THE RATE OF ACUTE SPINAL CORD INJURY IN TASHKENT CITY BETWEEN 2005-2012 YEARS

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ABSTRACT

Objective: to analyze main clinical-statistical indices of spine and spinal cord injuries (SCI) and system of organization of medical aid to the victims. We conducted a cohort retrospective study of materials of medical institutions of Tashkent city. Medical records of patients and records of forensic examinations were analyzed. 242 cases of spinal cord injuries were studied. Over the last 10 years in Tashkent the frequency of SCI have been tend to increase, males and working-age people are dominated. In 60.9% of cases the injury was associated, in 36.2% - isolated, and in 2.9% - combined. Fallings from height and road traffic accidents were the main reasons for getting SCI. Lesions at cervical level registered in 45% of cases, thoracic level - 27.3%, at lumbar level - 27.7%, respectively. According to ASIA/IMSOP, full injuries were noted in 40.1% of cases, incomplete injures were in 59.9%. Overall mortality from SCI was 68.6%. Thus, for the first time this study allowed to get in detail the clinical and statistical indicators of SCI in the region.

UDC CODE & KEYWORDS

■ UDC: 612.7 ■ Spinal cord injury ■ Hospital ■ Statistics

INTRODUCTION

As Polishchuk et al. (2001), Fehlings et al. (2001), Kondakov et al. (2003) and Grin et al. (2008) writes spinal cord injury (SCI) is one of the most difficult problems of modern medicine. According to Kondakov et al. (2002), Ramikh (2008) and Barinov et al. (2010), spinal and spinal cord traumas are the most frequent and severe lesions of the nervous system, amounting from 26 to 145 cases per 1 million population. The number of spinal cord injuries trends to increase, and their social significance is largely determined by the young age of the injured (more than half of them are less than 45 years). Knowledge of the pathogenesis of the problem, progressive development of engineering sciences bring a lot of new solutions used in medicine, but functional outcomes after treatment for SCI remain unsatisfactory (Dulaev, 1998; Fehlings et al., 2001; Hurlbert, 2006; Plotnikova et al., 2008). Additionally, surgical and pharmacological techniques used are ineffective (Dulaev, 1998; Fehlings et al., 2006; Hurlbert, 2006). Thus, the problem of treatment of patients with SCI is urgent issue of traumatology and neurosurgery.

Organization of providing timely specialized aid to victims of SCI is an urgent problem in our country as well. One of the reasons for this is the lack of evidence-based health statistics of this disease based on data from epidemiological studies. Data on the actual number of patients with SCI, distribution of hospitalization of these patients by injury severity and other epidemiological parameters allow an assessment of existing system of health care organization and identify ways to improve it.

The purpose of research was to analyze main clinical and statistical parameters of SCI in Tashkent city between 2005-2012 years.

Materials and Methods

Between 2005-2012, a retrospective cohort study was conducted in Tashkent city, using materials of expert conclusions of 134 victims with associated and multiple vertebral injuries, conducted in Tashkent forensic expertise bureau, archives and files of treating-prophylactic institutions. The medical records of 108 patients from traumatology and neurosurgery hospitals of Tashkent were analyzed. In order to study the causes of deaths in different periods of traumatic disease additionally were analyzed protocols of judicial expertise and registration journals of deaths in polyclinics, which were verified in the registrar.

In 2005-2012, were registered 242 cases (202 men and 40 women) of SCI, the average age of victims was 40.3±4.5 years. In 2005, 29 people were injured, in 2006 - 32, in 2007 - 26, in 2008 - 24, in 2009 - 33, in 2010 - 25, in 2011 - 32, and in 2012 - 41 people. Of 108 patients from traumatology and neurosurgery hospitals, 32 people died. For copying data, we have developed a form of consideration called as "card of stationary patient with spinal and spinal cord trauma".

Mathematical statistical studies were conducted using Program «SPSS 15.0 for Windows». Data are presented by quantitative (age, time) and qualitative variables. The following qualitative variables were analyzed: gender, medical care facility, the mechanism of injury (kick backs, accidents, gun injury, falls from height, compression, diving, stab wound, unknown mechanism), a part of spine (cervical, thoracic, lumbar), degree of spinal cord injury according to classification ASIA/IMSOP (A, B, C, D, E). Variables in this study are independent, the distribution of their values do not obey the laws of normal distribution. To determine the relationship between categorical and nominal variables we used Pearson criterion.

Results and Discussion

Men were 5-fold likely to suffer from SCI than women. Maximum number of victims were recorded in the working-age groups (Table 1). The greatest number of spinal and spinal cord injuries took place on Saturday and Sunday - 93 (38.4%)

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cases, the smallest number was on Monday and Friday. In summer SCI amounted 41.7%, in spring - 23.6%, in winter - 18.6%, and in autumn - 16.1%, respectively.

Table 1: Distribution of patients with spinal cord injuries by age and gender, n (%)

Age, years	Men		Women		Total	
	n	%	N	%	n	%
15-19	12	5.0	4	1.6	16	6.6
20-29	76	31.4	6	2.5	82	33.9
30-39	43	17.8	16	6.6	59	24.4
40-49	25	10.3	12	5.0	37	15.3
50-59	32	13.8	2	0.8	34	14.0
60 and over	14	5.8	0	0	14	5.8
Total	202	83.5	40	16.5	242	100.0

Source: Authors

Consumer injury was in 211 (87.2%) patients, manufacturing traumas - in 28 (11.6%), the circumstances of injury were not listed - in 3 (1.2%); transport - in 69 (28.5%), of them during injury inside the vehicle were 56 (81.2%) patients, accidents - in 11 (15.9%), the circumstances of injury could not be established - in 2 (2.9%) patients.

