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Spine and Spinal Cord Injuries on the Basis of Medical Documentation

Uraz kręgosłupa i rdzenia kręgowego w świetle dokumentacji medycznej

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Abstract

Introduction. The progressive mechanisation of work in every area of life and the rapid development of means of transport have a major impact on the steadily increasing number of injuries. Spinal injuries are a major medical problem due to the complex structure of the spine, and particularly the neural elements located in the spine.
Aim. The analysis of causes, the number and type of injuries of the spine and spinal cord trauma performed on the basis of the documentation from the Emergency Department (ED) of Lower Silesia Specialized Hospitalname Tadeusz Marciniak in Wroclaw and documentation from the Clinic and the University Clinical Hospital (UCH) in Wroclaw.
Material and Methods. A retrospective analysis was performed on the documentation of 530 patients from the ED at Lower Silesia Specialized Hospital name Tadeusz Marciniak in Wroclaw who suffered a back injury and/or spinal cord injury and 45 patients from the Clinic and the Department of Neurosurgery at UCH in Wroclaw who were treated for a spine injury and spinal cord injury.
Results. The analysis of the study material shows that:
— more than a half of the ED patients (58.87%) and 44% of those hospitalized in the Department of Neurosurgery suffered a spinal injury during a traffic collision;
— more men were patients in the Department of Neurosurgery (60%), whereas among the ED patients women were slightly more often hospitalized because of a spine injury (52.64%);
— the vast majority of respondents with spinal injury were brought to hospital by emergency teams.
Conclusions.
1. The predominant reason for spinal injuries and spinal cord injuries being motor vehicle accidents.
2. Mainly young people aged 20–35 years suffer spine and spinal cord injuries.
3. Spine injury most often refers to the cervical part of the spine. **(JNNN 2014;3(4):153–156)**
Key Words: spine and spinal cord injuries, epidemiology

Streszczenie

Wstęp. Postępująca mechanizacja prac w każdej dziedzinie życia oraz szybki rozwój środków komunikacyjnych mają zasadniczy wpływ na stale zwiększającą się liczbę urazów. Urazy kręgosłupa stanowią poważny problem medyczny z uwagi na złożoną budowę kręgosłupa, a zwłaszcza zawartych w nim elementów nerwowych.
Cel. Analiza przyczyn, ilości i rodzaju urazów kręgosłupa i rdzenia kręgowego w oparciu o dokumentację Szpitalnego Oddziału Ratunkowego (SOR) Dolnośląskiego Szpitala Specjalistycznego im. Tadeusza Marciniaka we Wrocławiu oraz dokumentację Kliniki i Katedry Neurochirurgii Uniwersyteckiego Szpitala Klinicznego (USK) we Wrocławiu.
Materiał i metody. Analizie retrospektywnej poddano dokumentację 530 pacjentów SOR Dolnośląskiego Szpitala Specjalistycznego im. Tadeusza Marciniaka we Wrocławiu, którzy doznali urazu kręgosłupa i/lub rdzenia kręgowego oraz dokumentację 45 pacjentów Kliniki i Katedry Neurochirurgii USK we Wrocławiu leczonych z powodu urazu kręgosłupa i rdzenia kręgowego.
Wyniki. Z analizy materiału badawczego wynika, że:
— ponad połowa pacjentów SOR (58,87%) oraz 44% hospitalizowanych na Oddziale Neurochirurgii doznała obrażeń kręgosłupa w czasie kolizji drogowej;

— wśród pacjentów Kliniki Neurochirurgii dominowali mężczyźni (60%), natomiast wśród pacjentów SOR nieco częściej z powodu urazu kręgosłupa hospitalizowane były kobiety (52,64%);
— zdecydowana większość badanych po doznaniu urazu kręgosłupa została przywieziona do szpitala przez zespoły ratownictwa medycznego.

Wnioski.

1. Dominującą przyczyną urazów kręgosłupa i rdzenia kręgowego są wypadki komunikacyjne.
2. Urazom kręgosłupa i rdzenia kręgowego ulegają głównie osoby młode w przedziale wiekowym 20–35 lat.
3. Uraz kręgosłupa najczęściej dotyczy odcinka szyjnego. **(PNN 2014;3(4):153–156)**

Słowa kluczowe: urazy kręgosłupa i rdzenia kręgowego, epidemiologia

Introduction

The progressive mechanization of work in every area of life as well as the rapid development of means of transport have a major impact on the steadily increasing number of injuries [1]. In Poland, injuries and their consequences are in fourth place as the cause of death- after cardiovascular diseases, cancers and the cases where the reason for death was not known. The most common causes of death in this group are traffic accidents, which account for over one third of deaths, suicides and falls [2].

