CERVICAL PROLAPSED DISCS

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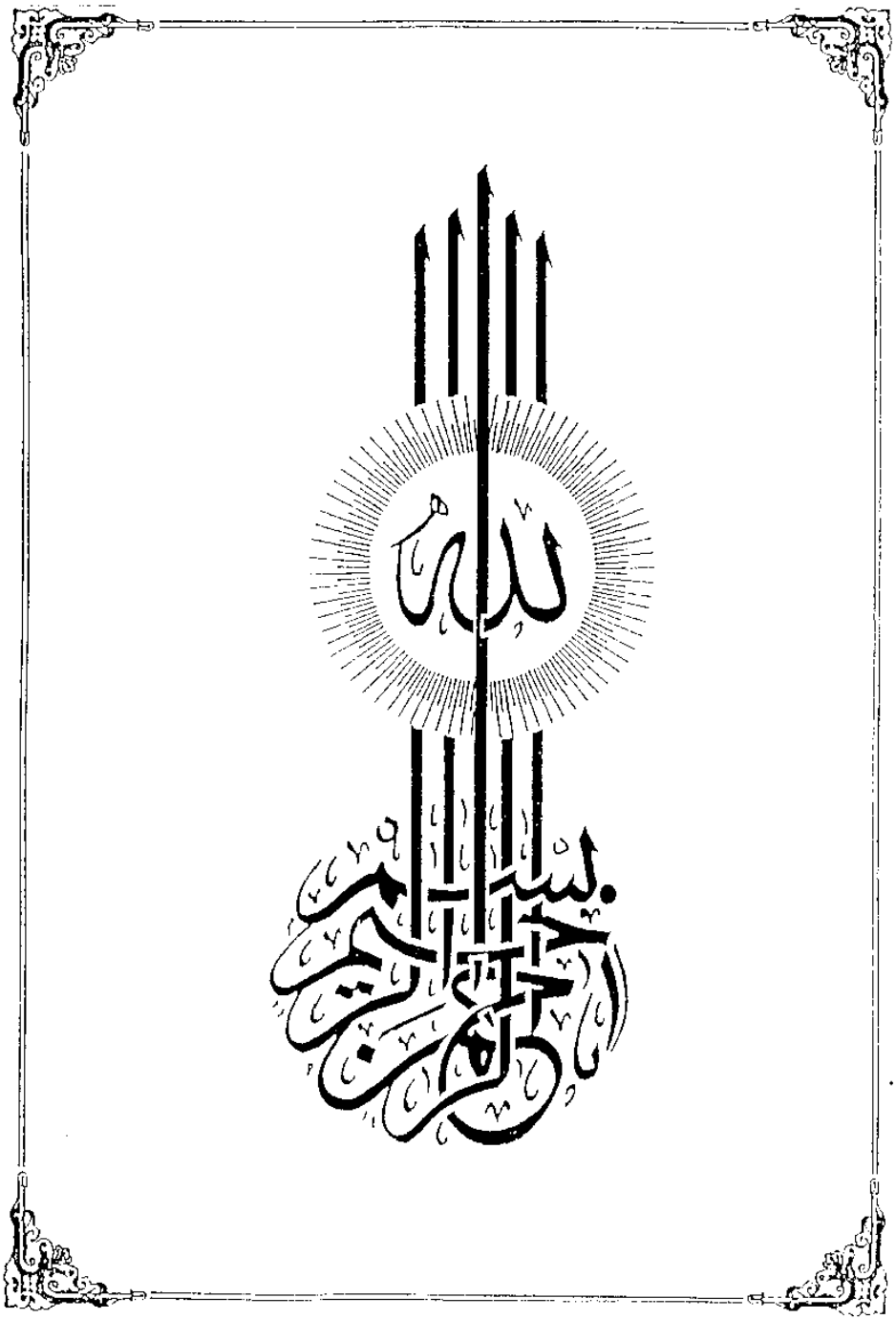

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I N T R O D U C T I O N

Pain in the neck and upper limbs is one of the commonest complaint of patients in middle and later life. It was found that cervical spondylosis, as a cause of this complaint, is present in high proportion of patients over the age of 50.

Cervical spondylosis, as agreed by most authors, is a degenérative disease and it affects the spinal cord and roots secondly . The possible relationship of spondylosis and spinal cord disease has been discussed since many years, but the exact mechanism of its production is not completely understood.

The aim of this work is to review the clinical and radiological appearances in those cases, and to discuss different surgical and non surgical techniques carried out in our neurosurgical unit and pointing out to their results.

CHAPTER I

REVIEW OF LITERATURE
EMBRYOLOGIC CONSIDERATION.
ANATOMY OF THE CERVICAL VERTEBRAE & CORD
Biomechanics of the spinal Column.

REVIEW OF LITERATURE

The first recorded description of the intervertebral disc was made by Vesalius in 1855. He described the difference between the annulus fibrosus and the nucleus pulposus.

Details of the embryologic and structural anatomy followed after 3 centuries.

Between 1855 and 1880 came a whole series of publications by Virchow, Von Luschka, Remark and Lowe.

Their contributions concerned the embryology and anatomy of the disc, the development of the spine and its components and the role of the foetal notochord in the formation of the intervertebral disc.

Elsberg in 1913 had called attention to the similarity between the so called chondroma and certain structure of the intact intervertebral disc.

Elliot in 1926 was the first to describe the connection between radicular symptoms and narrowing of the intervertebral foraminae in the cervical area.

Byron Stookey in 1927 described the subject of compression of the spinal cord by ventral extradural cervical chondromas. He misunderstood the precise pathologic nature of the lesion, but his description of the clinical finding is still the same till now.

