Problems of long-term hospitalised cervical spinal cord injury patients in university hospitals

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Of the 215 cervical spinal cord injury (CSCI) patients treated in Tokai University Hospital over the last 17 years, 42 who were hospitalised for more than 90 days were selected as the subjects for this survey. They were divided into two groups: group A: patients hospitalised for 180 days or more; and group B: patients hospitalised for more than 90 but less than 180 days. The aspects surveyed were: the number of days of hospitalisation, type of injury, level of spinal cord injury, extent of spinal cord paralysis, assessment based on Frankel's classifications, whether a tracheotomy was performed or not, surgical treatment, complications, and the clinical course after discharge. The most common injury for the 13 patients in group A (average stay 281 days) was a fracture-dislocation, followed next by those with a burst fracture. The majority of the 28 patients in group B (average stay was 117 days) had a central type of spinal cord injury. Characteristics observed in group A in particular were: higher segment injuries to the cervical spinal cord, complete paralysis, respiratory complications such as pneumonia, tracheotomy, or a waiting time of at least 6 months before discharge, in cases where a transfer to a rehabilitation hospital was possible. The major problems of treating CSCI patients in university hospitals are that severe cases, which are concentrated in university hospitals, are forced to occupy private rooms for long term treatment, and there is a difficulty in transferring these patients to rehabilitation hospitals. The following measures are desirable to improve the situation: construction of facilities specialising in the treatment of spinal cord injuries, and other assertive measures to be taken at national and prefectural levels.

Keywords: cervical spinal cord injury; long term hospitalised patients; respiratory complication; problems in management.

Introduction

Ideally, university hospitals should treat patients with cervical spinal cord injuries (CSCI) during the acute and subacute phases. However, there are few suitable hospitals to which patients with severe injuries can be transferred and they often require to stay in university hospitals for extended periods. The present survey investigates the actual state of long term hospitalised CSCI patients. The authors will also

discuss social measures to improve the situation.

Subjects

A total of 368 spinal cord injury patients have been treated in our university hospital during the past 17 years, since its establishment in 1975. Of these, 215 patients, or an overwhelming 58.4%, suffered from injuries to the cervical spine. Selected as subjects for

our survey were 42 CSCI patients who were hospitalised for 90 days or more. They were divided into two groups: group A, hospitalised for 180 days or more (13 patients) and group B, hospitalised for more than 90 days but less than 180 days (29 patients) (Table I).

Results

Hospitalisation periods for group A patients averaged 281 days, with a maximum of 730 days, while those for group B averaged 117 days. The average age for both groups was between 40 and 49 years. The most common injury for group A patients was a fracture-dislocation, followed in frequency by those with a burst fracture, while the largest number of group B patients suffered from central cervical spinal cord injuries (Table II). Sixty percent of group A patients had injuries of the midlevel cervical spinal cord such as C3 and C4, while many of the group B patients had injuries of the lower level cervical spinal cord (Table III). The leading cause of injury was a fall (61% of group A and 48% of group B patients), followed by traffic accidents.

A majority of group A patients (12 patients, or 92%) had complete spinal paralysis. Meanwhile, in group B, although 11 patients had complete paralysis, it should be noted that 18 patients (62%) had partial paralysis. Complete paralysis did not improve in either group, based on Frankel's classification. While six group A patients (46%, indicating a large number of nonfunctional cases) required tracheotomy and mechanical ventilation after admission, only six group B patients (20%) received this treatment.

Seventy percent of group A patients (nine patients) and 49% of group B patients (14 patients) had surgical treatment, suggesting that group A patients received surgical operations more often, in accordance with a greater degree of bone injury. No significant differences were seen between the two groups in terms of the type of surgery performed, except that the posterior method with wiring (for dislocations), as well as the Luque method (for the unstable spine), and anterior spinal fusion were

frequently used for patients with fracture-dislocations. The anterior method was frequently used for subtotal vertebrectomy in burst fracture cases. Vertebral body wiring was added in some cases.¹

The commonest complication for both groups was pneumonia, experienced by 53% of group A patients. In addition, some patients had multiple complications such as decubitus ulcers, cystitis, and gastrointestinal haemorrhages (Table IV).

Discharge

Sixty percent of group A patients managed to be transferred to rehabilitation hospitals in Kanagawa or other prefectures after waiting for at least 6 months. Two patients were discharged and sent home directly, two died during hospitalisation, and one is still hospitalised after 2 years. A large number of group B patients were transferred to rehabilitation hospitals in Kanagawa within 6 months, and the rest were discharged and remain at home.

Case report

A 56 year old male patient, who fell while at work, sustained an excessive stretch injury which resulted in paralysis at the level of C4. X-rays showed no fracture although the patient had an ossification of posterior longitudinal ligament (OPLL) complication and swelling in the posterior pharynx. To date, the patient remains paralysed and has been hospitalised for 730 days. He has a tracheotomy, and requires mechanical ventilation. Monthly hospital expenses amounting to more than one million yen are covered by the Workmen's Accident Compensation Insurance. However, the patient pays for a private room, which costs him more than 200,000 yen a month (Fig 1).

Discussion

Each year, between 30 and 40 spinal cord injury patients are admitted to our university hospital, a majority of whom suffer from CSCI.