In 60.9% of cases trauma had combined nature, in 36.2% - isolated nature, in 2.9% - combined nature. SCI as a result of deliberate actions was recorded in 11 (4.5%) cases. The main reasons of SCI were: falls from height - 87 (36%) cases; kick back (most of the injuries were after accidents) - 68 (28.1%); plunger trauma - 4 (1.7%); blow on the back - 33 (13.6%); injuries related to violence - 20 (8.3%); compressions - 4 (1.7%); unknown mechanism - 26 (10.7%).

Injuries at cervical level were observed in 109 (45.0%) cases, at breast level in 66 (27.3%), at lumbar level were in 67 (27.7%) cases (Table 2). Injuries of C1-C2 vertebrae were in 7 patients (in 3 ones were with C1 transligamentous dislocation; 4 victims were with fractures of the odontoid process of C2 of types II and III; in 2 cases were combined with C1 broken rear arc). 102 people had subaxial level of damage.

Table 2: Distribution of patients with spinal cord injuries by the level of trauma, n (%)

Part of vertebral column	Males		Females		Total	
	n	%	n	%	n	%
Cervical	98	40.5	11	4.5	109	45.0
Thoracic	58	24.0	8	3.3	66	27.3
Lumbar	46	19.0	21	8.7	67	27.7

Source: Authors

Injuries of cervical part were occurred after falls from height (36 cases), diving (4) and accidents (37); injuries of thoracic level were after falls from height (16) and accidents (17); criminal types of injuries (gunshot and knife wounds) registered in 18 cases in the thoracic spinal column. Falls from height were the main cause of injury in case of damage of the lumbar part and registered in 35 cases.

Injuries at the lumbar-thoracic level were assessed using the universal AO/ASIF classification. The data are presented in Table 3. Types of injuries, in which there was no bone pattern of damage (bruising of the spinal cord and cauda equina roots - 17; criminal damage types - 9) were excluded.

Table 3: Distribution of patients with spinal cord injuries by type of damage, n (%)

Part of vertebral column	Тип по AO/ASIF					
	A		B		C	
	n	%	n	%	n	%
Thoracic	19	28.8	17	25.8	11	16.7
Lumbar	42	62.7	11	16.5	7	10.5
Total	61	45.9	28	21.1	18	13.5

Source: Authors

More than half of victims (n=142; 58.7%) on admission had severe degree of spinal cord injury, which was manifested by significant motor and sensory disorders, as well as dysfunction of pelvic organs (Table 4).

According to ASIA/IMSOP, spinal cord lesions of grade A and B were noted in 97 people, incomplete injuries (C, D, E) were in 145 victims. There were significant differences between the level of spinal injury and degree of spinal cord trauma (p=0.01).

Drunkenness was recorded in 73 (30.2%) cases (only on the records in history cases). 14 people were revealed to be intoxicated during road accidents, which accounted for 20.3% of all road accident victims (n=69) and 5.8% of the total number of victims (n=242).

Re-hospitalizations were in 30.2% of cases, the most common causes were urological infections (32.9%), pain (24.7%) and pressure ulcers (16.4%).

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Table 4: Distribution of patients with spinal cord injuries by the degree of injury at admission, n (%)

Part of vertebral column	Degree of injury, according to ASIA/IMSOP									
	A		B		C		D		E*	
	n	%	n	%	n	%	n	%	n	%
Cervical	41	16.9	6	2.5	19	7.9	43	17.8	0	0
Thoracic	33	13.6	3	1.2	13	5.4	17	7.0	0	0
Lumbar	6	2.5	8	3.3	15	6.2	36	14.9	2	0.8
Total	80	33.1	17	7.0	47	19.4	96	39.7	2	0.8

Note : * - significant differences to control group (***)-P<0.001)

Source: Authors

Our findings correspond to the literature data, which report the increase in patients with SCI up to 200-fold (Grin et al., 2008; Dulaev, 1998, 2009). In St. Petersburg, in 2002, the number of victims with SCI increased to 600-640 affected per 10 million population, compared with 1989 (Kondakov et al., 2002, 2003). In Germany, between 1994-1999, the number of identified spinal and spinal cord injuries increased from 632 to 695 per 1 million population per year (Kondakov, 2002). In Russia, annually occur more than 8,000 SCI (Grin et al., 2008), in Ukraine - 2-3 thousand SCI (Kondakov, 2002). In the U.S., annually injuries of vertebral column affect 150-160 thousand people, of them 10-30% are spinal cord injuries (Benzel, 2005). According to our data the main causes of SCI were accidents and falls from height, of them one third noted drunkenness. In these cases mainly observed cervical spine injuries, whereas Barinov and Kondakov (2010) reported cervical injuries while diving.

Conclusion

Over the last 10 years in Tashkent the frequency of SCI have been tend to increase, males and working-age people are dominated. In 60.9% of cases the injury was associated, in 36.2% - isolated, and in 2.9% - combined. Fallings from height and road traffic accidents were the main reasons of SCI. Spinal cord lesions of grade A and B, according to ASIA/IMSOP, were mainly characterized for fractures of cervical and thoracic parts of spine, while incomplete traumas - for lumbar part. Sometimes, associated and multiple fractures were registered that caused high mortality and disability, economic spendings and sharp deterioration in the quality of life of the victims.

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