Systematic Review on Surgical Treatment of Dorsal Disc Prolapse

A Meta-Analysis

Submitted For Partial Fulfillment of Master Degree In Orthopedic Surgery

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List of Contents

Title	Page No.
List of Tables	**Error! Bookmark not defined.**
List of Figures	**Error! Bookmark not defined.**
List of Abbreviations	**Error! Bookmark not defined.**
Introduction	1
Aim of the Work	4
Review of Literature	
▪ Applied Anatomy	5
▪ Pathogenesis & Clinical Presentation	10
▪ Radiology	16
▪ Treatment	21
Methodology	48
Results of Meta-Analysis	59
Discussion	86
Summary	90
References	91
Arabic Summary	—

List of Tables

Table No.	Title	Page No.
Table (1):	Stages of Disc Herniation.	12
Table (2):	Showing studies included in our meta-analysis:	53
Table (3):	Meta-analysis for the rate of ASIA Score E after surgery utilizing the anterior approaches.	59
Table (4):	Meta-analysis for the rate of improvement by ASIA Score after surgery utilizing the anterior approaches.	60
Table (5):	Meta-analysis for operative blood loss associated with surgery utilizing the anterior approaches.	62
Table (6):	Meta-analysis for the rate of complications associated with surgery utilizing the anterior approaches.	63
Table (7):	Complications of pts underwent different anterior approaches.	64
Table (8):	Meta-analysis for the rate of improvement by Frankle Score after surgery utilizing the anterior approaches.	66
Table (9):	Changes occurred in pts on Frankle score postoperative in different studies using anterior approaches.	67
Table (10):	Meta-analysis for JOA Score after surgery utilizing the anterior approaches.	68
Table (11):	Meta-analysis for the length of hospital stay after surgery utilizing the anterior approaches.	69
Table (12):	Meta-analysis for the operative time associated with surgery utilizing the anterior approaches.	70

List of Tables Cont...

Table No.	Title	Page No.
Table (13):	Meta-analysis for the duration of chest tube insertion associated with the anterior approaches.	71
Table (14):	Meta-analysis for the length of ICU stay associated with the anterior approaches.	72
Table (15):	Meta-analysis for the rate of ASIA Score E after surgery utilizing the posterior approaches.	73
Table (16):	Meta-analysis for the rate of improvement by ASIA Score after surgery utilizing the posterior approaches.	74
Table (17):	Postoperative changes on ASIA score:	75
Table (18):	Meta-analysis for operative blood loss associated with surgery utilizing the posterior approaches.	76
Table (19):	Meta-analysis for the rate of complications associated with surgery utilizing the posterior approaches.	77
Table (20):	Complications of pts underwent different posterior approaches	78
Table (21):	Meta-analysis for the rate of improvement by Frankle Score after surgery utilizing the posterior approaches.	79
Table (22):	Changes occurred in pts on Frankle score postoperative in different studies using posterior approaches.	80
Table (23):	Meta-analysis for the recovery rate by JOA Score after surgery utilizing the posterior approaches.	81
Table (24):	Meta-analysis for JOA Score after surgery utilizing the posterior approaches.	82

List of Tables Cont...

Table No.	Title	Page No.
Table (25):	Meta-analysis for the length of hospital stay after surgery utilizing the posterior approaches.	83
Table (26):	Meta-analysis for operative time associated with surgery utilizing the posterior approaches.	84
Table (27):	Summary of results	85

List of Figures

Fig. No.	Title	Page No.
Figure (1):	Ligaments attached to thoracic vertebrae.	6
Figure (2):	Thoracic vertebra.	6
Figure (3):	Schematic representation of the main structural features of an intervertebral disc	7
Figure (4):	Herniated disc.	11
Figure (5):	Stages of disc herniation [18].	12
Figure (6):	Sensory dermatomes of trunk region	15
Figure (7):	Discography	17
Figure (8):	T1 (A) and T2-weighted fast spin-echo (B) sagittal images through the thoracic cord (straight arrow) and conusmedullaris (curved arrow)	19
Figure (9):	Exposure of thoracic disc provided by standard laminectomy	26
Figure (10):	Incision of transthoracic approach.	28
Figure (11):	Transthoracic discectomy and lateral thoracic plate fixation [31].	29
Figure (12):	The introduction of the MaXcess retractor into the thoracic cavity [32].	30
Figure (13):	Thoracoscope [28].	31
Figure (14):	Thoracoscopic excision of thoracic disc [28]	32
Figure (15):	Anatomical landmark for pedicle *(circle)* and laminar bone cuts *(dotted line)*	35
Figure (16):	Intraoperative view	36
Figure (17):	Preoperative sagittal	36
Figure (18):	Lateral extracavitery approach	41

