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# Management of Spinal Cord Injury in a General Hospital in Rural India

V. Chacko, M.S. (Orth.),<sup>1</sup> B. Joseph, D.Orth., M.S. (Orth.),<sup>2</sup> S. P. Mohanty, D.Orth., M.S. (Orth.), MNAMS,<sup>3</sup> and Thomas Jacob, D.Orth.<sup>4</sup>

<sup>1</sup>Director/Professor and Head of the Department, <sup>2</sup>Reader, <sup>3</sup>Reader, <sup>4</sup>Resident, Department of Orthopaedic Surgery and Rehabilitation, Kasturba Medical College, Manipal- 576119, Karnataka, South India

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## Summary

*Two hundred eighteen patients with spinal injury treated in a general hospital in rural India are analysed. One hundred and twenty-five of them had neurological deficit. The commonest cause for spinal injury was falling from trees (55.2%). Rescue and retrieval systems for these patients were inadequate and knowledge regarding precautions to be taken when transporting the patient was lacking. The frequency of decubitus ulceration and of urinary tract infections were unacceptably high. A high percentage of patients with cervical spine injury expired. The study highlights the necessity for appropriate preventive measures, and also reemphasises the shortcomings of treatment of spinal cord injury patients in general hospitals.*

**Key words:** Spinal cord injury; Prevention; Therapy; Complications.

## Introduction

Interest in the care of patients with spinal injuries has been documented since antiquity. The principles of diagnosis were described by Hippocrates and also by the ancient Egyptians (Edwin Smith Papyrus). However, the results of treatment were far from acceptable even in advanced countries until the middle of this century (Munro, 1959). Since then, remarkable advances have been made in developed countries for the care of the paraplegic with the advent of spinal injury centres and the concept of the 'total care' of the spinal injuries (Guttmann, 1973; Bedbrook, 1981).

Very few spinal centres have been established in India and hence the acute care of most victims of spinal injuries takes place in general hospitals.

This study from a general hospital situated in rural India attempts to evaluate the problems encountered in such a system and also attempts to define how the pattern of injuries encountered here differs from reports from Western countries.

## Materials and Methods

Two hundred and eighteen patients with spinal injuries were seen during the

last seven years at the Kasturba Medical College Hospital, Manipal. This accounted for 1.21 percent of all the cases of musculo-skeletal trauma seen during the same period.

All the patients were treated in the orthopaedic department of this hospital, in a general ward of 44 beds. Four beds had been set aside for spinal injuries, but most of the time patients with spinal injuries are treated along with orthopaedic patients because of the shortage of beds in that room.

*a. Patients without neurological deficit:*

Of the two hundred eighteen patients, ninety-three had no neurological deficit. Cervical spine injuries comprised 8 cases (8.6%) whereas thoracic and lumbar spine comprised 30 (32.3%) and 55 (59.1%) cases respectively. Thoracic and lumbar spine injured patients were treated by bedrest alone. Those with cervical spine injuries had skull traction. Once the pain eased spinal extension exercises were initiated and the patients were discharged, wearing a spinal jacket, and for those with cervical spine injuries an extended cervical collar was provided. The average stay in the hospital was 9.3 days.

*b. Patients with neurological deficit:*

An analysis of the 125 patients with spinal injury with neurological deficit is shown in Table 1. Those with a cervical spine injury were treated with Cruthfield's skull traction for reduction and maintenance to start with, and were nursed on six pillows and were turned every two hours. All had retention of urine, treated by continuous bladder drainage with a Foley's catheter. After 3 weeks a Minerva jacket or an extended cervical collar was given and the patient was mobilised in a wheelchair. Out of a total of 30 cases, 9 expired and all of the 9 cases had complete lesions. One patient with a complete lesion recovered considerably both covering sensory and motor function. The average stay in the hospital was 62.7 days.

