THE VALUE OF ANTERIOR APPROACH IN THE MANAGEMENT OF CERVICAL DISC DISEASE.

THESIS
SUBMITTED FOR PARTIAL FULFILLEMENT OF
MD. IN NEUROSURGERY

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بسم الله الرحمن الرحيم

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ

خَلَقَ الْإِنسَانَ مِنْ عَلَقٍ

اقْرَأْ وَرَبُّكَ الْأَكْرَمُ الَّذِي عَلَّمَ بِالْقَلَمِ

عَلَّمَ الْإِنسَانَ مَا لَمْ يَعْلَمْ

العلق ١-٥

بسم الله الرحمن الرحيم

ACKNOLEDGEMENT

I would like to express my deepest thanks to *Prof. Dr. Sayed El-Gindy* Consultant of neurosurgery Maadi Armed Forces Hospital who honoured me with his generous supervision, valuable help and advise.

I am very much indebted to *Prof. Dr. Mamdouh Salama* head of Neurosurgery Departement, Faculty of Medicine, Ain-Shams University for suggestion of the title of the work, his meticulous supervision, guidance and advice. He has always been so much encouraging and supporting in every possible way. He spent a good deal of his precious time reviewing this work.

Thanks are due to *Prof. Dr. Alaa Abd-El Hay* Prof. of neurosurgery Faculty of Medicine, Ain-Shams University for his valuable advices and appreciable guidance and collaboration during this work.

To *Prof., Dr. Adel Al-Hakeem,* Prof. of neurosurgery Faculty of Medicine, Ain-Shams University I'm quite grateful for his sincere and precious help. His continuous cooperation and kind supervision deserves an endless gratitude.

I also need to thank *Dr. Mohamed Tawfik* Consultant of neurosurgery Maadi Armed Forces Hospital and *Dr. Magdy El-Killeiny, Dr. Hosam El-Hoseiny, Dr. Alaa Fakhr* lecturers of neurosurgery, Faculty of Medicine, Ain-Shams University for their sincere help in carrying out the surgical procedures and collecting patients data.

To all the staff of neurosurgery departements in Ain-Shams University Hospitals and Al-Maadi Armed Forces Hospital I owe much of appreciation.

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INTRODUCTION

INTRODUCTION

Cervical disc disease and spondylosis have troubled human beings since ancient times. However, pathological changes that develop in the cervical spine with increasing age were not reported until the early nineteenth century. Treatment was generally supportive and nonoperative until Horsley (1895) successfully decompressed the cervical spinal cord of a patient with progressive cervical "caries" at C5 and C6. Despite his dramatic result, others were reluctant to treat cervical disc disease aggressively because the pathological changes associated with it were still poorly defined (Ehni, 1990).

Cervical disc disease has been studied more in recent times. Bailey, (1960) Elsberg, (1931) Gowers. (1888) and others recognized the deleterious effects of compression of the cervical cord and nerve roots by osteophytic protrusions into the spinal canal and root foramina.

Brain, (1952) Frykholm, (1951) and Gooding (1974) stressed the role of ischemia caused by compression of radicular arteries and veins as a fundamental process. Still others identified the importance of abnormal joint mobility and intermittent cord compression by osteophytic processes during neck movement in the evolution of various cervical disc syndromes.

Predisposing factors that contribute to the clinical signs of cervical disc disease were classified by Symonds, (1953) who recognized the role of acute and chronic neck trauma, and by Arnold (1955) and Payne and Spillane,

(1957) who identified the anatomical and radiographic dimensions of the normal and spondylotic cervical spine.

Descriptive pathology of cervical spondylotic myelopathy and radiculopathy was slow to develop because of the paucity of human necropsy material. Nevertheless. O'Connell, (1955) Hughes, (1966) and Wilkinson, (1960) successfully defined the spectrum of cord and root lesions that develop in association with cervical spondylosis.

British clinicians have been responsible for the classification of the neurological syndromes that result from cervical spondylosis. Brain, (1952) and his associates outlined the clinical presentation of the spondylotic myelopathies, radiculopathies, and myeloradiculopathies, and Lees and Turner, (1963) defined the natural histories of these disorders without active treatment.

The clinical spectrum of cervical disc disease includes radiculopathy, myelopathy, and combined myeloradiculopathy. These syndromes may result from acute rupture of an intervertebral disc, from progressive and insidious development of spondylosis and intervertebral osteophytes, and from the coincident problem of disc rupture or spondylosis, or both, in the presence of a developmentally narrowed spinal canal.Ehni, (1990)

Basically, there are two approaches to the compressed spinal cord and roots, anterior and posterior. The posterior approach affords easy access to the posterior elements of the vertebrae and to the dorsal and dorsolateral aspects of the spinal canal and its contents from Cl to Tl. This approalch affords the best access for treatment of posterior compression. Hypertrophic and inelastic ligamenta flava compressing the cord are readily removed by laminectomy. Similarly, posterior decompression of cervical roots is easily accomplished with one or more foramenotomies. If the patient has combined myeloradiculopathy from predominantly posterior compression, laminectomy with foramenotomy is very effective. The posterior approach, however, has two principal disadvantages, it increases mobility, thereby stimulating bone spur formation at the intervertebral joints, and it does not afford access to the ventral spinal canal, where disc rupture and osteophyte formation usually occur.

