RADIOLOGY OF PROLAPSED DISC

THESIS

Submitted for Partial Fulfilment of

Master Degree in

Radiodiagnosis

By

Hany Hamed Mohamed El-Beltagy

(M.B.; B.Ch.)

SUPERVISED BY

Prof. Dr. Mohamed Samy El-Biblawy

Prof. and Head of Department of Radiodiagnosis

Faculty of Medicine, Ain Shams University

Dr. Ahmed Abd El-Tawab Mohamed

Lecturer of Radiodiagnosis

Faculty of Medicine, Ain Shams University

FACULTY OF MEDICINE

AIN SHAMS UNIVERSITY

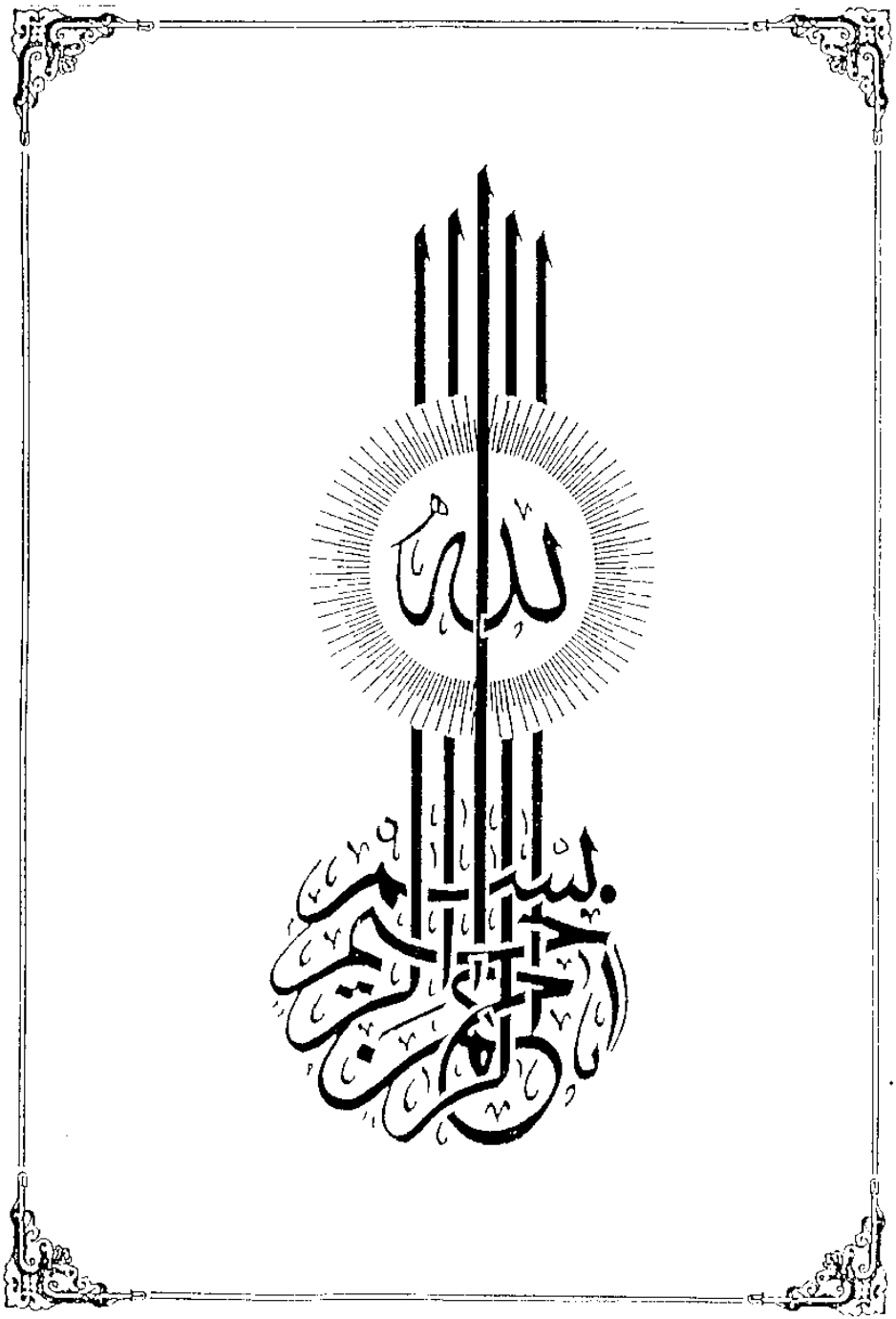
1986

TO WHOM I OWE MY SUCCESS

MY MOTHER

MY ELDEST BROTHER DR. MOHAMED

MY BROTHER & SISTERS



ACKNOWLEDGEMENT

I wish to express my sincere gratitude to Prof. Dr. ***Mohamed Samy El-Biblawy,*** *Prof. and Head of Department of Radiodiagnosis, Faculty of Medicine, Ain Shams University, for his kind supervision and valuable guidance. I deeply appreciate that he has facilitated the evolution of this work.*

I would like to thank Dr. ***Ahmed Abd El-Tawab Mohamed,*** *lecturer of Radiodiagnosis, Faculty of Medicine, Ain Shams University, for his friendly discussions and fruitful guidance throughout the whole work.*

My thanks are also extended to the staff members of Radiodiagnosis Department and to my colleagues for their encouragement and help.

