PARAPLEGICS — CAUSES AND EFFECTS

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SYNOPSIS

292 patients admitted to the Spinal Injuries Unit, Dept of Rehabilitation Medicine, Tan Tock Seng Hospital, between 1973 and 1980 were collected and analysed. 34.93% (102) of them were due to Road Traffic Accidents, 34.93% (102) were from Industrial Accidents and 21.09% (62) were caused by Home Accidents. There were more cervical injuries in Singapore than in places like U.S.A. and Australia. In this survey 138 were cervical injuries, 22 thoracic injuries, 95 thoraco-lumbar (T10 — L1) injuries and 37 lumbar injuries. After varying periods of treatment and rehabilitation in the Dept of Rehabilitation Medicine only 11.3% (33 cases) were totally dependent in selfcare activities and mobility, and the rest were independent in such activities with or without aids or appliances.

INTRODUCTION

In all developed and developing countries the spectrum of spinal cord paralysis is almost the same and the incidence is on the increase. In developed countries the annual incidence is about 22-24 new cases per million population, and this is the same in Singapore. In the year 3000 B.C. the ancient Egyptians believed that paraplegia was an ailment not to be treated at all (1). Today, with the advancement in medical technology and with better knowledge and understanding of the physiology of the central nervous system, doctors have a totally different concept in the management of paraplegia. We either treat it or not at all. With better facilities and improved care, paraplegics and tetraplegics enjoy a longer life span than their counterparts before the second world war. The life expectancy of paraplegics today is about 10% less than that of the normal population and for tetraplegics it is 15 — 20% less, whereas before the war those with spinal cord injuries could hardly survive more than two years after the injury (2, 3).

MATERIAL & METHOD

Between 1973 and 1980 all traumatic spinal cord injury cases admitted to the Spinal Injury Wards of the Dept of Rehabilitation Medicine, Tan Tock Seng Hospital, are collected and analysed. Altogether there were 292 cases referred mainly by the four Government General Hospital (Table 1).

In the management of patients with spinal cord injuries, the emphasis is on the prevention of the extension of the paralysis, limb contractures, pressure sores and urinary tract infection. This is made possible by early management of spinal injuries at a proper spinal injury centre like the one at the Tan Tock Seng Hospital. The best method of relieving the pressure on the spinal cord is by means of realigning the vertebrae mainly by non-operative methods such as skull traction. Occasionally, operative intervention is indicated to reduce the fracture-dislocation and stabilise it by means of plates, rods, etc. with or without fusion (4). Early management means faster recovery and hence shorter stay in the hospital (5). 55.5% of the 292 cases treated were admitted to the Dept, less than one week after trauma (Table 2). This resulted in 62.7% of them being able to go home before completing three months of stay in the Dept, though spinal injuries were allowed to stay for a maximum period of six months in the centre (Table 3).

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Table 1: SOURCE OF REFERRAL

Source of referral	Number	Percentage
Singapore General Hospital	158	54.1
Tan Tock Seng Hospital	40	13.7
Toa Payoh Hospital	40	13.7
Alexandra Hospital	44	15.0
Sembawang Hospital	4	1.4
Private Hospitals	6	2.1
Total	292	100

Table 2: TIME LAPSED BEFORE ADMISSION

	Number	Percentage
Less than one week	162	55.5
Less than two weeks	50	16.8
Less than four weeks	35	12.1
Less than eight weeks	17	5.8
Less than six months	17	5.8
More than six months	11	4.0
Total	292	100

Table 3: TIME SPENT AT D.R.M.

Months	Number	Percentage
Less than one month	46	15.1
Less than two months	73	25.0
Less than three months	64	21.9
Less than six months	97	33.2
More than six months	12	4.1
Total	292	100

RESULTS

89.4% of the 292 cases under study were males. This is because the majority of the victims of the commonest causes of accidents in Singapore (i.e. road traffic and industrial) were males. Based on the 292 cases recorded the annual incidence is about 16 per million (taking the average population during the period of survey as 2.3 million). However, this figure does not reflect the national incidence as not all the cases with spinal cord injuries admitted to the various private hospitals were referred to this centre. Unlike the National Spinal Cord Injury Data Research Centre of USA at Phoenix/Arizona, Singapore does not possess any collaborative research centre for Spinal Cord Injuries.

Table 4: AGE

Age	Number	Percentage
Below 15	4	1.4
15-25	101	34.5
26-35	66	22.6
36-45	36	12.3
46-55	50	16.8
56-65	24	8.4
66-75	11	4.0
Total	292	100

AGE GROUP (Table 4)

The highest incidence seems to affect those between the ages of 15 and 35 years (57.1%). It is to be noted that the bulk of the work force in Singapore falls within this age range.