Spinal injuries are the major medical problem due to the complex structure of the spine, particularly neural elements located in the spine: the spinal cord and nerve roots that are usually seriously damaged during an injury [3]. The spine and spinal cord injury may lead to permanent damage of the bone and nerve structures and thus to permanent disability or death.

According to the world statistics, the predominant cause of spine injury are road accidents, accounting for 33% to 75% of injuries. Next come usually falls from height (15–44%) and sports injuries (4–18%). In some regions, a significant percentage of injuries are gunshot wounds and damage to the spinal cord resulting from the injury caused by a sharp instrument [3].

The aim of the study is to analyze the causes, the number and type of injuries of the spine and spinal cord on the basis of the documentation from the Emergency Department (ED) at Lower Silesia Specialised Hospital name Tadeusz Marciniak in Wroclaw and the documentation from the Clinic and the Department of Neurosurgery at University Clinical Hospital (UCH) in Wroclaw.

Material and Methods

Material that has been subject to a retrospective analysis consisted of the documentation from the Emergency Department of the Lower Silesian Specialised Hospital name Tadeusz Marciniak in Wroclaw dating from 01.01.2010 to 31.12.2010 as well as the information included in the registration books of the above department. The database was created based on this material. It contained information about five hundred and thirty patients with suspected spinal injury and spinal cord injury. We analyzed the medical records of 45 people treated for an injury of the spine and spinal cord in the Clinic and the Department of Neurosurgery at UCH in Wroclaw.

The gathered material was processed with the use of text editor Microsoft Office Word and Microsoft Office spreadsheet Excel.

Among the patients of the Department of Neurosurgery, 40% were women and 60% were men aged 15 to 76 years (mean age 43 years). However, among patients from the ED — women were hospitalized slightly more often (52.64%) than men (47.36%). In the study group, the mean age was 38.4 years. Detailed data are includeded in Table 1.

Table 1. Characteristics of the study group

	N	Clinic of Neurosurgery UCH		ED at Lower Silesia Specialized Hospital	
		N	%	N	%
Gender	Woman	18	40	279	52.64
	Man	27	60	251	47.36
Age	>20	3	7	24	4.53
	20–35	17	38	264	49.82
	36–50	10	22	113	21.32
	>50	15	33	129	24.33

Results

The analysis of the study material showed that the most common cause of spinal and spinal cord injuries are motor vehicle accidents. More than a half of the ED patients (58.87%) and 44% hospitalized in the Department of Neurosurgery for the spine and spinal cord injuries suffered during a vehicle crash (18% of respondents were drivers of the vehicle, 22% were passengers, and 2% pedestrians). The second most common cause of spinal injuries among patients in UCH was the fall from height (32%), whereas among those who reported

themselves to the ED only approx. 2.5% suffered from this kind of injury.

Detailed data are presented in Table 2.

Table 2. Causes of spine injury in the study group

Cause of injury	Clinic of Neurosurgery UCH		ED at Lower Silesia Specialized Hospital	
	N	%	N	%
Motor vehicle accident	20	44	312	58.87
Fall from height	14	32	14	2.64
Sport injury	1	2	18	3.39
Assault	–	–	32	6.04
Pathologic structure	4	9	–	–
Others	6	13	82	15.47
No data	–	–	72	13.58

Among patients who were diagnosed at ED, the vast majority (nearly 90%) suffered the spine injury. Most often it was a sprain and strain of cervical structures (80.38%), and trauma without symptoms of fractures within the lumbar spine (7.73%). However, among patients hospitalized in the Department of Neurosurgery, 44% of injuries related to the spine itself, and 56% to the spine and spinal cord. Most spinal cord injuries were connected with compression fracture of the spine bone (corpus vertebrae) (42%) or fracture of vertebrae (31%). Among the spinal cord injuries the most common were abrasion of the spinal cord (23%) or compression (13%). Table 3 presents detailed data referring to the location of spinal cord injury.

