INTRODUCTION

Traumatic cervical spine injury is defined as an acute trauma to the bony, neurogenic and soft tissue of the vertebral column resulting in variable degree of sensory, motor deficit and bladder/bowel dysfunction which may range from inconsequential symptoms to total loss below the level of injury.

The basic principles of cervical spine surgery continue to include adequate decompression, provision of a structural stability, biologically functional bone graft, and creation of a stable construct to allow for solid fusion. In recent years, the options to achieve these goals have expanded significantly. Bone banking and bone graft substitutes yield increasingly viable alternatives to autogenous bone graft. New prosthetic implants and cages are currently under investigation. Various plating systems are available to provide internal stability to cervical spine constructs. The anterior cervical spine surgery approach at the level of the C3 to T1 has been introduced in 1952.\textsuperscript{1,2} The addition of autologous bone graft for an intervertebral fusion has been proposed by Smith and Robinson in 1955 and modified by Cloward in 1961 and Verbiest in 1969.\textsuperscript{3,4} The anterior plate fixation has been first described by Bohler in 1967.\textsuperscript{5} Anterior cervical surgery now represents one of the most frequently performed spinal procedures. It involves disc space, removal of a single vertebra or several vertebrae if the pathology involves beyond the level of disc space.\textsuperscript{6,7} Anterior cervical fusion with plate fixation provides immediate stability to affected area, reduces risk of graft extrusion, avoids need for extended post-operative external immobilization and significantly shortens the rehabilitation period.\textsuperscript{8,9} At the beginning, standard AO-plates were used; later small fragment plates and the so-called H-plate were introduced.\textsuperscript{10} Caspar developed a ‘trapezoidal’ plate in 1980 for use in cervical spine for multiple indications including trauma, tumours and revision surgery etc.\textsuperscript{11,12} Anterior cervical plating has numerous potential benefits as an adjunct to anterior cervical discectomy and fusion (ACDF). It provides rigid fixation, resists graft settling and development of segmental kyphosis, promotes higher fusion rates, allows for less cumbersome external immobilization.\textsuperscript{13}

As cervical injury is a very serious type of spinal injury in which there is involvement of underlying cord leading to quadriplegia and breathing problems, so prompt intervention in the form of anterior decompression and fixation is must. Therefore, this study was conducted.
to evaluate the neurological recovery following anterior decompression, grafting and fixation with Caspar plating.

**METHODOLOGY**

This is a case series conducted in the Department of Neurosurgery, Jinnah Postgraduate Medical Centre, Karachi, from July 2008 to March 2011.

All patients of cervical injury with anterior cord compression due to vertebral fracture or traumatic disc were included. Those patients were excluded in whom only grafting was done without plating as well as those who were re-operated were also excluded. All patients of cervical trauma received in emergency were resuscitated and cervical X-rays were done. Traction was applied in patients with sub-luxation. All patients were prepared for surgery after neurological assessment. All cases were evaluated for their clinical features, level and degree of neurological injury was assessed using Frankle grading as shown in Table I.

In supine position under general anaesthesia with cervical traction, anterior decompression, grafting harvested from iliac crest and Caspar plate with two screws above and two below were applied in normal vertebrae under fluoroscopy. No screw was applied in the graft. Redivac drain was placed. Postoperative X-rays were taken on next day of surgery. Postoperative neurological recovery was assessed according to Frankel grading with 6 months follow-up. Data was analyzed with Statistical Package for Social Sciences (SPSS) version 12 and described as frequencies and percentages.

**RESULTS**

Among 30 patients, 24 (80%) were males and 6 (20%) were females. Minimum age was 15 years and maximum was 55 years, most common age group being 30 – 40 years (n = 15). The mean age was 35 ± 7.2 years. Causes of injury were road traffic accident (n = 20, 66.6%), fall (n = 08, 26.6%) and assault (n = 02, 6.66%).

All 30 patients underwent anterior cervical decompression, fusion and Caspar plate fixation. These patients were divided into three groups according to the type of injury like fracture (n = 8), subluxation (n = 10) and traumatic herniated disc (n = 12).

