

# Cost Effective & Simple Treatment of Traumatic Lower Cervical Spine Instability.

A H KHALID S U ABRAR. J M MIAN

*Department of Neuro surgery Lahore General Hospital Lahore*

*Correspondence to: Dr. Abdul Hameed*

Trauma is a common cause of lower cervical spine instability. This instability of lower cervical spine may result in a serious injury to the cervical spinal cord which may be devastating to the patient with respect to long term disability and suffering. The cause may be fall, industrial, automobile accidents and athletic activities. Cervical spine injuries are usually treated by skeletal traction for 3-6 weeks. This treatment, according to an estimate costs of 40 to 50 thousand rupees though still remaining ineffective in decompression, bony fusion and stabilization. Along with the cost it also gives many miseries to the patient like bed sores, infection etc. In affluent societies where ideal treatment for the patient takes priority with out even a mention of cost the casper plating remains the best treatment. In our country this system costs about 30 thousand rupees to the patient. Peroperative this system needs flourescopic help for the surgeon which is not available in our theatres. So we as surgeons and our patients still resort to more cheap and simple treatment. This study evaluates costeffectiveness and efficacy of a fixation system consisting of locally made DC plates and cancellous screws which costs only 2000 to 2500 rupees to the patients and needs only a screw driver for the surgeon. This study was conducted in the department of Neurosurgery Lahore General Hospital Lahore comprising of 20 consecutive patients of lower cervical spinal instability due to trauma. There was no fracture or loosening of the implant up to the follow up of 6 months. Excluding the three patients who were in Grade E(Frankel grading), 75% of patients improved their grading to more useful grades. At the end of follow up of 6 months, only 20% of patients were in the non useful grades i.e. A , B & C. There were no complications like bed sore, thromboembolic phenomena, UTI and non union of the spine producing chronic instability. It was concluded that lower cervical spinal instability treated by locally made CD plates and cancellous screws is acceptable and costeffective treatment in our patients.

**Key words:** Spinal Instability, Spinal Fixation.

The lower cervical spine instability is most commonly the result of traumatic injuries. The principal objective of treatment is to prevent or minimise the extent of spinal cord injury subsequent to trauma and instability. The sufferers are not only disabled themselves but they also require the care of many other members of his family. The resulting economical loss is magnified many times. The sufferers are usually young and energetic group. These circumstances need a treatment which should be heartening for the patient as regards the cost and results and simple for the unequipped surgeon.

## Material and Methods.

This study has been carried out at the Department of Neurosurgery, Unit II, King Edward Medical College, situated at Lahore General Hospital, Lahore. This department is also affiliated with Post Graduate Medical Institute, Punjab.

This study is comprised of 20 consecutive cases in and around the city of Lahore presenting to department of neurosurgery from March 1996 to Oct 1997 with cervical spine injuries from C 3-7 level. The excluding criteria for the patients were: patients coming from other cities far from the Lahore, patients having multiple fractures of the long bones, patients having chest injuries and patients having associated medical diseases.

Antero-posterior and lateral plain radiographs of cervical spine were obtained to assess the bony injury. CT/MRI were done where indicated. Crutchfield cervical

traction was applied as an initial procedure to achieve reduction. Anterior cervical spine fixation with Dynamic Compression plate and cancellous screws of appropriate lengths was performed after sufficient reduction has been achieved. Corpectomy and replacement with autologous bone grafting (from iliac crest) was done where indicated. Patients were mobilized gradually in a hard cervical collar over a period of 6 weeks. Patients were followed up after 3 months interval for a period of 6 months. At the time of follow up, antero-posterior and lateral radiographs of the spine were obtained to assess the bony spinal fusion.

