

## Original Article

# Spinal Cord Injury Patients in the Physical Medicine and Rehabilitation Hospital, Kuwait – A Nine-Year Retrospective Study

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**ABSTRACT**

**Objectives:** To analyze spinal cord injury (SCI) cases regarding incidence, etiology, rehabilitation management and outcome during the period from 1991 to 1999.

**Setting:** Physical Medicine and Rehabilitation Hospital (PMR), Kuwait.

**Subject/Method:** The data from hospital files of 141 cases were analyzed. Each case was followed from onset of SCI until the last stage of the rehabilitation process.

**Results:** SCI represented 10.49% of the total admissions in PMR during the study period. Non-traumatic etiology represented 36.17% of all SCI cases, while traumatic etiology accounted for 63.82%. Road traffic accidents (RTA) were responsible for 64.44% of all traumatic cases.

A total of 56.02% of the patients were paraplegics and 43.98% were tetraplegics. Urinary infection (UTI) was the most frequent complication. At the final rehabilitation stage, 60.99% of patients remained wheelchair-dependent.

**Conclusion:** SCI is a major cause of disability and the majority of cases are of traumatic origin. RTA is a leading and increasing cause of SCI in Kuwait; the majority of the victims being young males. Although rehabilitation possibilities have greatly evolved in the last decades, the majority of SCI patients remain wheelchair-dependent. Prevention measures appear to be acutely necessary.

KEYWORDS: epidemiology, Kuwait, rehabilitation, spinal cord injury

**INTRODUCTION**

The State of Kuwait has a total population of 1,991,115 from which 38.69% are Kuwaiti nationals and 61.31% expatriates (estimation from July 1999). PMR is the only rehabilitation unit with beds in Kuwait. Within the PMR are physical therapy, occupational therapy, speech therapy and an artificial limb department. The doctors (physiatrists) cover all medical problems of a case and are the coordinators of the rehabilitation team. Nursing care is provided 24 hours a day, seven days a week.

**METHOD AND PATIENTS**

The present study encompasses a survey of all 141 SCI patients admitted to the PMR between 1991 and 1999. The patients include Kuwaiti citizens, residents, and some Saudi Arabian citizens. Most patients were transferred to the PMR Hospital from orthopaedic and neurosurgical hospitals in Kuwait. A few patients were transferred from general hospitals or, post surgery, from abroad. Each case is listed only once, at the initial admission. Readmitted cases were usually Kuwaitis, as most non-Kuwaitis returned to their countries of origin after the initial rehabilitation period.

Age, gender, nationality, date of first admission, diagnosis, the treatment made in the referring hospital (usually surgery), complications, locomotion and bladder management, as well as the length of hospitalization were followed for every patient.

**Non - Traumatic Spinal Cord Injuries (NTSCI) (Tables 1 and 2)**

The 51 (36.17%) SCI cases of non-traumatic etiology were represented by:

- Discal compression and narrowing of the spinal canal: 30 (58.82%)
- Spine TB: 7 (13.72%)
- Tumors: 5 (9.80%)
- Vasculopathies: 4 (7.84%)
- Transverse myelitis 4 (7.84%)
- D.M. neuropathy 1 (1.96%)

The mean age of the non-traumatic SCI patients was 50.37 years.

**Traumatic Spinal Cord Injuries (TSCI) (Tables 3 and 4).**

TSCI represent 63.82% of the total SCI admissions in PMR. A causative analyses shows 64.44% for RTA, 24.71% for falls from height, and

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6.74% for trauma by falling objects. Diving and stab injury were both represented by two cases each (2.24%). RTA (Table 5) is the leading cause of TSCI in all studies consulted by us except a study from Fiji where the leading cause was the falls from heights<sup>[1,2,3]</sup>. There is a net dominance of males with 89.77%, from which the majority are Kuwaitis. The mean age in this category is 20.68 years.

Yearly distribution for RTA shows a minor variation for the interval 1991-1996 and a significant increase in number since 1997 (Fig.1).