Out of 47 cases with thoracic and thoracolumbar fractures with neurological deficit, 39 had complete paraplegia. At the time of admission to the hospital two had a urinary tract infection and one had pressure sores. Two patients expired within 7 days from paralytic ileus and electrolyte imbalance. All those with an incomplete lesion recovered except one who had a thoracic spine injury. All were

**Table I** Details of Spinal Injury with Neurological Deficit

Type of Injury	Incomplete Lesion	Complete Lesion	Total	No. of cases Expired	No. of cases Recovered
Cervical Spine Injury	9	21	30 (24%)	9	10
Thoracic Spine Injury	3	18	21 (18.4%)	1	2
Thoraco-lumbar injury with paraplegia	5	21	26 (20.8%)	1	6
Thoraco-lumbar injury with cauda equina lesion	7	13	20 (16%)	Nil	7
Cauda equina lesion	10	18	28 (22.4%)	Nil	14
Total:	34	91	125 (100%)	11	39

treated by the six pillow technique with two hourly change in position carried out manually by the ward staff. Gross vertebral displacement was treated by postural reduction. The paralysed bladder was managed primarily by continuous indwelling catheterisation and later by intermittent catheterisation once the bulbocavernous reflex returned.

After six to eight weeks the patients were fitted with an alkathene jacket and slowly mobilised in a wheelchair. Only a few accepted trunk to foot orthosis and few managed swing through crutch ambulation depending on the neurological level. The average stay in the hospital was 55 days.

There were 48 patients cases with a cauda-equina lesion. Two had a urinary tract infection and pressure sores at the time of admission. There were no deaths and 21 had neurological recovery – 4 completely, whereas 17 patients had residual paralysis only at the ankle. All were treated initially in a manner similar to those with paraplegia. Their ambulation was naturally easier, and the average stay in the hospital was 42.3 days.

## Results

The male: female ratio was 13.5:1. 60.5% of cases with neurological deficit were in the 3rd and 4th decades. The time lag between injury and admission to this hospital is shown in Table 2, and the mechanism of injury in Table 3.

**Table II** Time lag between injury and admission in Hospital

Time Lag	No. of cases with neurological deficit	Percentage
Less than 24 hours	55	44
24 to 48 hours	23	18.4
Over 48 hours	47	37.6
Total	125	100

**Table III** Cause of Injury

Cause of Injury	No. of cases with neurological deficit	Percentage
Fall from trees	69	55.2
Road traffic accidents	16	12.8
Weights falling on patients	23	18.4
Other causes	17	13.6
Total	125	100

Various modes of transport were adopted to bring the injured to hospital and this included being brought recumbent in the back seat of a car (56%), or recumbent in an ambulance (34%). The remainder were brought in smaller vehicles very often too small to permit the patient to be recumbent.

The incidence of urinary tract infection and pressure sores was analysed and is shown in Tables 4 and 5.

**Table IV** Incidence of Urinary Tract Infection

Type of Lesion	Cases admitted with UTI	No. of cases Developed UTI		Total No. of case of UTI	Average period of onset (in days)
		With incomplete lesion	With complete lesion		
Cervical spine injury	Nil	2	10	12 (57.1%)	13.9
Thoracic spine injury	2	Nil	12	12 (60%)	10.8
Thoraco-lumbar injury with paraplegia	Nil	Nil	18	18 (72%)	11.7
Thoraco-lumbar injury with cauda equina lesion	1	4	13	17 (89.4%)	15.6
Lumbar spine injury with cauda equina lesion	1	3	11	14 (51.9%)	17.1
Total	4	9	64	73 (66.4%)	13.8