List of Abbreviations

Abb.	Full term
AP	Antero-posterior
CSF	Cerebrospinal fluid
CT	Computed tomography
gTDH	Giant thoracic disc herniation
LECA	Lateral extracavitary approach
Mini-TTA	Mini transthoracic approach
MITTD	Minimally invasive transforaminal, thoracic microscopic discectomy
MRI	Magnetic resonance imaging
PEEP	Positive endexpiratory pressure
PLL	Posterior longitudinal ligament
SSEP	Somatosensory evoked potentials
TDH	Thoracic disc herniation
TF	Transfacet pedicle-sparing
TMED	Thoracic microendoscopic approach
TP	Transpedicular
VATS	Video assisted thoracoscopic surgery

INTRODUCTION

The thoracic spine is the second segment of the vertebral column, located between the cervical and lumbar vertebral segments. It consists of twelve vertebrae, which are separated by intervertebral discs. Along with the sternum and ribs, the thoracic spine forms part of the thoracic cage. This bony structure helps protect the internal viscera – such as the heart, lungs and oesophagus [(1)].

Thoracic disc herniation has long been a difficult clinical entity to diagnose and, most certainly, to treat. Since Middletone and Teacher described central thoracic disc herniation secondary to trauma in 1911 [(1)].

Numerous authors have described the entity as well as its diagnosis and treatment [(2)].

Clinical presentation is highly variable and is dependent on multiple factors. These include the location of the TDH (e.g., central, centrolateral, lateral), the size of the herniation, the duration of compression, the degree of vascular compromise, the size of the bony spinal canal, and overall health of the spinal cord and patient. Patients that have become symptomatic from their TDH usually present with one of three complaints: axial back pain, radicular pain, or myelopathy. Pain is the most common presenting symptom in up to 76 % of patients and may be localized to the middle or lower thoracic

spine and can radiate to the lower lumbar spine. Radicular pain, when present, may involve the anterior chest wall in a band-like dermatomal distribution or may radiate to the groin, abdomen, or lower limb. Paresthesias or dysesthesias may accompany the pain, in up to 61 % of patients. Myelopathy, the most severe of the three presentations, can include muscle weakness and paraparesis than can progress to a severe state of complete paraplegia [3].

Thoracic disease imaging examination begins with AP and lateral x-rays. These films provide insight into the overall alignment of the thoracic spine and may display any obvious fractures or neoplastic processes. Degenerative changes are identifiable as well, including disc space narrowing, osteophytes, and facet arthrosis. Calcification of the disc is visible in approximately 45–71 % of symptomatic discs versus only 4–6 % of the time in asymptomatic discs on plain radiographs. The imaging modality of choice, however, in those patients that thoracic disc disease and/or herniation is suspected is an MRI. This study is noninvasive, does not expose patients to ionizing radiation, and highlights degenerative disc changes, herniations, and neural element compression with significant detail in both the sagittal and axial planes. Location of the herniation within the canal is easily determined. As mentioned previously, MRI is very sensitive and not necessarily specific in detecting TDHs [3].

Patients who are not experiencing significant neurologic dysfunction secondary to thoracic disc herniation may be managed non-operatively. Initial treatment for those with axial back pain may include a brief period of bed rest, activity modification, and the use of over-the-counter or prescription non-steroidal anti-inflammatory medication [4].

Candidates for surgery include those patients with myelopathy on presentation; progressive neurologic deterioration; severe, intractable radicular pain; and radicular pain that has not improved after a comprehensive course of conservative treatment [3].

In early cases, a number of authors have discussed the treatment of thoracic discs via posterior surgical approach [5].

In 1958 Crafoored et al were the first to describe an anterior thoracic approach to try to decrease complications attributed to posterior approach [6].