CONTENTS

INTRODUCTION AND AIM OF WORK

INTRODUCTION AND AIM OF WORK

Prolapse of intervertebral discs is one of the most common clinical problem. They usually lead to variable neurological manifestations. So the diagnosis and accurate localization of the prolapsed disc is mandatory to pave the way for surgical management.

Disc prolapse can be diagnosed by different radiological modalities. Myelography and computed tomography of spine are the commonest. Recently magnetic resonance imaging shows considerable diagnostic potential and provides a new perspective.

Plain X-ray is still done at first as it may arouse the possibility of disc prolapse and to exclude other pathological lesions of spine.

The aim of our work is to show the criteria of disc prolapse by these different diagnostic modalities.

Applications and limitations of each modality are considered.

RADIOLOGICAL ANATOMY OF THE SPINE

RADIOLOGICAL ANATOMY OF THE SPINE

The normal adult vertebral column consists of seven cervical, twelve thoracic and five lumbar vertebrae, the sacrum derived from five fused segments and a small coccyx articulating with the sacrum, made up of four fused segments (Du Boulay, 1984).

Each vertebra consists of a body and a neural arch which encloses the vertebral foramen. The neural arch is subdivided into paired pedicles, laminae, transverse, superior and inferior processes and a single spinous process, (Du Boulay, 1984).

Each unfused vertebra, with the exception of the first cervical vertebra is separated from the adjacent vertebrae by an intervertebral disc. The vertebral bodies are united to the intervertebral disc peripherally by the annulus fibrosis and strong anterior and posterior longitudinal ligaments. Just as the size of the vertebral bodies progressively increases craniocaudally, so does

the height of the intervertebral disc spaces. The exception to this is the disc space between the fifth lumbar and the first sacral segment, the height of which varies with the segmental pattern at the lumbosacral junction. The intervertebral discs account for between one quarter and one fifth of the length of the spine, (Du Boulay, 1984).

The anterior longitudinal ligament which descends on the front of the vertebral bodies from the basi-occiput to the sacrum is attached firmly to the inter-vertebral discs and the margins of vertebrae. the post-erior longitudinal ligament running on the posterior aspect of the vertebral bodies is attached less firmly to the discs and adjacent margins of the vertebrae. The laminae of the neural arches are united by ligamenta flava. The transverse processes are interconnected by longitudinal ligaments as are the spinous processes, (Du Boulay, 1984).

In the erect posture the vertebral column has two primary and two secondary curves. The primary curves, which are developmentally determined, are the dorsal

convexity in the thoracic and sacral regions. The secondary curves, lordotic curves which develop in the cervical and lumbar regions are compensatory and to some extent influenced by posture, (Du Boulay, 1984).

In the adult spine, there are two major types of joints and a third ancillary system of joints:
Amphiarthrodial joint between vertebral bodies, the intermediate area being occupied by the intervertebral disc;
Two diarthrodial joints which are true synovial joints between the articular processes of adjoining vertebrae;
Diarthrodial joints in association with the costal facets of the thoracic spine; and
Synovial joints (diarthrosis) between the posterolateral margins of the lower five cervical bodies (joints of luschka).

The significance of disease in Luschka joints is based on the anatomic relationship of these joints to the neighbouring structures especially the mixed nerve roots, vessels, and ligaments, (Meschan, 1976).

Cervical Spine:

The cervical spine consists of seven cervical vertebrae. The upper two vertebrae which have a special function to fulfil, are unique, (Du Boulay, 1984).

The atlas and axis differ with regard to development from the rest of the vertebrae in that the ossification centre for the body of atlas separates from the rest of the vertebra, and unites with the body of axis to form the odontoid process, (Meschan, 1976).

The first cervical vertebra (atlas), which has no body, consists of two large lateral masses which are united by anterior and posterior arches. On the upper surface of the lateral masses are the paired superior articular facets which articulate with the occipital condyles. The inferior articular facets articulate with the superior articular facets of axis. A shallow depression on the posterior surface of anterior arch in the midline articulate with the odontoid process of axis, forming the anterior atlanto-axial joint, (Du Boulay, 1984).

Fig. (1): Lateral projection of cervical spine.
1- body Ia-Odontoid process, 2- pedicle, 3- transverse process, 3a- anterior tubercle of transverse process, 3c-posterior tubercle of transverse process, 4- lateral articular mass, 4a- superior articular process, 4b- inferior articular process, 5- lamina, 6- spinous process, 6a- spinolaminar line, 7- anteroposterior diameter of spinal canal, 8- uncinte procless, 9- transverse foramen, 10- anterior arch of atlas, 11- intervertebral foramen, 12- intervertebral disc space.
(Quoted from Du Boulay, 1984).