**Table V** Incidence of pressure sores

Type of lesion	Cases admitted with pressure sores	No. of cases who developed pressure sores		Total No. of cases with pressure sores	Average period of onset (in days)
		With incomplete lesion	With complete lesion		
Cervical spine injury	Nil	Nil	8	8 (38.1%)	24.3
Thoracic spine injury	Nil	Nil	9	9 (40.9%)	33.8
Thoraco-lumbar injury with paraplegia	1	Nil	11	11 (45.8%)	34.6
Thoraco-lumbar injury with cauda equina lesion	1	Nil	5	5 (26.3%)	38
Lumbar spine injury with cauda equina lesion	1	Nil	3	3 (11.1%)	36.5
Total	3	Nil	36	36 (32.4%)	33.4

## Discussion

The age distribution of our patients is comparable with studies from other parts of the world. The preponderance of males is in accordance with other published reports. However the single most common cause for spinal injuries in this series was falling from a tree. This feature and also the infrequent occurrence of road traffic accidents is most likely due to the rural bias of our patients. Eighty percent of India's population live in rural areas and it seems highly probable that our figures and others from India (Shanmugasundaram, 1984) would reflect the pattern of spinal injuries in India as a whole.

Road traffic accidents are the major cause of spinal injuries in reported series from Western Countries, and preventive measures in the form of compulsory use of seat belts and road safety measures have appreciably reduced the number of such accidents (Burke, 1973; Ackroyd and Hobbs, 1979). However, the government and the public in this country are slowly becoming aware of this

problem and preventive measures towards safer methods of sealing the trees are only now being planned.

The mode of transport of patients from the site of injury to hospital is far from ideal as is noted in this study and also others from India (Shanmugasundaram, 1984). While rescue and retrieval systems for spinal injury patients is likely to remain inadequate for some time to come on account of financial and other constraints, knowledge regarding appropriate positioning while transporting the patient should be disseminated by health education measures. Within a few years more than 80% of the country will be covered by television. Community sets for viewing are being made available and it would certainly form a good medium for dissemination of health education, especially for those who are illiterate.

The two most common complications of spinal injury are urinary tract infection and decubitus ulceration. 66.4% of our patients developed urinary tract infection while 32.4% developed decubitus ulceration. These complications were most frequent in those with quadriplegia and paraplegia (Table IV & V). Interestingly these statistics are almost identical with those reported by Donovan and his colleagues (1984), who in an elegant study showed that in the U.S.A. these complications were also common among patients treated in a general hospital prior to their transfer to a spinal centre.

Apart from prevention of urinary tract infection, the other problem was bladder management after the patient was discharged from hospital. Due to the poor educational and socio-economic background and a rural environment, the care of bladder function becomes difficult. For several years continuous catheterisation seemed to be the best method of drainage in these conditions. With the advent of intermittent clean self catheterisation the problem of acceptability and education of the patient cast doubts in our minds. However, during the past year this has been instituted and to our surprise has been easily accepted and successfully carried out by patients with the above background. (These patients are not included in this study).

The poor results with respect to secondary complications is not surprising when we study the nursing care available in our general orthopaedic and surgical wards. If all the time available was used entirely for patient care by all the available staff in the ward, and this time was equally shared among the 44 patients, only 6.5 nurse hours could be spent on each patient. The gross inadequacy of this is evident when one realises that just to manually turn the patient twelve times a day requires at least four man hours (four nursing staff spending five minutes to turn a patient).

There is no doubt whatsoever that adequate and effective care for the spinal injured cannot be given in a general hospital ward. This re-emphasises the need for many more spinal injury centres in this country.

## Conclusion

Rescue and retrieval systems for spinal injured patients are woefully lacking in India, and are likely to remain so for some time to come; but education of the public regarding precautions during transportation would be valuable.

The acute care of spinal injuries in a general hospital is far from ideal, resulting

in an unacceptably high incidence of complications. Though the earlier results with self clean catheterisation has shown encouraging results, it has to be critically analysed to assess its acceptability.

Finally, the alarming frequency of falls from trees indicates the urgent need to devise the methods of pursuing occupations entailing tree climbing with the hope of reducing the incidence of spinal injuries in India.

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