Keyes and Compere published a literature in 1932 about the anatomy, embryology and pathologic details of the intervertebral disc.

This study was a confirmation and extension of the studies published by Schmoral in 1927 and 1928.

In 1934 Mixter and Bane put the last stone in understanding of this lesion.

In 1945 Semmes and Murphy published their classic observation upon lesions of the cervical intervertebral disc. It was their work which made clear the frequency of those lesions and which was described before as scalenus anterior syndrome.

The present state of our knowledge of the cervical disc has been reacted by adding many of the informations by other workers.

EMBRYOLOGIC CONSIDERATION

The vertebral column develops around the notochord. Alongside the notochord and the neural tube the mesoderm lies in three longitudinal strips. That nearest the midline is the paraxial mesoderm, it becomes segmented into masses of cells called mesodermal somites.

The somites produce :

1. Sclerotome medially surrounding the notochord and neural tube producing the vertebrae and dura mater.
2. The myotome produces the muscles of the body wall.

A series of cartilagenous rings appear in the mesodermal sheath, in each ring ossifies three centres to form the centrum and the two halves of the neural arch of a vertebra. Each ring is formed by fusion of adjacent halves of the original somite. Thus the vertebra lie in the intersegmental planes.

The notochord which remains unchanged as a solid cord of uniform size is progressively compressed into the regions of the dense intervertebral discs. The dense mesenchymal part of the annulus fibrosus becomes markedly reduced during condrification of the bodies and the outer most rim of the disc persists.

As chondrification proceeds (8th. week), the notochord cells are squeezed out from the vertebral bodies and displaced into the intervertebral discs.

During this period some mucoid degeneration and proliferation occur in the notochord cells which then forms the nucleous pulposus.

The annulus fibrosus is composed histologically of a mixture of fibrous cartilage and collagenous fibrous tissue.

The nucleous pulposus is composed of chondroid basophilic matrix traversed by collagenous fibriles sometimes containing Stellate cells or vesiculated ballon cells which are vestigeal notochord.

ANATOMY OF THE CERVICAL VERTEBRAE

From the third to the seventh the cervical vertebrae have the same general features.

The body is small and is broader from side to side. The pedicles project laterally as well as backward. The vertebral foramen is large in proportion to the size of the body and it is triangular in outline. The laminae are long and narrow and are thinner above than below. The spine is short and bifid.

The superior and inferior articular processes project laterally at the junction of the pedicles and laminae. The transverse process is pierced by the foramen transversorium.

A small synovial joint is present on each side between the bevelled lateral border and the projecting lip of the upper surface of the vertebra below .

The upper border of the laminae and the lower part of their anterior surfaces give attachment to the liga-

menta flava. The spines give attachment to the ligamentum nuchae and to a number of the deep muscles of the back of the neck.

The foramen transversorium transmits the vertebral artery and veins and a plexus of sympathetic nerve fibres.

The concavities above and below the pedicles are named the vertebral notches and these produce the intervertebral foramina when the vertebrae are articulated. They transmit the spinal nerves and vessels. The vertebral bodies are united by anterior and posterior longitudinal ligaments and by intervertebral discs.

The anterior longitudinal ligament is a strong band of fibres which extend along the anterior surfaces of the bodies of the vertebrae. It is thicker and narrower opposite the bodies of the vertebrae than opposite the intervertebral discs. It is fixed to the discs and to the margins of the vertebral bodies.

The posterior longitudinal ligament lies on the posterior surfaces of the bodies of the vertebrae within the vertebral canal. It is separated from the middle parts of the bodies by the emerging basi vertebral veins which drain into the anterior internal vertebral plexus.

The vascular supply of the disc :

The vascular supply of the intervertebral disc has clinical bearing to the explanation of changes which occur in this important structure.

Vessels appear parallel to the notochord. Others derived from the periosteum, penetrate into the cartilagenous plate and run in the direction of the nucleous pulposus, other vessels emerge from the vertebral bodies and penetrate directly into the cartilagenous plates.

Regression of the vascular supply to the disc begins shortly after birth and continues progressively so that at the age of 15 to 25 most of the vessels have practically disappeared.

The only source of nutrition to the disc is by diffusion process from the cancellous vertebral bodies.

At about the 6th. month the notochord cells begin to degenerate and clump together to form a mucoid core surrounded by fibrous tissue and hyaline cartilage cells.

The nucleous pulposus remains centrally situated in the cervical and thoracic regions while in the lumbar region it is somewhat posterior.

The fibrocartilagenous annulus fibrosus is heaviest anteriorly and laterally while its posterior aspect is relatively weaker.

After the 3rd. decade of life the nucleous pulposus gradually is replaced by fibrous tissue, loosing its gelatinous consistency.

The vascular supply of the vertebrae and cord :

The arterial supply to the cervical vertebrae and spinal cord and its coverings are derived from branches of the vertebral artery ascending cervical, deep cervical and occipital arteries.

Each spinal artery enters through its corresponding intervertebral foramen and divide into 3 branches supplying the vertebral arches, ligamentum flava, spinal nerve, cord and adjacent membranes and to the posterior aspect of the vertebral bodies.

The venous supply of those structures is not accompanied by arteries and is without valves. It is formed by large plexuses within and around the spinal column extending the entire length of the spine.

The intra spinal plexuses pass in the vertical direction as four large longitudinal veins two infront and two behind the spinal cord.

The anterior internal plexuses consist of large veins on the posterior surface of the vertebral bodies and intervertebral fibrocartilage on either side of the post erior longitudinal ligament.

The posterior internal plexuses are situated on either side of the midline in front of the vertebral arches and ligamentum flava. A series of venous chann-