The anterior approach to the cervical spine is relatively easy and safe from the levels of C3 through C7, where the vertebral segments are most often affected by disc disease.

Since its introduction in the treatment of cervical disc disease by Bailey and Badgley in 1952, the anterior surgical approach has gained increasing popularity as a means of relieving cervical nerve root and spinal cord compression. The pioneering efforts of Cloward, (1958) Dereymacker, (1963) and Robinson, et al., (1955) and Verbiest, (1970) among others must be recognized. In properly selected patients, 63% to 100% of patients have improved after anterior cervical surgery, Ehni, (1990).

Although the therapeutic efficacy of anterior surgery in general seems to be accepted, no consensus exists about which technique is best. Until recently, most reports recommended anterior fusion. Lately, several authors have reported equally good results with anterior discectomy alone. Microsurgical technique may further enhance results. Advocates of anterior fusion state that fusion is necessary to properly decompress the spinal cord or nerve roots, to provide cervical stability, and perhaps to promote resorption of lateral osteophytes; Ehni, (1990). Advocates of anterior discectomy doubt the need for fusion since cervical vertebrae usually fuse after discectomy and, in any event, the absence of cervical fusion does not preclude a good operative result.

AIM OF THE WORK

The aim of this study is to estimate the value of the anterior approach in treatment of degenerative cervical disc disease.

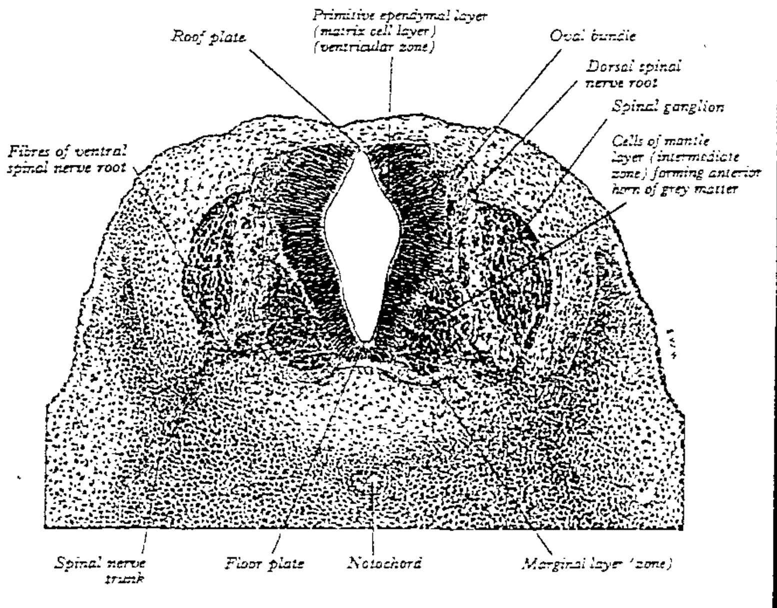
REVIEW OF LITERATURE

DEVELOPMENTAL ANATOMY OF THE CERVICAL SPINE

In the third week of embryonic life the mesoderm coalesces in the midline forming an axial semiridge; (the notochord) while the ectoderm is forming the neural tube just above it. Coincident with this the mesoderm aggregates into somites on either side of the notochord and at 4 weeks after fertilization the embryo is resegmented and ready to go into a vertebrated fetus of 41 somites. The mesoderm which coalesces medially around the notochord and the neural tube forms what is called sclerotome. While that mesoderm which grows dorsally and laterally gives rise to myotomes and the intermediate mesoderm form the branchial arches, mesonephros and limb buds. Fig(1)

At 5 to 6 weeks the embryo begins to resegment and the somites give rise to vertebrae by fusion of right and left somites across the midline incorporating the notochord; and cranial half of each somite fuses with the caudal half of the adjacent one forming primtive vertebra. The separation of the cranial and the caudal halves of each somite occurs about a cleft called; Von Ebner's fissure; at which the remaining, cells form the intervertebral disk. Some of the cells migrate dorsally over the neural tube to form the vertebral arches and ventrally to form costal processes or ribs. At the conclusion of the process of resegmentation the embryo becomes a fetus.

During the fetal phase the vertebrae change their soft consistency into hard one by a process of chondrogenesis and osteogenesis which begins in



Transverse section of the developing spinal cord in the cervical region of a human embryo early in the sixth week. CR length = 8 mm.

