolumbar*	19	26
Lumbar	2	4

Note: *Transition region between the thoracic and lumbar regions (fractures of D11 to L1).

Table 4 Classification of spinal cord injuries according to the Frankel scale

Frankel	Total of patients (70)	%
A	32	46
B	8	11
C	19	27
D	2	3
E	9	13

Table 5 Sample distribution of clinical complications within the first 60 days after surgery

Clinical complications until 60 days postsurgery	Total of patients (70)
UTI	18
Pressure ulcer	10
Pneumonia	4
Cardiac	1
UTI and eschar	3

Abbreviation: UTI, urinary tract infection.

An adequate analysis of the distribution and prevalence of SCIs is of paramount importance for the planning and development of strategies to approach polytrauma and for the implementation of measures to increase population awareness.

In the present study, there was a predominance of male patients (79%), which in line with the data from the literature.^{7-9,15,16} The mean age of the most affected patients in developing countries is 32.4 years old, according to a study by Rahimi-Movaghar et al.⁷ The average age found in the present study, was higher: 44 years old. However, considering the classification of the Brazilian Ministry of Health, both averages place these patients within the age group of adults (31–59 years old).

Fractures occurred mostly at the cervical level (50%), which similar to in the findings of national and international studies.^{8,9,17} About 4.5% of the patients in one study had more than one fracture at different medullary levels.¹⁸ Therefore, due to the high frequency of cervical fractures and their great impact on the neurological status and the quality of life of the patients, protection of the cervical spine in the initial care becomes essential.

Regarding the severity of the neurological deficit, the majority of patients (46%) were classified as Frankel A, due to the absence of any motor or sensory function below the lesion. This neurological picture was also observed in national studies.¹⁵

Table 6 Distribution of the sample according to the origin of the patient with spinal cord injury

Patient origin	Total of patients (70)	%
Metropolitan area of the capital city of Vitória	35	50
Central region of the State of Espírito Santo	18	25
Southern region of the State of Espírito Santo	4	5
Northern region of the State of Espírito Santo	7	11
Other states	6	9

The two main causes of SCIs in the present study (automobile accidents and gunshot wounds) are similar to those found in the epidemiological analysis of national data.⁹ However, this result differs from the international figures, in which falls appear as the second main cause of SCIs.^{7,10} In developed countries, the proportion of trauma by automobile accident is stable, with a tendency to decrease, which is justified in part by the better infrastructure and greater safety provided by their automotive vehicles.¹⁹

Among the complications, UTI was the most frequent, present in 26% of the cases with complications, a result similar to those reported in several international studies.³ Pagliacci et al²⁰ suggest that 53.7% of SCI patients presented urologic complications in the first 6 months posttrauma.

The origin of the patients was evaluated according to the macro-regional division of the state of Espírito Santo,²¹ with the majority of patients submitted to surgery for traumatic SCI (75%) coming from the metropolitan region of the capital city of Vitória and the central region of the state of Espírito Santo (►Table 6). The southern region of the state had less referrals, probably due to the proximity to the city of Rio de Janeiro. A total of 9% of the patients came from another state (southern region of the state of Bahia), since the closest reference center for these patients is located in Vitória.

Conclusion

The patients submitted to a surgical procedure for SCI in the state of Espírito Santo are predominantly men, with a mean age of 44 years, cervical spine injury due to automobile accidents, classified as Frankel A, and originally from the metropolitan region of the city of Vitória. The main complication presented was UTI.

Conflicts of Interest

The authors declare that there are no conflicts of interest in the present work.

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