These patients were divided according to the level of spinal injury and C5-C6 was the most common level (n = 16, 53.3%) as shown in Figure 1.

Postoperative follow-up showed that according to Frankel grading, 22 (73.33%) patients improved clinically, no improvement was seen in 6 (20%) patients, one (3.33%) patient deteriorated and one (3.33%) expired. Four patients of grade-A improved to grade-B (n = 1), two remained unchanged and one expired. Five patients in grade-B, pre-operatively improved to grade-C (n = 04) and one remained unchanged. Out of 13 patients in grade-C, pre-operatively 8 improved to grade-D. Of grade-E, 2 remained unchanged and one deteriorated. Seven pre-operative patients of grade-D improved to grade-E and one remained unchanged as given in Table II. All patients developed pain at donor site.

**DISCUSSION**

The last two decades have witnessed an ongoing discussion whether anterior or posterior surgery is the treatment of choice for most of the cervical spine injuries. The goals of any treatment of cervical spine injuries are: return to maximum functional ability, minimum of residual pain, decrease of any neurological deficit, minimum of residual deformity and prevention of further disability.

The age distribution of patients presenting with spinal cord injuries is bimodal. The first peak is at age of 15 – 24 years while second peak is in older than 50 years persons.14 In this study, age ranged between 15 to 55 years with mean age of 35 years.

In this study, 24 (80%) of 30 patients were males and 6 (20%) were females. Studies have shown that the majority of patients presenting with spinal injuries are male.8 The reason is that males are more mobile and outgoing and so more prone to trauma.
The younger patients suffer from high-energy trauma, such as motor vehicle accidents, sport injuries or acts of violence and in patients older than 50, injury usually result from low-energy trauma, such as falls from the standing position.\textsuperscript{14,15} Motorcycle accidents account for approximately 20% of spinal cord injuries.\textsuperscript{15} This study also showed road traffic accident (n = 21), fall (n = 7) and assault (n = 2) as common modes of injury.

The most common level of injury in this study was C5/6 in 16 patients (53.33%). This compares with study done by Augutis \textit{et al.} which stated that one half of injuries occur at C5 - C6.\textsuperscript{16}

There are four general indications for spinal stabilization as outlined by White and Panjabi: to restore clinical stability to a spine in which the structural integrity has been compromised, to maintain alignment after correction of a deformity, to prevent progression of a deformity, and to alleviate pain.\textsuperscript{17}

There are some reasons why those goals can be reached better by anterior approach surgery. Usually the bony compression of the cord and roots comes from the front, therefore, anterior decompression is usually the procedure of choice. Also, the anterior stabilisation with a plate is usually simpler than a posterior instrumentation.\textsuperscript{18}

The most important technical aspect in anterior cervical plating include a suitable graft and its maximum surface contact between the vertebral bodies, selection of appropriate length plate and proper position of the screws. Any anterior osteophytes should be removed with rongeur or high speed drill to maximize bony contact with plate. Fluoroscopic image is used to assure correct placement of screws and prevent any extension of screws beyond posterior cortical wall.\textsuperscript{8} The authors used the same principle of surgery in this study with decompression and grafting followed by Caspar plating; postoperative follow-up showed that according to Frankel grading 22 (73.33%) patients improved clinically.

The complications related to anterior cervical approach are many including injury to nerves, vessels, trachea, esophagus, cord and complications related to implant, graft and graft site. Hoarseness may be secondary to irritation of trachea or injury to larynx. Injury to sympathetic nerve produces Horner syndrome and it is protected by avoiding dissection laterally to transverse process.\textsuperscript{19,20} In this study, all patients had postoperative pain at graft donor site which was temporary and relieved soon. However, there was one expiry and one patient deteriorated neurologically after surgery but the rest of complications were not seen.

**CONCLUSION**

Cervical injury is a serious entity causing spinal instability and cord compression which can lead to weakness in all four limbs and even death depending upon the extent of cord involvement. For spinal stability and neurological recovery, cord decompression and fixation should be done. For anterior cord compression after decompression and grafting fixation with Caspar plating is a simple procedure which is cost effective, easy and has good outcome.

**REFERENCES**

17. White AA, Panjabi MM. Biomechanical considerations in the