During the acute phase of treatment, CSCI patients first enter the intensive care unit, then are transferred to general wards. Orthopaedic treatment during this period consists of installing halo-tong traction for

Table I Details of group A (13 cases hospitalised for more than 180 days)

Patient	Age/Sex	Days in hospital	Cause of injury	Diagnosis	Degree of paralysis	Frankel grade	Treatment	Surgery	Complications	Discharge
1	56/M	730	Fall	C4 hyperextension injury	C4 complete	A-A	Tracheotomy	—	Pneumonia	Hospital
2	54/M	518	Fall	C4 fracture-dislocation	C5 complete	A-A	Tracheotomy	PR	Pneumonia	Died
3	24/F	294	Fall	C4 fracture-dislocation	C5 complete	A-A	Tracheotomy	PR + ASF	Decubitus ulcer	Rehabilitation centre
4	70/M	285	Fall	C5 fracture-dislocation	C6 complete	A-A	Tracheotomy	PR + ASF	Pneumonia	Died
5	16/F	252	Traffic accident	C5 burst fracture	C4 complete	A-A	Tracheotomy	Lu + ASF	Haemothorax	Rehabilitation centre
6	58/M	218	Fall	C5 burst fracture	C5 complete	A-A	—	ASF	Gastrointestinal bleeding	Home
7	44/M	211	Fall	C6 burst fracture	C6 complete	A-A	—	ASF	Pneumonia	Rehabilitation centre
8	31/M	210	Sports accident	C4 burst fracture	C4 complete	A-A	—	Lu	Gastrointestinal bleeding	Rehabilitation centre
9	16/M	209	Sports accident	C5 burst fracture	C5 complete	A-A	—	PR + ASF	Cystitis	Rehabilitation centre
10	49/M	207	Fall	C4 hyperextension injury	C6 incomplete	B-B	—	—	Decubitus ulcer	Rehabilitation centre
11	43/M	185	Fall	C4 fracture-dislocation	C5 complete	A-A	Tracheotomy	PR	Pneumonia	Rehabilitation centre
12	77/M	184	Fall	C3 hyperextension injury	C3 complete	A-A	Tracheotomy	—	Pneumonia	Rehabilitation centre
13	29/M	184	Traffic accident	C4 fracture-dislocation	C4 complete	A-B	Intubation	ASF	Dislodging of grafting bone	Rehabilitation centre

PR = posterior reduction; ASF = anterior spinal fusion; Lu = Luque rod.

Table II Spinal injuries in groups A and B

	Group A	Group B
Fracture-dislocation	6 (46.2%)	7 (24.1%)
Burst fracture	4 (30.8%)	8 (27.6%)
Hyperextension injury	3 (23.0%)	2 (6.9%)
Central spinal cord injury	0	12 (41.4%)
Total	13	29

Table III Levels of spinal cord injuries in groups A and B

Level	Group A	Group B
C3	1 (7.7%)	0
C4	7 (53.8%)	1 (3.4%)
C5	3 (23.0%)	12 (41.3%)
C6	2 (15.4%)	8 (27.5%)
C7	0	5 (17.2%)
C8	0	3 (10.3%)
Total	13 cases	29 cases

Table IV Complications in groups A and B

	Group A	Group B
Pneumonia	7 (53.8%)	11 (37.9%)
Decubitus ulcer	5 (38.4%)	4 (13.8%)
Cystitis	2 (15.4%)	4 (13.8%)
Gastrointestinal bleeding	2 (15.4%)	0
Heart failure	1 (7.7%)	1 (3.5%)
Multitrauma	1 (7.7%)	5 (17.2%)
Reduction failure	2 (15.4%)	0
Total	13 cases	29 cases

Figure 1 A 56 year old man with C4 complete paralysis hyperextension injury at C3–4 with OPLL, hospitalised for 730 days. (A) X-ray on admission revealed swelling of retropharyngeal space (arrow). (B) CT on admission revealed no fracture, but OPLL at C2–C4. (C) X-ray 2 years after injury.

Table V Acute-phase treatment system for cervical spinal cord injury patients at Tokai University Hospital

Patients are sent into the intensive care unit

Examination of local symptoms as well as general physical condition

Hospitalisation in the center's ICU ward—acute phase treatment (1 week or less)

Orthopaedic treatment

Halo-tong traction for cervical spinal cord injuries

Reduction of bony injuries as soon as possible

Treatment of multiple trauma

Prevention of decubitus ulcer

Total physical management

Respiratory, circulatory, urinary and gastrointestinal systems

Psychiatric care

Informed consent

Rehabilitation programmes

Survey by case workers

Examine social and financial backgrounds

Survey of rehabilitation hospitals to which patients will be transferred in the future

spinal bone injuries and performing reduction as early as possible. Generally speaking, patients are transferred to other hospitals after 3 months. However, patients with serious symptoms are forced to receive long term treatment in private rooms (Table V).^{2,3}

The characteristics of group A patients hospitalised for 6 months or more include higher segment injuries of the cervical spinal cord, complete paralysis, respiratory complications such as pneumonia, or having had a tracheotomy. The pathology of these patients makes a transfer to other hospitals difficult. There is also the problem of inadequate facilities, ie the lack of the capacity to accommodate such patients.

Some problems of treating CSCI in university hospitals include the long term use of private rooms by severely injured patients, and the difficulty in transferring such patients to rehabilitation hospitals. Serious problems cited by patients and their families include the financial and psychological burden, the frustration of patients themselves due to extended hospitalisation, and the hospital's recommendations for home remodelling to enable hospital discharge.⁴

The following measure may be considered to improve the situation: the expansion of facilities for cervical spinal cord injuries; training of medical professionals such as doctors, nurses and physiotherapy staff; promotion of consistent treatment starting in the acute phase; development of a central control system for the accommodation of CSCI patients; and assertive national and prefectural policies toward these patients.

Conclusions

- 1 The problems of cervical spinal injury patients hospitalised in university hospitals for 3 months or more have been investigated.
- 2 The patients hospitalised for 6 months or longer, in particular, were characterised by having an injury at a high spinal cord level, complete paralysis, and complications such as pneumonia. These features are considered factors which make transfer to other hospitals difficult.
- 3 Assertive measures at the national and prefectural levels are called for in the future, such as an expansion of facilities.

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