**Injury Level in SCI (Fig. 2)**

The configuration is, of course, given by TSCI. The sites of predilection are lower cervical region and the transitional dorsolumbar segment. In accordance with other studies<sup>[3]</sup>, the total number of subcervical lesions is more than the cervical. A total of 79 cases (56.02%) are paraplegia and 62 cases (43.98%) are tetraplegia. Cauda equina represented 17.02% of the total. One case, a young male, had a Brown-Sequard syndrome caused by stab wound in the dorsal spine. Partial spinal cord syndromes like anterior or posterior cord syndrome or conus medullaris were not found. C5 and L1 are the levels with the highest incidence. The injury level distribution illustrated in Fig. 2 is consistent with other literature data<sup>[2, 4, 5]</sup>.

**Complications in SCI (Table 6)**

The majority of complications were UTI, present in 59.57% of all cases including two cases that had urethral fistulisation and one urinary bladder lithiasis. Particular for our study is the prevalence of urinary complications versus pressure sores. Many other statistics give pressure sores as leading complication, but for long-term follow-up UTI keeps the first position<sup>[7]</sup>. Digestive complications (18.43%) were represented by severe constipation.

Cutaneous complications, primarily pressure sores, had an incidence of 15.60%. The patients with pressure sores were transferred to PMR with already constituted pressure sores. None of the patients had newly developed pressure sores while at the PMR. All pressure sores were healed during the PMR hospitalization period. A few patients required plastic surgery and a few patients were readmitted with pressure sores which had developed later at home.

Only 4.25% of the cases displayed autonomic dysreflexia episodes. They were connected with urethral catheter obstruction, suprapubic catheter obstruction or bowel impaction.

Deep venous thrombosis (DVT) was found in six cases (4.25%) from which one developed DVT while under our care. This incidence is low compared to other studies<sup>[7,8]</sup>.

**Table 1**  
Non-traumatic spinal cord injuries (NTSCI) - casuistry structure

Cases	No.	%
Total NTSCI	51	36.2
Total number of males	39	76.5
Total number of females	12	23.5
Total number of Kuwaitis	26	51
Total number of non-Kuwaitis	25	49

**Table 2**  
Non-traumatic spinal cord injuries - etiology

Etiology	No.	%
Disc compression & canal stenosis (% from NTSCI)	30	58.8
Spine TB	7	13.7
Tumors	5	9.8
Ischaemia; A-V malf. & thrombosis	4	7.8
Transverse myelitis	4	7.8
DM neuropathy	1	2

