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Comparative study between anterior cervical discectomy and fusion versus disc replacement in the management of degenerative cervical disc disease

Thesis

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Introduction

Cervical myelopathy and spinal cord compression caused by spondylotic disease or acute disc herniation is a common spinal disorder that is the subject of controversy over the role and timing of surgical intervention as well as the optimal treatment. **(1)**

Since the first description of the cervical anterior discectomy with fusion by Cloward and Smith in 1958 respectively in 1955, and the cervical anterior discectomy without fusion in 1960 by Hirsch a debate is started which of both methods is the best. While this discussion is still not closed, the advent of the cervical disc prosthesis has contributed to extra confusion. Instead of two possibilities, nowadays three possible treatments concur with each other: cervical anterior discectomy without implantation of any structure (CAD), cervical anterior discectomy with fusion (CADF), and finally, cervical discectomy with implantation of a disc prosthesis (CADP). **(2)**

In the absence of arthrodesis, kyphotic deformity is always a feared complication. **(1)**

Nowadays anterior cervical discectomy and fusion (ACDF) may be considered the standard procedure for treatment of degenerative disc disease of the cervical spine. However, there is evidence that ACDF may result in progressive degeneration of the adjacent segments. **(3)**

Twenty-five percent of patients undergoing cervical fusion will have new onset of symptoms within 10 years of that fusion. Other reports have helped to shed light on the recurrence of neurological symptoms and degenerative changes adjacent to fused cervical levels. Segments adjacent to a fusion may have an increased range of motion and increased intradiscal pressures. [(4)]

Total intervertebral disc replacement (TDR) is designed to preserve motion, avoid limitations of fusion, and allow patients to quickly return to routine activities. The primary goals of the procedure in the cervical spine are to restore disc height and segmental motion after removing local pathology. A secondary intention is the preservation of normal motion at adjacent cervical levels, which may be theorized to prevent later adjacent level degeneration. It avoids the morbidity of bone graft harvest it also avoids complications such as pseudarthrosis, issues caused by anterior cervical plating, and cervical immobilization side effects. [(4)]

Aim of the work

The aim of this study is to compare the efficacy and outcome of both anterior cervical discectomy and fusion versus disc replacement in the management of degenerative cervical disc disease.

I-Anatomy

Cervical vertebrae:

The cervical spine consists of three atypical and four typical cervical vertebrae. Typical cervical vertebrae, C-3 to C-6, include a vertebral body, two pedicles, two lateral masses, two laminae, and a bifid spinous process. The seventh cervical vertebra is slightly different in it has a transitional form, it has a larger spinous process that is not bifid. Atypical vertebrae include the atlas (C1), the axis (C2), and the 7th cervical vertebra. [5]

Because the cervical vertebrae bear the least weight, their bodies are relatively small and thin with respect to the size of the vertebral arch and vertebral foramen. In addition their diameter is greater transversely than in the anteroposterior diameter. [6]

The lateral edges of the superior surface of each body are sharply turned upward to form the uncinate processes that are characteristic of the cervical region.

However, the most obvious diagnostic feature of the cervical vertebrae is the transverse foramina that perforate the transverse processes and transmit the vertebral arteries. The anterior part of the transverse processes represents fused costal elements that arise from the sides of the body the lateral extremities of the transverse processes bear two projections, the anterior and posterior tubercles. The former serve as origins of anterior cervical muscles; the latter provide both origins and insertions for posterior cervical muscles. [6]