Evaluation of Management of Closed Spinal Injury

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Abstract

Objectives: to evaluate the role of conservative, decompression, spine fixation in management of closed spinal injury.

Methods: The study was conducted at Specialized Surgical hospital and Al-Kadhemayia Teaching Hospital, in the period between July 2003 and July 2005.The study included 61 patients categorized Into many groups according level of vertebral injury (cervical, cervicodorsal, dorsal, dorsolumbar, Lumbar and lumbosacral), type of injury (compressed fracture, burst fracture and fracture dislocation) And according the severity into three groups as G1(complete motor paralysis and sensory loss) G2 (complete motor paralysis and incomplete sensory loss) and G3 (incomplete motor paralysis And incomplete sensory loss).The methods of treatment include (conservative, decompression, And open reduction and internal fixation).

Results: no deterioration of the neural function occurred in any case .All patients who had full neural Function on admission remained so. The patients who at time of admission was completely paraplegic Or tetraplegic did not show any neural improvement .Internal fixation was done to maintain good alignment of the spine and stabilize the fracture dislocation segment for early mobilization and rehabilitation no significant improvement in the neural status has occurred in patients with complete motor and sensory loss below the level of the injury at time of admission. The value of decompression of the spinal Canal may improve neurologic recovery or rate of recovery in some patients with an incomplete deficit.

Conclusion: clinical awareness is the most important diagnostic point. Other associated injuries which frequently co-exist should not be forgotten. Adequate radiological examination must be done.MRI is very helpful especially in incomplete spinal cord injury. Conservative treatment consists of immobilization. Laminectomy was performed for patients who have incomplete neural deficit. Internal fixation Performed for patients who have fracture dislocation.

Key word: closed spinal injury, conservative, surgery.

Al-kindy Col Med J Vol.8 No.2 2012 P:80-83

Introduction

Traumatic spinal cord injury is a devastating challenge for the injured individual, for family and Friends, for health care community and for society as a whole (1). Injuries are divided according to Bony level: cervical, dorsal, dorso-lumbar, lumbar, lumbosacral (2, 3, 4). Spinal cord segment anatomy is well defined and has readily identified myotomes and dermatomes that allow for accurate demarcation of the upper (cephalic) level of the cord (3, 5 and 6).

- **Pathology of spinal injury**

Spinal cord injury following vertebral injury is a dynamic process this continues for a long period in spite of satisfactory reduction and removal of pressure (4, 6 and 7).

- **Pathology of acute spinal cord injury**

*Central hemorrhages: especially into gray matter from capillaries, venules, and arterioles
* Remote hemorrhages.
* Central hemorrhagic necrosis.
* Post-traumatic infarction.
* Subarachnoid hemorrhage.
* Subdural or extramural hematomas.
* Edema.
* Axonal injuries.
* Myelin sheath injuries.
* Inflammation (8, 9).

- **Pathology of cord injury in the chronic phase**

* Central cavitations.
* Persisting subpial rim of axons.
* Post- traumatic infarction.
* Post -traumatic syringomyelia.
* Remote necrotic foci.
* Inflammation.
* Wallisian degeneration.
* Scarring and gloss.
* Arachnoiditis.
* Atrophy.
* Regenerative processes (8, 10).

- **Secondary injury mechanisms involved in the pathophysiology of Spinal cord injury**

1. Systemic effects.
2. Local vascular damage of the cord microcirculation.
3. Biochemical changes.
4. Electrolyte shifts.
5. Edema.

6. Loss of energy metabolism (2, 10, 11, 14).

- **Types of bony injuries**

* Wedge compression fractures.
* Burst fractures.
* Fracture dislocation.
* Distraction fractures.
* Hyperextension injuries.
* Fracture of transverse and spinous process (1, 5, 9 and 15).

