Comparative study between monosegmental and short segment posterior spinal fixation in treatment of thoracolumbar fractures

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

" وَقُل رَّبِّ زِدْنِي عِلْماً "

صدق الله العظيم

سورة طه .أية ١١٤

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INTRODUCTION

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The thoracic and lumbar areas are the most common sites of vertebral fractures, up to 90% of all spinal fractures occur in the thoracolumbar region.[1]The thoracolumbar junction is the most common injury site for thoracic and lumbar trauma. Most patients are young males involved in high-energy accidents. More than half of fractures occur between T11 and L1, and 30% occur between L2 and L5. More than 50% of injuries are sustained in motor vehicle accidents, and 25% are sustained in a fall from greater than 6 feet. Complete neurologic injuries occur in about 20% and incomplete neurologic injuries occur in about 15% of patients. More than 50% of patients have associated injuries including pelvic, calcaneal and long bone fractures, head trauma, pulmonary injuries, and intra-abdominal injuries occur. Distant spine injuries remote from the site of the primary injury occur in 5% of patients.[2,3]

Thoracic and lumbar spinal injury patterns can usually be explained by the application of one or two force vectors. These forces cause relatively consistent injury types that serve as the basis for the main classification schemes. The most common primary forces are axial compression, lateral compression,

flexion, extension, distraction, shear and rotation. The most common force combinations are flexion-rotation and flexion-distraction.

The decision to treat a fracture surgically with internal fixation with or without neural element decompression, or nonsurgically with a brace, depends on several factors. Indications for surgery are clear in some cases but controversial in others and include spinal mechanical instability, neurologic deficit, significant spinal deformity, and multiple injuries.(4)

The goals of surgery are to achieve and maintain sagittal and coronal balance, minimize construct length while providing sufficient stability to allow for early mobilization, achieve neural element decompression when indicated, avoid complications, and proceed within the most appropriate time frame.(4)

The surgical treatment of thoracolumbar spine fractures has undergone profound changes with emphasis on the preservation of intact segments (short arthrodesis) and on the decreased need for immobilization during the postoperative period.(5)

The bisegmental, two-level posterior approach (short segmental stabilization) is the “working horse” of the posterior techniques that allows a secure fixation of the pedicle screws in the intact vertebra one level above and below the fracture. With

this construct, a good reduction and stable fixation is reliably achieved.[6]

The improved rigidity and stiffness of pedicle screw-based posterior spinal fixation systems have made short-segment pedicle screw fixation more reliable.[7]

In certain types of fractures of the thoracolumbar spine, the application of biomechanical knowledge of the vertebral segment together with the use of pedicular implants has permitted the execution of monosegmental arthrodesis without the need for external immobilization during the postoperative period; a fact that represents maximum preservation of intact vertebral segments.[5]

To preserve more motion segments, some authors have advocated using monosegmental pedicle screw instrumentation to treat thoracolumbar fractures. Patients were instrumented with pedicle screws bilaterally into the fractured level and one adjacent level, either superior or inferior depending on which side the intact endplate is located, the screws were inserted into the fractured level using different trajectories depending on the locating side of the intact endplate.[7]

AIM OF WORK

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This prospective randomized clinical trial was conducted to compare monosegmental and short segment posterior spinal fixation in thoracolumbar fracture treatment as regards operative time, blood loss, length of operative wound and postoperative outcome.