In 1960, Hulme confirmed their findings by further describing the transthoracic anterior approach [7].

AIM OF THE WORK

This study aims to review the currently available data published for surgical management of dorsal disc prolapse.

Chapter 1

APPLIED ANATOMY

The Thoracic Intervertebral Disc:

Unlike the wedge-shape discs of the cervical and lumbar spines, thoracic discs are nearly uniform in shape. Thus, the form of the vertebral bodies—and not the intervertebral discs—determines the kyphosis of the thoracic spine. The height of the intervertebral disc is the narrowest in the thoracic spine, with a disc to vertebral body height ratio of 1:5, compared to a 1:3 ratio observed in the lumbar spine. In general, discs are thinner in the upper thoracic region, and the thicker in the lower thoracic region. This may explain the greater incidence of disc lesions in the lower thoracic region, in concert with decreased support from ribs not having direct attachment to the sternum and increased load of the body weight [(8)].

The intra-articular ligaments divide the costovertebral joints into separate synovial cavities. Direct contact of the ribs to the disc limits protrusion of disc material in a posterolateral direction. Of clinical significance is the instance of disc narrowing; as the disc narrows, pressure on the head of the rib increases, leading to costovertebral arthrosis (Fig 1) [(9)].

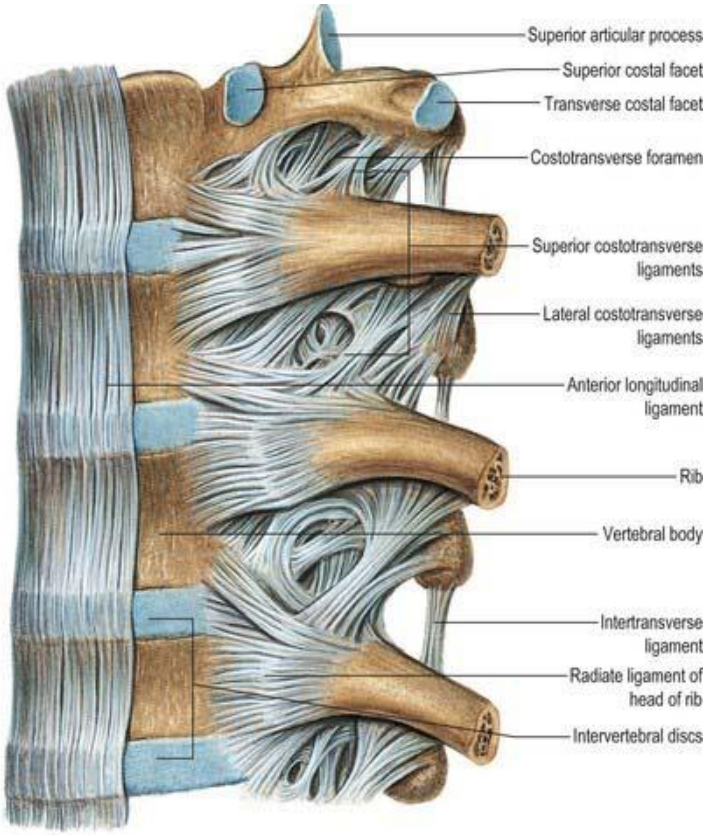

Figure (1): Ligaments attached to thoracic vertebrae [(9)].

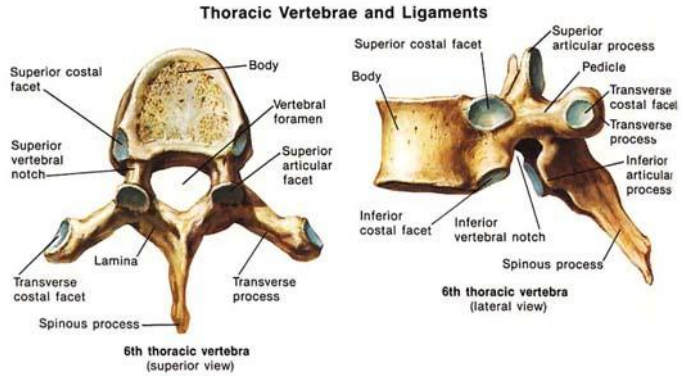

Figure (2): Thoracic vertebra [(9)].