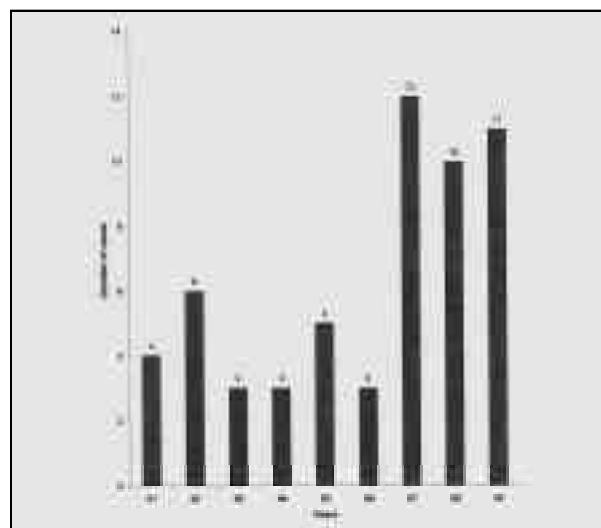


Fig. 1: Road traffic accidents - annual distribution

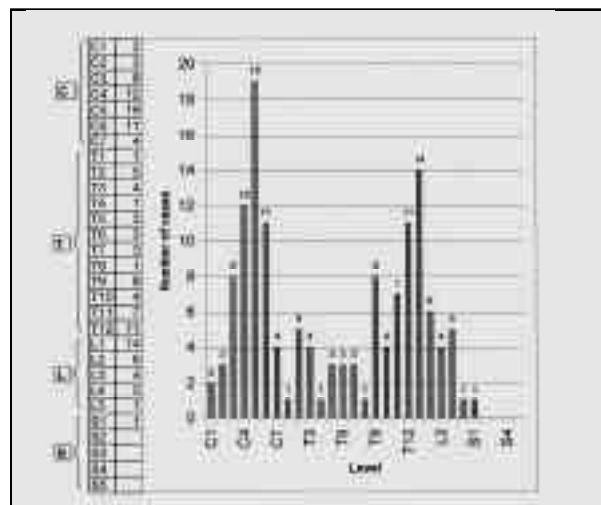


Fig. 2: Injury level in SCI

**Table 3**

Traumatic Spinal Cord Injuries (TSCI) – casuistry structure

Cases (Total Number)	No.	%
TSCI	90	63.8
Males	79	87.8
Females	11	12.2
Kuwaitis	40	44.5
Non-Kuwaitis	50	55.6

**Table 4**

Traumatic spinal cord injuries – etiology

Etiology	No.	%
Road traffic accident (% from total TSCI)	57	63.3
Height fall	22	24.7
Hit by falling object	6	6.7
Dive	2	2.2
Stab	2	2.2

**Table 5**

Road traffic accidents (RTA) – casuistry structure

Cases	No.	%
Total RTA	57	63.3
Kuwaiti	34	59.6
Non-Kuwait	23	40.4
Male, Kuwaiti	28	49.1
Male, non-Kuwaiti	21	36.8
Female, Kuwaiti	6	10.5
Female, non-Kuwaiti	2	3.5

**Table 6**

Complications incidence in SCI

Complications	No.	%
Urinary	84	59.6
Digestive	26	18.4
Cutaneous	22	15.6
Autonomic dysreflexia	6	4.3
DVT	6	4.3
Ectopic ossifications	6	4.3
Respiratory	4	2.8

**Table 7**

Urinary bladder management at discharge

Type of urinary drainage	No.	%
Continent	63	44.7
Intermittent catheterization	34	24.1
Condom urinary drainage	20	14.2
Permanent catheter	13	6.2
Suprapubic catheter	7	5
Suprapubic tapping	4	2.8

CT = continent  
IC = intermittent catheterisation  
CO = condom urinary drainage

PC = permanent catheter  
SP = suprapubic catheter  
TAP = suprapubic tapping

**Table 8**

Locomotion at discharge

Type of Locomotion	No.	%
Wheelchair – bound	86	61
Independent walker using aids	29	20.6
Independent walker without aids	26	18.5

**Table 9**

Frankel class at admission and discharge

Frankel Class		No. of patients		Frankel Class		No. of patients	
Adm.	Disch.		%	Adm.	Disch.		%
C	D	40	28.4	B	D	4	2.8
A	A	37	26.2	A	B	3	2.1
B	B	17	12.1	D	E	3	2.1
C	C	12	8.5	C	E	2	1.4
B	C	11	7.8	A	C	1	0.7
D	D	10	7.1	D	C	1	0.7

A = Complete sensory and motor paralysis

B = Complete motor paralysis and incomplete sensory paralysis

C = Partial sensory and partial motor paralysis but function-less

D = Partial sensory and partial motor paralysis, with present partially affected motoricity; the patient may walk independently using aids

E = Normal sensory and motor functions

Loveridge et al<sup>[9]</sup> have demonstrated reduced total lung capacity and increased residual volume in SCI, conditions which foster respiratory infections. We found four cases with bronchopneumonia.

Sexual dysfunction has a high incidence in SCI. Its presence and severity is a function of the injury's level and extension. Psychological changes are also frequent and usually transient. In our retrospective study, we were not able to collect reliable data for a quantitative evaluation of these two aspects that, owing to their high incidence, are more likely to be considered part of the condition rather than complications. A comprehensive approach of these aspects is given by Grabois et al<sup>[10]</sup>.

**SCI Outcome (Tables 7, 8, 9)**

As expected, the majority of the patients remained wheelchair-bound (60.99%). The greatest number (28.36%) moved from Frankel class C to D<sup>[11]</sup>. Only two cases regained normal gait moving from D to E and from C to E, respectively.

Regarding urinary bladder management, the majority were discharged incontinent (55.32%) for which intermittent catheterisation was the choice (24.11%).