Table 5: SPINAL CORD INJURY (1973 — 1980) — AETIOLOGY

Level of Lesion	Cervicle	Thoracic	(T10 — L1) Thoraco-lumbar	Lumbar	Sacral
Traffic Accident					
Car, Lorry, Truck	29	3	9	4	—
Motorcycle, bicycle	31	5	7	1	1
Pedestrian	9	—	3	—	—
Industrial					
Hit by heavy objects	13	3	13	9	—
Fall from heights	21	1	30	12	—
Domestic					
Hit by heavy objects	1	—	3	—	—
Fall from heights	9	4	24	8	—
Falls (low or ground level)	11	—	2	—	—
Crime					
Stab, gunshot, etc	2	6	4	—	—
Sports					
Swimming, parachute, etc	12	—	—	2	—
Total	138	22	95	36	1

Table 6: SPINAL CORD INJURY (1973 — 1980) — LEVEL OF LESION

Types	Incomplete	Complete	Brown Sequard	Total
C1	—	—	—	—
C2	1	—	2	3
C3	8	—	—	8
C4	13	5	—	18
C5	30	8	—	38
C6	34	6	0	40
C7	24	2	—	26
C8	4	1	—	5
T1	1	—	—	1
T2	—	—	—	0
T3	—	2	1	3
T4	2	6	—	8
T5	1	2	1	4
T6	—	2	—	2
T7	2	2	—	4
T9	—	—	—	—
T10	1	3	2	6
T11	2	5	—	7
T12	25	15	—	40
L1	34	8	—	42
L2	16	2	—	18
L3	13	—	—	13
L4	5	—	—	5
S1 — S4	—	—	—	—
S5	1	—	—	1
Total	217	69	6	292

AETIOLOGY (Table 5)

This table shows that industrial and road traffic accidents each contributed 35% to the total causes of spinal cord injuries in Singapore. This is comparable to similar surveys made in Australia and England. One survey made in New South Wales, Australia, showed 44% of spinal cord injuries were due to road traffic accidents and in England the figure was 40% (4). In Singapore road accidents usually involved motorcyclists and cyclists (45 cases) and pedestrians accounted for only 12 cases. Pedestrians were mainly the very old and the very young whose poor judgement and poor response to emergencies made them more prone to road accidents.

63% of all industrial accidents were due to falls from heights such as wooden scaffoldings loosely secured by strips of rattan. In view of the danger posed by such wooden scaffoldings, the Labour Ministry is going to make it mandatory for building contractors to use only metal scaffoldings approved by the Ministry itself for future building construction work.

Other causes of spinal cord injuries in order of frequency were Home Accidents (21%), Sports Accidents (5%) and injuries as a result of Crime (4%).

SITE OF LESION (Table 5)

In Singapore we have a much higher percentage of cervical cord injuries when compared to figures obtained from the U.S.A. or Australia. There were 138 (47%) cervical cord lesions 22 (8%) thoracic lesions, 95 (32%) thoraco-lumbar (T10 — L1) lesions and 37 (13%) lumbo-sacral lesions with cauda equina involvement. It is interesting to note that cervical cord lesions were the most common amongst those involved in accidents on the road, at home expecially after falls from low or ground levels, and in sports (See Figure VI).

CLINICAL PATTERNS (Table 6)

Out of the 217 cases with incomplete lesions (i.e. cases who did not lose completely the functions of either the muscles, the skin sensations or the bladder and bowel) 182 were due to cervical and lumbar cord lesions. 50% of those with thoracic cord lesions had complete cord transection. However, only 6 cases out of the 292 suffered Brown Sequard lesions.

FUNCTIONAL RECOVERY AFTER REHABILITATION

Since most cases were admitted very early to the Spinal Injuries Centre (55.5% were referred for treatment within one week after injury), the speed of recovery increased and the duration of stay at the Centre was shortened. 62.7% stayed not more than 3 months in the Centre. On discharge from the hospital, 64.8% were independent in self-care (Table 7) and 39.4% were able to walk independently (Table 8).

CONCLUSION

This paper highlights the concept that to treat spinal cord injuries properly, early admission to Spinal Injuries Centre like the Dept of Rehabilitation Medicine of Tan Tock Seng Hospital is of paramount importance. Moreover, the chances of good functional recovery are better too. A follow up of all permanently disabled patients should be carried out for the rest of their lives to ensure that their urinary functions and skin conditions are in good order as complications

Table 7: SPINAL CORD INJURY (1973 — 1980) — SELF CARE ACTIVITIES (A.D.L.)

A.D.L. Status (on discharge)	Number	Percentage
Total independence	189	64.8
Partial dependence	70	23.9
Total dependence	33	11.3

Table 8: SPINAL CORD INJURY (1973 — 1980) — MOBILITY STATUS

Mobility status (on discharge)	Number	Percentage
Independent ambulation	115	39.4
Independent ambulation with aids/appliances	71	24.3
Independent mobility in wheelchair	73	25.0
Bedridden or dependent mobility in wheelchair	33	11.3

from these two systems are the main cases of death amongst the paraplegics.

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