

## Original Article

## Outcome of lateral mass fixation in sub axial cervical spine injuries — a prospective study

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Lateral mass screw fixation with or without supplemental bone grafting is a contemporary option for treating subaxial cervical spine injuries. A prospective study was done on twenty one (n=21) adult patients with treated with lateral mass screw fixation in lower cervical spine injuries by modified Magerl technique between April 2012 to April 2016. In more than 50% cases, mechanism of injury of cervical spine were due to fall from height. Most of the patients were between 18-30 yrs of age. Seventy to eighty per cent of all cases were rated C and D on the ASIA scale. Neurological improvement of at least one grade seen in more than 50% of patients with incomplete cord injuries. More than 90% patients went on to develop a solid fusion within an average of 14 months. Complications were very rare. So on conclusion Posterior lateral mass fixation using the modified Magerl's technique is a safe and effective procedure for traumatic instability of the lower cervical spine in terms of patient tolerance, early mobilization and functional outcomes with a higher fusion rate. [J Indian Med Assoc 2018; 116: 35-6]

**Key words :** Cervical spine injuries, Lateral mass fixation, safe and effective.

Cervical spine is the most common level for spinal cord injury, representing 55% of all spinal cord injuries<sup>1</sup>. Lateral mass screw fixation is one of the options for stabilisation of the fracture with or without supplemental bone grafting. Roy-Camille first introduced screws into the lateral masses of the cervical spine to stabilize the unstable spine in 1964<sup>2,3</sup>. Major advantage of lateral mass screw fixation is that it provides equal or greater biomechanical stability than anterior plating or traditional interspinous wiring technique<sup>4</sup>. The study was done prospectively and the aim of the study was to determine the effectiveness of lateral mass screw fixation in treating lower cervical spine injury (C3-C7).

### MATERIALS AND METHODS

The study was done at NRS Medical College and Hospital from April 2012 to April 2016. Patients were studied prospectively and evaluated clinically and radiologically at follow up. Total number of 21 (n=21) adult patients of subaxial cervical spine injuries requiring lateral mass fixation were included in the present study. There were some inclusion criteria, like: (a) Age > 18 yrs (b) patients suffering from post-traumatic cervical spine injury within levels C3-C7 who were candidates for posterior approach only. (c) Unstable spine with neurological compromise (d) Unilateral or bilateral facet dislocations. Exclusion criteria

were : ( a) isolated cord contusion or myelomalacia on MRI. (b) Isolated anterior column injury (burst fractures with intact Posterior Ligamentous Complex). (c) Retropulsed vertebral body or disc. (d) Pathological fracture of the cervical spine or other bone or organ injury.

Titanium poly-axial screws of 3.5 mm diameter with a rod system were used for all cases of lateral mass screw fixation. We used modified Magerl fixation technique<sup>5</sup> in which a starting hole is created with a 2-mm burr bit. The screw is then angled laterally about 20 to 25 degrees. In the sagittal plane, the screw path is kept perpendicular to the plane of the adjacent facet joint. Modified Magerl technique allows placement of the screws within the midpart of the lateral mass. Unicortical screws were preferred than. Stitches were removed 14th day postoperatively. Patients were followed-up at the 6th, 8th and 12th week and then at three months, six months and one year. They were assessed clinically, radiologically and functionally.

Patients were mobilized at around 2-6 months postoperatively depending on the fusion status on follow-up x-rays. Other parameters that were evaluated included: possible complications of each procedure such as wire breakage, wire dislodgement, screw backout/pullout, and/or loss of sagittal alignment (residual kyphosis). Evidence of fusion was graded on two criteria: (a) absence of obvious hardware loosening; and (b) absence of motion (less than 1 mm) between contiguous spinous processes on flexion/extension radiographs<sup>7</sup>.

### RESULTS

Total number of 21 patients were included in the study, of which 18 patients were male and 3 patients were fe-

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Pre operative MRI &amp; X-Ray

Per operative Pic

Post operative X-Ray

male. In more than 50% cases, mechanism of injury of cervical spine were due to fall from height. Most of the patients were between 18-30 years of age. Seventy to eighty per cent of all cases were rated C and D on the ASIA scale. Neurological improvement at follow up seen according to the following Table :

Asia score at admission	No of patients	Asia score at final follow up
A	3	A - 3
C	6	C-3
D-2		
E-1		
D	8	D-3
E-5		
E	4	E-4

On radiological assessment there was no postoperative loss of kyphosis correction at follow up. Average period for achieving radiological fusion was about 14 months. Fusion occurred in more than 90% cases. There were no intra-operative complications (ie, vertebral artery injury, dural tears or screw loosening). Postoperatively and on follow-up, patients did not complain of radiculopathy, worsening of neurological deficit or persistent pain. Three cases had superficial infection postoperatively infection was controlled without any major consequence.

#### DISCUSSION

Most of the distractive flexion injuries of cervical spine were treated mainly with posterior stabilisation by lateral mass fixation. According to the literature, the lateral mass screw fixation in cervical spine injuries results in an inherently stable implant which provides immediate rigid fixation. Most common mechanism of injury is accidental fall from height as described by Hu *et al*<sup>8</sup>. In our study also more than 50% of the patients were due to fall from height.

Lateral mass technique is the safest & most effective method available today. For instance Wang *et al*. stated that the lateral mass screw technique was almost free of complications if executed properly<sup>9</sup>. Jeanneret *et al*. 10 also reported that this technique was far superior, more stable and resulted in fewer complications. Nazarian and Louis *et al*<sup>11</sup>. obtained rigid stabilization with excellent maintenance of alignment of cervical spine and fusion rates with lateral mass screw fixation technique. According to Paterder *et al* 12 - lateral mass screws for traumatic injuries

of the cervical spine had excellent maintenance of alignment & minimal complications. Our study was in agreement with the above authors 10-13 as we did not have any major intra- or postoperative complications in the present study. The major limitation of our study was the relatively small sample size of 21 patients. On close follow-up of patients there were no cases of loss of alignment (residual kyphosis) or persistent pain in our study.

#### CONCLUSION

Posterior lateral mass fixation using the modified Magerl's technique is a safe procedure for traumatic instability of the lower cervical spine in terms of patient tolerance, early mobilization and functional outcomes with a higher fusion rate and minimal preoperative or postoperative complications.

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