**Hospital Days (Table 10)**

The duration of stay in the hospital is differentiated as the initial admission in the surgery or diagnostic unit and admission to the initial

**Table 10**  
Hospital Days

Category of hospitalization days	Year (number of cases)								
	91 (n = 4)	92 (n = 6)	93 (n = 6)	94 (n = 7)	95 (n = 14)	96 (n = 9)	97 (n = 36)	98 (n = 27)	99 (n = 32)
<b>Surg. and diag days</b>									
In Kuwait	65	246	272	304	580	588	2179	1237	1580
at Abroad	225	190	96		181	180	214	697	150
<b>Initial Rehab. days</b>									
In Kuwait	325	251	532	587	1397	785	3897	2624	2547
at Abroad	110	330	549	94	240	-	30	313	150
<b>Secondary Rehab. days</b>									
In Kuwait	130	275	294	890	761	230	350	69	41
at Abroad	-	210	-	-	30	-	-	-	-
<b>Total Hospital days</b>	853	1502	2143	1875	3189	1783	6407	4826	4388
<b>Day per capita</b>									
Surg. and diag. days	72.50	72.66	61.33	43.42	54.35	85.33	66.47	71.62	54.06
Rehab.	141.25	177.66	229.16	224.42	173.42	112.77	118.80	111.33	85.56

Average surgery days per capita: 64.37, Average initial rehab. days per capita: 104.68, Average total rehab. days per capita: 152.70, New cases per million people, per year: 7.86

**Table 11**  
SCI - comparative data from different rehabilitation hospitals

Casualty structure	Holland (Harren)	Germany (Hamburg)	Brasil (Brasilia)	Denmark (Hornbaek)	Fiji I. (Suva)	Kuwait (PMR)
New cases/million/year	16	*	*	9.2	18.7	7.8
TRAUMATIC %	48	80	87.3	74.4	53.6	63.8
Mean age	35	34	30.3	*	*	20.6
Males %	76.8	73	80.6	*	*	87.7
RTA%	*	46	41.7	47	25.3	64.4
NON TRAUMATIC %	52	20	12.7	25.5	46.4	36.1
Mean Age	54.6	42	*	*	*	50.3
Males %	61.6	*	*	*	*	76.4
Initial rehab. days	154	177.5	126.7	219.5	*	104.6

\*data not available

rehabilitation period as the first admission in PMR as well as secondary rehabilitation for readmissions. A distinction is also made between treatment in Kuwait and abroad. The average of surgery days per capita is 64.37 days. Average initial rehabilitation days per capita is 104.68 days and total rehabilitation days per capita is 152.70.

### Comparative Data from Different Rehabilitation Hospitals (Table 11)

For the county of Haren, in Holland, Schonherr<sup>[4]</sup>, reported 16 new cases/million/year and later Asbeck<sup>[12]</sup> reported a similar figure. In Denmark, Biering<sup>[5]</sup> reported 9.20 cases/million/year, which is one of the lowest published values. We found an incidence of 7.86 new cases/million/year. The explanation for this low incidence is the small number of SCI in the first four years of the survey; an unusual condition generated by the regional military

conflict. If we take into consideration only the last five years, the number of the new cases/million/year is 11.85, which is also a relatively low figure.

In the TSCI group, there is an obvious, and particular for Kuwait, high male dominance (87.77%), the young age (20.68 years) and the high percentage of RTA (64.44%).

The number of total rehabilitation days per capita in Kuwait is 152.70; a low number as compared with other countries.

### DISCUSSIONS AND CONCLUSIONS

1. There is a net dominance of young males in TSCI and RTA has an alarming prevalence. Preventive measures such as public education and traffic amelioration appear acutely necessary.
2. UTI is the leading complication. This situation may be different from other statistics where pressure sores are the leading complication. This is likely due to a strict policy for pressure sores prevention and treatment, which is followed in our wards.
3. The duration of rehabilitation period is comparable or shorter versus data from other centers.
4. Though it is customary to make 10-year statistical studies, we have included only nine years (1991-1999) because 1990, the preceding year, was a year of collapse in PMR activity owing to the military conflict in the region. The number of SCI increased progressively from four in 1991 to 32 in 1999. The number of SCI (95 cases) in the last three years (1997 - 1999) represented 10.49% from the total new

admissions in PMR (905 cases), in the same period.

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