2016

Microscopic Lumbar Discectomy. A Comparative Study of One Year Follow Up Results to Standard Open Discectomy

Thesis

Submitted for the partial fulfillment of the MD degree in Orthopaedics

By

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2016

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List of Abbreviation

Abb.	Full term
AF	Annulus fibrosus
ALL	Anterior longitudinal ligament
APLD	Automated percutaneous lumbar discectomy
CL	Capsular ligament
CSF	Cerepro spinal fluid
DRG	Dorsal root ganglion
EHL	Extensor hallucis longus
EMG	Electromyography
ENG	conventional neurography
FHL	flexor hallucis longus
FNST	*Femoral nerve stretch tests*
GAG	Glycosaminoglycan
HNP	Herniated Nucleus Pulposus
IAR	Instantaneous axis of rotation
IDP	Intradiscal Pressure
ISL	Interspinous ligament
LF	Ligamentum flavum
MAL	Mamillo-accessory ligament
MEPs	motor-evoked potentials
MPLD	Manual percutaneous lumbar discectomy
NP	Nucleus pulposus
ODI	Oswestry disability index

List of Abbreviation

Abb.	Full term
PLL	Posterior longitudinal ligament
SEPs	Somatosensory-evoked potentials
SLRT	Straight Leg Raising Test
SSL	Supraspinous ligament
STIR	short-time-inversion-recovery
TNF	Tumor necrosis factor
VAS	Visual analogue scale

Acknowledgemen

First of all, my deep thanks are to ALLAH, The Great, for everything, and for giving me health and strength to finish this work.

I am greatly honored to express my deepest gratitude and respect to Prof. Youssry Elhawary, Professor of Orthopaedics, Cairo University who is my great mentor. No words can describe his stimulating supervision, continuous advice and encouragement.

I am deeply thankful to Prof. Dr. Yasser El-Miligui, Professor of Orthopaedics, Cairo University, for his everlasting support and encouragement.I am really appreciating his help throughout this work.

My deep gratitude goes to Prof. Dr. Ihab Emran, Professor of Orthopaedics, Cairo University he was the one who put the idea and plan of this work. He supervised closely its progress with great interest. Without his continuous guidance and unlimited help, this work would have never come to light.

Hazem Farid

سورة البقرة الآية: ٣٢

Abstract

The intervertebral disc acts as an articulation between the lumbar vertebrae as a shock absorber. The disc is composed of three parts; the cartilaginous plate, annulus fibrosus and nucleus pulposus.

Herniation of nucleus pulposus occurs between the radial fissures in the annulus. This is predisposed to by certain occupations that require heavy weight lifting, smoking, pregnancy, and prolonged driving of motor vechiles.

Radiculopathy caused by the herniated nucleus pulposus may be produced by a combination of inflammatory, mechanical and biochemical changes brought about by enzymes as phospholipase A2.

Back pain is often the earliest symptom of lumbar disc disease and usually followed by sciatica. In addition patients may complain of sensory disturbances like tingling, numbness and parasthesias.

In a rare cases motor weakness and bladder disturbances may complicate lumbar disc herniations which require urgent discectomy and decompressions.

Key words:

Microscopic Lumbar Discectomy. A Comparative Study of One Year Follow Up Results to Standard Open Discectomy

INTRODUCTION

Lumbar disc represents a common medical problem with numerous procedures being carried out in patients with intractable pain or severe neurological symptoms related to nerve root compression.It constitutes 5% of low back pain and the most common cause of nerve root pain (sciatica). The incidence of lumbar disc herniation peaks in patients between 24 and 45 years of age. The natural history of lumbar disc herniation indicates that they may decrease in size or even disappear within a few weeks or months of onset.In migrated or extruded herniations, phagocytosis of the herniated disc by the macrophages occurs while in contained herniations, dehydration of the herniated nucleus pulposus plays a major role in the reduction of the herniated disc size.[1]

Eighty to ninety percent of acute attacks of sciatica settle with conservative management. The emergent indications for surgery include altered bladder function and progressive muscle weakness, but these are rare. The usual indication for surgery is to provide more rapid relief of pain and disability in the minority of patients whose recovery is unacceptably slow.[1]

Lumbar discectomy is the most common operation performed in the United States for lumbar-related symptoms.Mixter and Barr described the first surgical procedure to remove the herniated lumbar disc in 1934 through a laminectomy and durotomy, with later enhancement by Semmes, who described approaching the herniated disc through hemilaminectomy and retraction of the dural sac. This became popularized as the classical discectomy technique[2].