Methods

From Jul. 2003 to Jul. 2005; 61 patients with closed spinal injury were treated in specialized surgical hospital and AL-Kadhemayia teaching hospital all patients in this series were admitted within first two weeks of injury. The information obtained from the patients and their records included: Age, time of injury and time of admission, the cause of injury, level and type of spinal injury, history of illness, pain, tenderness, parasthesia, paresis, paraplegia, quadriplegia, incontinence of urine and bowel. The commonest causative factor was road traffic accidents this was seen in 54.4% of cases falling from height was seen in 35.5% and direct trauma seen in 9.9% .The cervical spine was involved in (18 cases , 29.7%), dorsal spine was involved in (11 cases, 19%) , dorsolumbar spine was involved in (9 cases, 14%), lumbar spine injury was involved in (21 cases, 34.7%) and the lumbosacral spine was involved in (2 cases, 2.4%). There were 29 patients with wedge compression fracture, 19 fracture dislocations, 11 burst fracture and 2 had no fracture seen radiologically but there was neurological deficit. Stable fractures were seen in 39 patients (63.5%), while unstable fractures were seen in 21 patients (34%). 50 patients were treated conservatively bed rest and manual turning of the patients on the ordinary bed. Operative treatment was performed in 11 patients, vertebral fixation done in 5 patients.

Results

- **RESULT OF CONSERVATIVE TRATMENT**

No deterioration of the neural function occurred in any case. All patients who had full neural function on admission remained so. The patients who at time of admission was completely paraplegic or quadriplegic did not show any neural improvement, in 12 patients with complete neural loss 2 patients died within 3-14 days of admission due to respiratory failure as a result of cervical cord injuries in all two cases, table 1.

Table 1 Results of conservative treatment

No improvement	Improved	Good recovery	Complete recovery	No. of Patients	Neural status
0	0	0	23	23	No neural loss
10	0	0	0	12	Grade 1
1	2	0	0	3	Grade 2
5	4	3	0	12	Grade 3
16	6	3	23	50	Total

Two patients were died within 3-14 days.

- **Results of operative treatment by open reduction and internal fixation**

The aim of treatment by internal fixation was to maintain good alignment of spine and stabilize the fracture dislocation segment for early mobilization and rehabilitation. No significant improvement in the neural status had occurred in 5 patients with complete motor and sensory loss below the level of injury at time of admission. All these patients remained with complete neural loss with sphincter paralysis after operation, table 2.

Table 2 Result of treatment by internal fixation

No improvement	Improved	Good recovery	Complete recovery	No. of patients	Neural status
0	0	0	0	0	No neural loss
5	0	0	0	5	Grade 1
0	0	0	0	0	Grade 2
0	0	0	0	0	Grade 3
5	0	0	0	5	Total

- **Result of treatment by decompression**

There is an empirical impression that clearance of the canal may improve neurologic recovery or rate of recovery in some patients with an incomplete neurologic deficit, table 3.

Table 3 Result of treatment by decompression

No improvement	Improved	Good recovery	Complete recovery	No. of patients	Neural status
0	0	0	0	0	No neural loss
4	0	0	0	4	Grade 1
0	0	0	0	0	Grade 2
0	1	1	0	2	Grade 3
4	1	1	0	6	Total

Discussion

Closed spinal injury is the major cause of sever disability following trauma, delay in starting effective treatment often occurs and lead to increasing problem. The of management is to minimize morbidity and mortality and this achieved by early treatment as soon as possible by maintaining stability and relieving pressure effect on neural tissue. In our study the majority of patients 33 cases (54.5%) were due to road traffic accident. The mean age distribution in our study was 32.5 years which is lower than other studies, in Tator series the mean age was 42.5 years. The commonest level of spinal injury was the dorsolumbar 48.7% followed by cervical 29.7% .In Tator series the commonest injury was in cervical region 56.5%, dorsolumbar 23.8%. In our series the highest incidence of unstable injuries were in cervical and highest incidence of stable were in dorsal region, this both figure are nearly similar to Tator and Brightman finding. Fifty patients were treated conservatively, 22 had no neural deficit showed complete return to normal work and life, while 12 patients who had complete neural deficit, 10 patients showed no improvement and 2 patients died, four days after their injury. Sixteen patients had incomplete neural deficit, 10 of them (61.2%) improved, while 6 patients (38.7%) showed no improvement. Comparing with Duker, Tator, Bedbrook series in which 7%, 5.2%, 9.6% respectively showed slight improvement in patients with complete neural damage, while 60%, 72.6%, 70% respectively improved in patients with incomplete neural damage which is the same result in our series as far as incomplete. In this study, six patients were treated by laminectomy 4 patients had complete neural deficit and two patients have incomplete neural deficit. The patients with incomplete neural deficit treated by laminectomy showed significant recovery (varies from good recovery to improve), while other 4 patients who had complete neural deficit showed no improvement postoperatively , which is the same finding by Ducker and nearly similar finding by Henery and Hardaker.

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