Anterior Approach for Surgical Management of Dorsolumbar Fractures

An essay

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بسم الله الرحمن الرحيم

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

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Ibrahim Mahmoud Hegazy

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List of Abbreviations

ABC	:	Airway, Breathing, Circulation
ALL	:	Anterior longitudinal ligament
ALPS	:	Anterior locking plate system
ARM	:	Anterior radicularis magna artery
ASIA	:	American Spinal Injury Association
CSF	:	Cerebrospinal Fluid
DLCO	:	Diffusing Capacity Of The Lung For Carbon Monoxide
GIT	:	Gastrointestinal tract
IAR	:	Instantaneous axis of rotation
LMWH	:	Low molecular weight heparin
MEP	:	Motor evoked potentials
MRI	:	Magnetic resonance imaging
NSAIDs	:	Non steroidal anti inflammatory drugs
PDS	:	Polydioxanone
PFT	:	Pulmonary function test
PLL	:	Posterior longitudinal ligament
SCI	:	Spinal cord injury
SSEP	:	Somatosensory evoked potentials
V/Q scan	:	Ventilation/perfusion lung scan
VTE	:	Venous thromboembolism
WHO	:	World Health Organization

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Introduction

Each vertebral region has unique anatomical and functional features that result in specific injuries. The most common fractures of the spine occur in the thoracic (midback) and lumbar spine (lower back) or at the connection of the two (thoracolumbar junction). These fractures are typically caused by high-velocity accidents, such as a car crash or fall from height, Sports accident, Violent act, such as a gunshot wound, and pathological fractures***(Smith JA et al.,2005).***

Road traffic injuries (RTIs) are a major cause of global mortality and morbidity, killing approximately 1.3 million people and injuring 20 to 50 million each year. Current estimates for Egypt show a road traffic fatality rate of 42 deaths per 100,000 population-one of the highest in the Eastern Mediterranean Region. Of these deaths, approximately 3% are the direct result of spinal fractures with spinal cord injury from trauma.

The basic types of spinal fractures include: 1) vertebral compression fractures, 2) vertebral burst fractures, and 3) fracture-dislocations, which involve significant damage to the facet joints. and acute fracture of the pars interarticularis from hyperextension. Other minor fractures consist of laminar, transverse process, or spinous process fractures. The forces responsible for spinal fractures are compression, flexion, extension, rotation, shear, or distraction forces or a combination of these mechanisms ***(Patten RM et al.,2000).***

In 1983, Denis proposed the 3-column model of the spine, which described both the functional units that contribute to the stability of the spine and the destabilizing effect of injuries to the various columns. Disruption of 2 or more columns results in an unstable configuration.

Routine X-rays (anteroposterior and lateral views), CT and MRI are the usual methods used to diagnose spinal fractures, supplemented at times by bone scanning. MRI permits visualization of the soft tissue. Bone scans are often ordered to determine if the bone infection or bone tumor is present in other bones. Measuring bone density by DEXA scan, dual photon absorptiometry or quantitative computed tomography may be done as part of testing for osteoporosis. Various additional tests including comprehensive diagnostic laboratory testing, may be performed to identify or confirm the underlying disease process ***(Carragee, 1997)***.

Treatment includes nonoperative care and operative intervention indicated for patients with unstable fractures or those with neurologic deficits related to compression of the neural structures by bony elements or hematomas, partial cord injuries, or cauda equina injuries. In patients with fractures and associated spinal cord injury, the efficacy of decompressive surgery varies depending on the level and degree of injury ***(Woolard A et al.,2005).***

Surgical management of thoracolumbar fracture has three objectives: to reduce the traumatic spine deformity, to restore spinal canal anatomy in case of medullary decompression, and to achieve consolidation by stabilizing the spine by osteosynthesis, sometimes associated to bone graft. To these ends, the approach may be posterior, anterior or combined, in whichever order.

The anterior approach was first popularized by Hodgson et al in the treatment of tuberculous spondlitis in 1959 ***(Richardson WJ et al.,1999).***

Anterior approach is to be recommended on mechanical grounds, to repair anterior bone loss, and neurologically, to release medullary compression by removing intracanal bone fragments. It provides a one-shot solution: decompression by corporectomy, reduction by anterior spinal reopening, inter- or intrabody bone graft and, finally, plate osteosynthesis. Neurologic recovery rates are better than in posterior surgery, with better spinal profile correction ***(Guigui P et al.,1998).***

The prime drawback of the anterior approach lies in its technical difficulty. Certain contra-indications, however, are to be borne in mind: morbid obesity, certain chest pathologies inducing respiratory insufficiency (thoracic involvement with pulmonary contusion in multiple trauma), pleural synechia (purulent pleurisy) or coagulation disorder ***(Schultheiss M et al.,2003).***

Indications for treatment depend on the patient’s neurological status, the acceptability or otherwise of the initial deformity and the degree of medullary canal stenosis, but also on the morphological and neurological evolutionary potential of the spinal lesion. The prime indication for an anterior approach in spinal traumatology is incomplete neurologic deficit related to medullary compression induced by canal stenosis which cannot be managed using any other approach ***(Haas N et al.,1991).***

Aim of the Work

To review the anterior approach in the managemant of dorsolumbar fractures its indications, contraindications and advantages as a one shot solution for canal decompression , reduction and stabilization.