During the latter half of the 19th century, more techniques were developed to remove the herniated disc with minimal invasiveness.The first herniated disc excision using a microscope (microdiscectomy) was performed by Yasargil in 1977, which was the standard surgical procedure at the time. In 1993, Mayer and Brock and then in 1997, Smith and Foley described endoscopic discectomy techniques.With these minimally invasive techniques, authors demonstrated decreased soft tissue manipulation, operative time, blood loss, and hospital stay, allowing early recovery.(3&4)

The literature suggests that lumbar discectomy provides effective clinical benefit in carefully selected patients with sciatica. There is strong evidence in favor of microdiscectomy surgery over conservative treatment at short-term follow-up, but, at long-term follow-up, there is no significant difference among patients with subacute lumbar disc herniation with associated radiculopathy (LDHR) between the two groups.Overall, the long-term benefits of surgery versus nonoperative treatment are still unclear.[5]

AIM OF THE WORK

The aim of this work is to compare the clinical and functional term outcome of standard open and microscopic discectomy for herniated lumbar disc.

ANATOMY OF LUMBER SPINE

Lumbar vertebrae (Fig.1&2):

Lumbar spine consists of five lumbar vertebrae and the sacrum.Each vertebra have three functional components: the vertebral bodies, designed to bear weight; the neural arches, designed to protect the neural elements; and the bony processes (spinous and transverse), designed as outriggers to increase the efficiency of muscle action.[6]

The vertebral bodies are connected together by the intervertebral discs, and the neural arches are joined by the facet (zygapophyseal) joints. The discal surface of an adult vertebral body demonstrates on its periphery a ring of cortical bone, the epiphysial ring, acts as a growth zone in the young and in the adult as an anchoring ring for the attachment of the fibers of the annulus. The hyaline cartilage plate lies within the confines of this ring. [7]

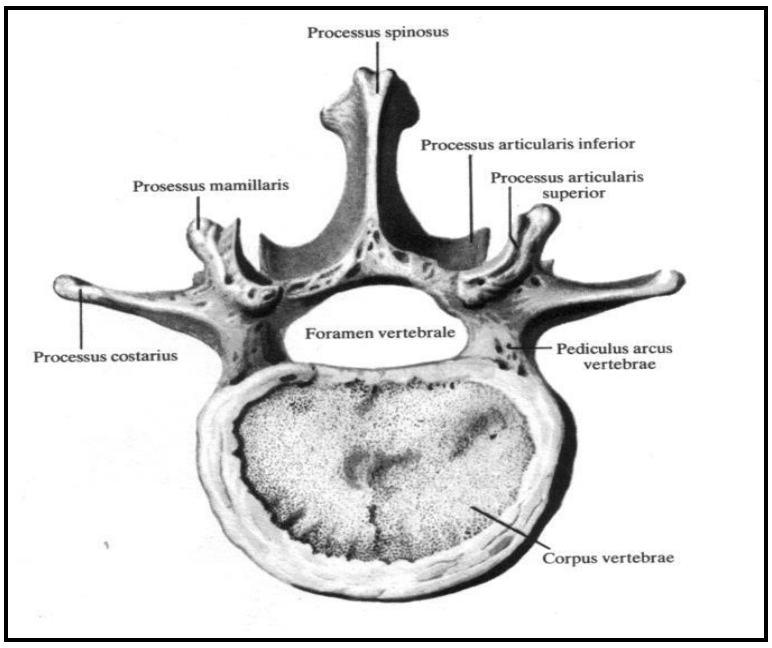

Figure (1): Top view of the lumbar vertebrae. [8]