Postlaminectomy Segmental Instability of the Lumbar Spine

Thesis

Submitted for Partial Fulfillment
of Medical Degree in Neurosurgery

By

Waleed Mohamed Gamal Alshahawi

Supervisors

Prof. Dr.MOSTAFA MOHAMED KOTB
Professor Of Neurosurgery
Cairo University, Neurosurgery Department

Prof. Dr. HAZEM ABD-ELSATTAR ABO ELNASR
Professor Of Neurosurgery
Cairo University, Neurosurgery Department

Prof. Dr. ALAA ABDEL-FATTAH ABD EL-AZEEZ
Professor Of Neurosurgery
Cairo University, Neurosurgery Department

Ass. Prof. Dr. AHMED MOSTAFA KERSH
Associate Professor Of Neurosurgery
Cairo University, Neurosurgery Department

2016

بسم الله الرحمن الرحيم

"قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم"

صدق الله العظيم

سورة البقرة:الآية32

Acknowledgment

I am most thankful to **GOD** for all his kindness and grace, for having granted me the patience to accomplish this work.

I would like to express my sincere gratitude to **Prof. Dr: Mostafa Mohamed Kotb** Professor of Neurosurgery, Faculty of Medicine, Cairo University, President of Egyptian Society of Neurological Surgeons (ESNS), for his guidance, support, directions and continuous encouragement. It has been my privilege and utmost pleasure to conduct this work under his supervision.

I would like to express my appreciation to **Prof. Dr: Hazem Abd-Elsattar Abo-Elnasr** Professor of Neurosurgery, Faculty of Medicine, Cairo University, for his supervision, kind help, support, and unique cooperation.

I would like to express my deepest appreciation to **Prof. Dr: Alaa Abd-Elfattah Abd-Elazeez** Professor of Neurosurgery, Faculty of Medicine, Cairo University, for his kind supervision and guidance, brilliant ideas, unique cooperation and encouragement which were of inestimable value.

I am greatly indebted to **Ass. Prof. Dr: Ahmed Mostafa Kersh** Assistant Professor of Neurosurgery, Faculty of Medicine, Cairo University, for his kind supervision, valuable advice and meticulous revision of work.

My thanks are extended to **the staff members of Neurosurgery Department**, Faculty of Medicine, Cairo University, for their kindness.

Last but not least, I would like to thank **All Patients** who participated in this study, without their kind help, this study could not be performed.

Dedication

To my Parents for their endless love and support,

To my wife for her patience and support,

To my lovely daughters ***Aya & Arwa.***

.

Abstract

The segmental instability of the lumbar spine has been defined as an abnormal movement in segment as a response to applied load. The aim of the study is to detect the cause of chronic low back pain following the lumbar laminectomy, how to diagnose the instability pain and the outcome after surgical fusions of **50** cases. All patients including males and females with all ages complaining of intractable chronic low back pain. The surgical intervention was in the form of lumbar transpedicular fixation in all cases, and then all cases will be followed up clinically up to 18 months according to pain improvement. Pain was evaluated in the last follow up by Ricciardi JE grade and low back pain measured by Oswestry disability index (ODI). The study shows that 20 patients graded as excellent while 30 patients have back pain, 18 patients graded as good while 12 patients graded as fair. The posterolateral fusion to be an effective treatment for management of cases with post laminectomy lumbar instability.

Keywords: laminectomy, segmental instability, fusion, pain

Content

List of Tables

List of Figures

Introduction

and

Aim of Work

Introduction

The lumbar vertebrae are the lowest five vertebrae of the presacral column. They are easily distinguished from other regional elements by their lack of a transverse foramen or costal articular facets. The body is large, having a width greater than its anteroposterior diameter, and is slightly thicker anteriorly than posteriorly ***(Christopher et al., 2011).*** The bony spinal canal is made up of three parts: the vertebral body anteriorly, the pedicles laterally, and finally the posterior bony elements. The posterior longitudinal ligament attaches to the disk space posteriorly and to the margins of the vertebral bodies above and below the disk space. The posterior elements of the lumbar vertebral unit consist of the pedicles, transverse and spinous processes, facet surfaces, lamina, and the pars interarticularis ***(Arthur et al., 2006).***

The motion segment is the smallest functional spinal unit (FSU) that exhibits the generic characteristics of the spine. It consists of two adjacent vertebrae with bony processes, an intervertebral disc, ligaments and the apophyseal joints. Load transmission from superior and inferior vertebrae occurs primarily through the soft intervertebral disc, the ligaments and the apophyseal joints ***(Langrana et al., 1996).***

The motion Instability of the spine has been defined as an abnormal movement in segment as a response to applied loads. The abnormal motion occurs due to damage to the motion restraining structures, passive or active

such as ligaments, joint capsules, discs and muscles that will alter their ability to withstand otherwise normal loadings ***(Tommy Hansson, 2010).***

Laminectomy is the removal of the lamina of the vertebra for purposes of decompression of the spinal canal. It is combined with variable amounts of bone removal from the posterior elements such as the facet joints to adequately decompress the thecal sac and the nerve roots. The ligamentum flavum which runs from the anterior aspect of the cephalad lamina to the superior aspect of the caudal lamina is also usually resected ***(Robert and Antony, 2009).***

Because of its simplicity, low expense, and wide availability radiography and particularly, functional flexion-extension radiography is the most thoroughly studied and the most widely used method in the imaging diagnosis of lumbar intervertebral instability ***(Leone et al., 2007).***

Each form of spinal operation has the potential to alter the distribution of weight among the structures of the spine. The facet joints may become incompetent following laminectomy resulting in axial pain. Spinal decompression invariably involves resection of the medial portion of the facet joint to relieve pressure on the nerve root. This resection may destabilize the joint, resulting in instability and pain . Pain may also be a consequence after discectomy operations. Removal of herniated disc may result in partial collapse and reduction in the height of the interspace. Discectomy may also create changes in the biomechanics of the spine,

resulting in increased load distribution on adjacent segments accelerating preexisting disc degeneration ***(Chin and Philip, 2011).***

Chronic low back pain is usually defined as that lasting 3 months or longer**.** Only patients who have pain at least this long should be considered for surgical reevaluation. It is important to take a careful history of the duration, location, and quality of the pain to differentiate segmental instability pain from radicular pain, spinal stenosis pain, sacroiliac pain, or degenerative disease of the hip ***(Bigos 1993)*.**

Severe spinal stenosis or ruptured/herniated discs are often treated by lumbar decompression. Although non-operative treatment and minimal invasive approach are often regarded as the gold standard of treatment ***(Atlas et al., 2000).***

Disc prosthesis could offer relief from degenerative spine pain related to micro-instability in the disc space ***(Michael et al., 2006).***

Aim of the Work

The aim of the work is to detect the cause of chronic low back pain following the lumbar partial or complete laminectomy, how to diagnose the instability pain either clinically and/or radiologically and the outcome after surgical fusions of **50** cases.