

Is fusion mandatory with spinal fixation of traumatic thoracolumbar burst fractures? A prospective comparative study.

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Summary

Burst fractures represent 10% to 20% of all spinal fractures and account for more than 50% of thoracolumbar fractures. They may result in significant disabilities especially in the more vulnerable young population.¹

All patients should have thorough neurological examination and proper investigations including plain x-rays, CT and MRI of the LSS. Plain x-rays are beneficial for a primary survey and for assessment of deformities (Cobb's angle). CT is mandatory to detect the type of the fracture and resulting deformities. MRI is sensitive in detection of the integrity of PLC, spinal cord injuries or CSF collections.^{57,58,64}

The goals of treatment for spinal injuries are the restoration of a normal pain-free status, and the dynamic and protective functions of the spine. The ideal treatment for a burst thoracolumbar fracture remains controversial and varies from conservative treatment to surgery via anterior, posterior or combined approaches.⁵⁰

Pedicle screw fixation has emerged as the treatment of choice for patients with a burst fracture as they can engage all the three columns of the spine and achieve appropriate reduction with a short segment construct. Pedicle screws have high pull-out strength and can withstand high stresses without failure. Despite these advantages, they are unable to prevent anterior collapse, especially in a highly comminuted fracture.⁴

Evidence of the need for spinal fusion remains inconclusive. Several studies recommend fusion, while others have claimed that it affords no benefit. The advantages of non-fusion were elimination of donor site complications, saving more motion segments, and reduction of blood loss and operative time at initial treatment.⁸

This study addressed the question of whether a simultaneous fusion is mandatory when treating a thoracolumbar burst fracture with posterior pedicle screw fixation. The study was conducted upon 40 patients with post-traumatic thoracolumbar burst fractures in the department of neurosurgery in Cairo university hospitals and Fayoum university hospitals to compare the radiological and functional outcomes of posterior pedicle screw fixation augmented by spinal fusion versus fixation without fusion. The radiological parameters; maintained correction of kyphosis and vertebral body height were measured preoperatively, on the 1st postoperative day and after 6 months of follow-up. The final functional outcome was represented as Visual Analogue Scale (VAS) score and was compared in the final follow-up visit. Intra-operative complications (e.g. pedicle fractures, unintended durotomy and injury to neural elements) and post-operative complications (e.g. CSF fistula, pseudomeningocele, wound infection, wound breakdown and implant failure) were documented and compared in both groups.

In conclusion, posterior fixation without fusion yielded satisfactory results similar to those of posterior fixation with fusion with no significant difference in complications and rate of implant failure. The advantages of non-fusion include avoiding bone harvest complications and related comorbidities, saving the high cost of synthetic bone substitutes, less operative time and less peri-operative blood loss. As the results were

comparable as far as 6 months of follow-up, we recommend posterior fixation without fusion for the treatment of thoracolumbar burst fractures in selected patients.