## Results

This was a prospective study which comprised of 20 consecutive patients presenting with injury to the cervical spine resulting in instability. Majority of patients (75%) were in younger age group i.e., their ages ranged from 15-30 years. Only 15% of patients were younger than 20 years and the 10% were above 50 years. A male predominance was clearly noted, 80% as compared to females who were 20%. This is probably due to more exposure of the males to unsafe working conditions. Most of the patients presented early after the injury, however, mean delay of 17 hours was noted. The patients who presented early were those who presented directly to the casualty department of the hospital, while other patients who presented late were usually referred from other hospitals. The mean stay in the hospital was 16.85 days. This included all the delay before undergoing surgery which was mainly due to patient's



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problems e.g. fever, paralytic ileus etc. Philadelphia collar was applied soon after the fixation. Patients were gradually mobilised from their bed and were discharged on 6th-7th day after removing the stitches. The operative time ranged from 02 hours to maximum of 3 1/2 hours, with an average of 02 hours and 30 minutes. Cases who took longer time included the cases in which severe damage had occurred to the cord and required careful decompression. There was no misplacement and misdirection of screws as judged by postoperative X-rays. There was no deterioration of neurological grade postoperatively. All the patients and their attendants accepted the cost of treatment happily. Excluding the three patients who were in Grade E, 75% of patients improved their grading to more useful grades. Thus by the end of follow up of 6 months only 20% of patients are in the non useful grades i.e. A, B & C. There was no incidence of screw loosening and breakage of the implant up to a follow up of 6 months.

### Comparison of Cost :

	Patient's consideration.	Surgeon consideration
Conservative.	Rs.40,000/-to 50,000/- Multiple complications.	Boring, prolonged bed occupation.
Casper Plating.	Rs.30,000/-	Needs flouroscope and experience.
Local DC plates with cancellous screws.	Rs.2000/- to 2,500/- only.	Only screw driver and little experience needed.

### Comparison of Frankel grades

Frankel Grade	No. of patients			
	Pre-Op	Post-Op	At 3 months	At 6 months
A	1	1	0	0
B	3	3	1	0
C	10	10	9	4
D	3	3	5	7
E	3	3	5	9

Five patients (25%) had no sensory deficit at the time of presentation. Sensory recovery observed in 80% of patients (12 out of 15). Out of these 50% (07 out of 12) had complete recovery and 42% (05 out of 12) had partial improvement.

Two patients had complete control on their sphincters pre-operatively. 11 out of remaining 18 (61.11%) patients had complete loss of control on sphincters and 7(39%) had partial control. At the end of follow up, only 04 (22.22%) patients had no control on their sphincter. Nine (50%) out of 18 patients regained complete control on the sphincters along with 02 patients who were having no loss of control on sphincters. Five (28%) out of 18 patients showed partial recovery.

### Discussion

Traumatic instability of cervical spine is amongst the most serious conditions that can cause a broad spectrum of disabilities. Previously injuries of the cervical spine were

managed conservatively by applying only cervical traction but the results were disheartening. Later, the technique of cervical spine fusion was adopted but rigid stabilisation was not possible with this procedure. The technique of anterior cervical spine fixation by a DC plate allows proper decompression of the cord along with rigid stabilisation that leads to solid bony fusion. The goal of treatment is to decompress a compromised spinal canal. The aim of the surgical treatment of cervical spine injuries is indicated to improve neurologic deficit, to restore spinal mechanics through correction of a deformity to stabilise unstable lesions, to facilitate the patient's comfort and nursing and lessen the economical loss incurred by this suffering.

The dynamic compression plates used in this study are locally made. This is an unconventional system who has a semirigid screw-plate junction that loads the screws less in pure tension than the constrained systems. Also stresses at the screw root of this semirigid system are less than in constrained systems, since the screws can pivot. This is demonstrated by the observation that during the critical "fusion" time, which lasted an average of 3 months in this study, there was not a single case of screw breakage. This is because as the screws can pivot slightly, the tension forces are dissipated. The second advantage of this micromotion is that it promotes remodelling. The third advantage of this system is that it utilises cancellous screws and thus a bicortical purchase is not necessary.

For the surgeons this technique was very easy and mastered quickly. In unequipped operation theatres surgeon very confidently carried out the procedure without fear of failure. When patients and their attendants were told about other two modalities of treatment, they were embarrassed and up set. But when expenditure of locally made DC plates with cancellous screws was told they accepted it with a bright and hopeful face.

### Conclusion

The surgical treatment of the traumatic lower cervical spine instability is a desirable treatment to improve the outcome and give hope to the patient. But ideal treatment by Casper plating glooms and depresses our patients when they find economical target unreachable. So ultra cheap local fixation system of DC plates and cancellous screws carries with it a nearly uniformly successful means of achieving arthrodesis of the spine while affording acceptably low rates of complications thus brightening and elevating the mood of our depressed patients.

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