Table 3. Spine section of the injury in the study group

Spine region	Clinic of Neurosurgery UCH		ED at Lower Silesia Specialized Hospital	
	N	%	N	%
Cervical section	21	47	453	85.48
Thoracic section	15	33	10	1.89
Lumbar section	9	20	66	12.45

The symptoms most commonly reported by the patients at the ED include neck pain (64.71%) and back pain (60.18%). Only 4 respondents (0.74%) reported abnormal sensation in the extremities. However, 82% of patients hospitalized in UCH declared that after the injury they experienced the restriction of mobility of the spine and 71% complained about a headache and backache. Moreover, 13% of patients experienced paresis of the right hand, and 18% paresis of the right leg, 16% paresis of the left hand, and 22% of patients paresis of the left leg whereas 16% experienced paralysis of both lower limbs.

The vast majority of the ED patient were brought to hospital by emergency medical team (63.4%). 7.17% of patients reported to hospital on their own. Unfortunately, there is no information regarding 28% of cases on how the patients arrived at the hospital. In contrast, patients treated at the Clinic were transported to the hospital by medical teams immediately after suffering the injury. Only in one case the person arrived at the hospital on his own.

The vast majority of patients visiting the ED have been subject to diagnostic imaging — with the X-ray of the spine (77.73%) and computed tomography (12.45%) performed. However, all patients treated in the Department of Neurosurgery had an X-ray done to facilitate a diagnosis of injury and 88% of patients had CT whereas 44% of patients had MRI performed. The patients hospitalized in the Department of Neurosurgery suffered trauma mainly in their leisure time (87%), and only 13% while working. Also, every tenth of the ED patients experienced trauma while performing different kinds of work in the household. In contrast, almost 70% of patients experienced trauma on the street. The vast majority of patients of the ED after the diagnosis of the injury was discharged home (81.13%). In contrast, all patients in the ward of Neurosurgery were admitted to different wards immediately after the injury.

Discussion

The research conducted by Kalinowski showed that the main reasons for various types of injuries are falls and motor vehicle accidents [4]. Our research shows that the most common causes of spinal injuries and spinal cord injuries are motor vehicle accidents. The results of the research carried out by Niemcunowicz-Janica et al. [5], Wysocka et al. [6], Yang et al. [7] and Pickett et al. [8] also confirm the aforementioned findings. However, other studies conducted in various academic centers in Poland [3,9] as well as in the world [10] indicate that the most common reason for spinal injuries and spinal cord injuries are falls from height. The research conducted in Canada shows that falls are the primary cause of spinal injuries among the elderly (over 65 years) [8]. However, among patients treated in the Department of Neurosurgery UCH Wroclaw, falls were the second most common cause of injuries.

According to various authors [4,6,7,9–13] men are more susceptible to spine and spinal cord injuries than women. This is confirmed by the results obtained in patients treated in the Department of Neurosurgery UCH. However, our own study carried out at the ED

shows that women more often suffer spine injuries than men. Similar results were also obtained by Niemcunowicz-Janica et al. [5] and Borzęcki et al. [14].

In our study, the largest group of patients consisted of people aged 20–35 years (38% of the patients from the Department of Neurosurgery and the ED patients 49,82%). Very similar results were presented by Wysocka et al. [6], where the largest group of the injured was observed in the age group ranging 21–40 years (38.9%), Agarwal et al. (21–39 years old — 41.5%) [10], Brzezicki et al. (21–40 years — 43.33%) [11] and Lisiński et al. (21–40 years — 68.5%) [13].

Our study showed that the cervical spine damage is the most common result of trauma. Niemcunowicz-Janica et al. [5], Wysocka et al. [6], Yang et al. [7] Agarwal et al. [10] and Rosińczuk et al. [12] reported similar results. In contrast, according to Brzezicki et al. [11] and Borzęcki et al. [14] the lumbar region is mostly damaged as a result of spine and spinal cord injury.

Conclusions

1. Motor vehicle accidents are the leading reason for spine and spinal cord injuries.
2. Mainly young people aged 20–35 years suffer spine and spinal cord injuries.
3. Injury most often refers to the cervical region of the spine.

Implications for Nursing Practice

Education of patients and their families is one of the tasks that nurses plan and carry out by themselves. A nurse who has knowledge of the factors that may increase the risk of injury, and knows clinical signs and symptoms suggesting there have been damage to the tissues and organs around the spine and spinal cord can consciously plan educational activities aimed at reducing the number of injuries in the future.

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