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~~Mparative~~Comparative~~-~~ Study between Antrolateral and Posterior Approach in Dorsolumbar Fractures

~~Research protocol~~ Thesis

~~Submitted~~ for Partial Fulfillment of MD Degree in Neurosurgery

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بسم الله الرحمن الرحيم
وَقُـل رَّبِّ
زِدْنـي عِـلْـمـاً
سورة طه
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Dedication

To:

My parents

for their endless love, support,

and continuous care

My ~~Husband~~Wife

&

My Family

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INTRODUCTION

A spinal injury consider the most catastrophic event in a person's life. The thoracolumbar area (T11, 12, L1) is the most common site for spinal column fractures, whereas large range of motions are possible in the cervical and lumbar spine,[1] the thoracic spine is restricted by the thoraxic cage. Because the lower cervical spine and the thoracolumbar areas represents transitional zone between mobile and immobile segments, injuries are common in these areas. Although the thoracolumbar junction has a higher risk for fracture it has important anatomical characteristics that allow for a greater recovery from neurologic injury than more cephalade cord segment injuries.[2] Motor vehicle crashes and falling from height are by far the common causes for spinal column injuries. Men are more likely to sustain injury than women do.[3] Interest in the treatment of thoracolumbar spinal fractures have intensified within last 15 years. Dissatisfaction with the result of conservative management of fractures has led to the redefinition of it’s role and the increased utilization of surgical techniques. In the 1980s, a great understanding of the abnormal anatomy of the fracture area of a has been achieved by using of computed tomography. Detection of spinal injury and bone in the spinal canal has been enhanced by these techniques.[4]

Over the last few decads, great interest has been focused on fractures of the dorsal and lumbar spine, in particular

fractures caused by axial loading. Stable fracture is considered when there is minimal compression fractures with intact middle and posterior columns.

Both operative and non operative management have been recommended, but the superiority of any one method of mangment has not been established till last ten years where the surgical manover take the upper hand in treating unstable fractures, and in spite of that the ideal internal fixation devices is still unknown.[5] Much progress has been achieved in the surgical instrumentation. This was done at first by using Williams plates bolted to the spinous processes (1963), ***Harrington (1967)***, Dynamic spinal alloplasty ***(Weiss, 1975),*** Osteosynthesis with metal plates, Transpedicular screws ***(Roy-Camille et al., 1976)*** and anterior rods, plates stabilized lastly.

There are golden aims of surgery as: Decompression of the neural canal, realign the body disruption and fixation of the spinal fractures by instrumentation and fusion.[6]

The surgical approach is dictated by the site of primary pathology. Approaches to the thoracolumbar spine include posterior and anterolateral approaches. The ideal approach is that provides excellent decompression, excellent alignment and instrumentation with minimal complications and short hospital stay.[7]

AIM OF THE WORK

The aim of this work is comparison between two surgical approaches:

Transpedicular approach and thoracolumbar approach in management of dorsolumbar fracture causing anterior neural compression as in burst fracture and pathological fracture.

ANATOMY OF THE VERTEBRAL COLUMN

The spinal column consist of 33 vertebrae inter connect by fibro-cartilaginous discs, articular facet capsules, and by ligaments.

Normally, there are 7 cervical, 12 dorsal, 5 lumbar, 5 sacral, and 4 separate coccygeal bones. The normal adult vertebral column has four curvatures, the cervical and lumbar regions have a lordosis, and the thoracic and lumbosacral regions have a kyphosis. Variations of the vertebral body dimensions and in the intervertebral discs make and maintain these curvatures which are often changed by age, osteophyte development, trauma, congenital malformations, neurological diseases, and imbalances of the spinal& paraspinal muscles. The center of gravity of our body is located just anterior to the sacral promontory. The center of gravity of the spinal column passes from the dense of C2 through the vertebrae to the promontory of the sacrum. The vertebral column has different types of articulations: Cartilaginous joints between the vertebral bodies, and the apophyseal joints between the vertebral arches. [8]

Vertebra:

The vertebra consists of a cylindrically shaped vertebral body ventrally, and vertebral arches dorsally all encases spinal cord and nerve roots. The outer shell of the vertebral body

formed of a thin layer of relatively compact cortical bones. The rostral and caudal surfaces of the vertebral body are generally concave separated and bounded together by the fibro-cartilaginous inter-vertebral disc. The dorsal arch is composed of the laminae, the pedicles, the spinous processes and the facet joint. The thoracic and lumbar transverse processes arise from the junction of the pars inter-articularis, the pedicle, and vertebral body. The transverse and the spinous processes serve as an attachment for muscles and ligaments. The articular processes arise from pars inter-articularis, interposed between the pedicles, the lamina, and the facet joints. Generally the superior articular processes project cranially, with the articulating surface of the facet on the dorsal surface. Typically the inferior articular process project caudally, with the articular surface facing ventrally. A thin layer of hyaline lines the surface of each facet, which is a synovial joint.[9]

Anatomy of the thoracic and lumbar vertebrae

Thoracic vertebrae (Figure 1):

Thoracic vertebrae are somewhat heart shaped and are intermediate in size between the lumbar and cervical vertebrae. They exhibit costal facets on both side at the junction of the vertebral body and the pedicle, and on the transverse processes. These facets are unique to the thoracic vertebrae. These costal facets are also observed on the thoracic transverse process except for the T10-12. T9-12 vertebrae have some lumbar feature. The surface area gradually increases from T1-12. The