Gray's Anatomy by Williams et al 1989 P,178

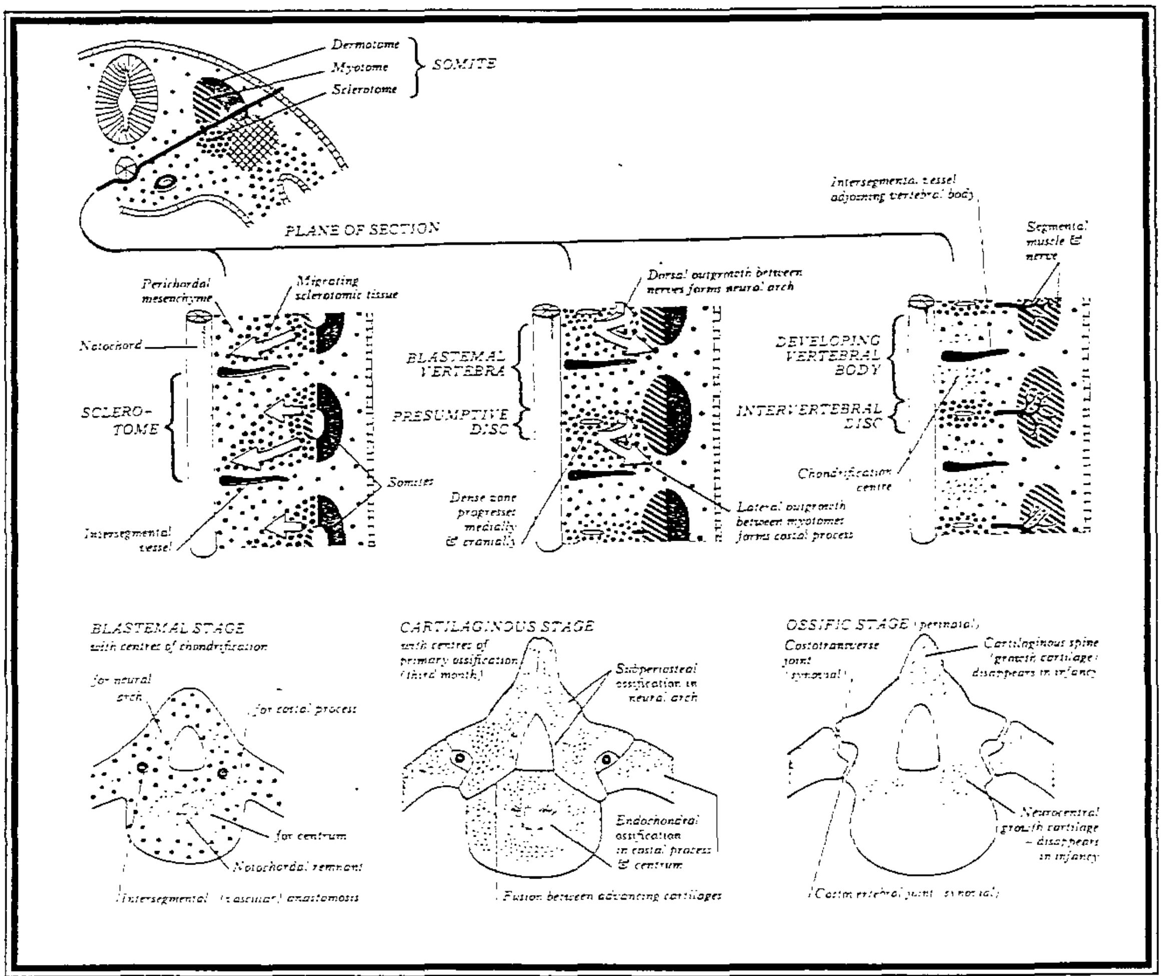
Fig - 1

two centres on each side of the midline. The change in consistency of the vertebrae from soft to hard, forces the notochordal tissue out of the vertebral body into disc spaces to remain their as the nucleus pulposus. The chondrification centres of the dorsal arches and the costal processes soon merge and replace the mesenchymal tissue completely and by the end of eight week the cartilagenous arches have fused with the body.Fig (2)

During infancy, childhood and adolescence ossification continues so that the vertebral arches fuse with the bodies at a line more driven into the bodies and is called the neurocentral synchondrosis which is more medially situated in cervical vertebrae from 2nd to 7th. Secondary ossific centres appear at late childhood as a ring about the margins of the vertebral bodies and consist of hard cortical bone when they have formed completely. The primary and secondary ossific centres fuse at the age of 15 to 18 years. The central portion of the cartilaginous end plate remains unossified and considered as one of the components of the intervertebral disc (Sherk, 1983).

Adult phase:

In the developing and immature cervical spine, the cartilaginous end-plate and the annular tissue of the intervertebral disc have less obvious and abrupt interfaces. The cartilaginous and ligamentous tissues merge into each other more gradually, and the junction between discal tissue and cartilaginous end-plate has considerably more mechanical strength than the junction of vertebral ossific nucleus and end-plate. In addition, capillaries, venules, and arterioles make their way into the cartilaginous end-plate and secondary ring epiphysis as ossification advances, but the intervertebral disc



Development of the vertebrae
Gray's Anatomy by Williams et al 1989 P, 160

Fig -2