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Evaluation of the Risk Factors on the Incidence of Adjacent Segment Degeneration After Anterior Neck Discectomy and Fusion

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Abstract : Background and Objectives: Cervical spondylosis is a common problem that affects the adult spine and is the most common cause of radiculopathy and myelopathy in older patients. Anterior discectomy and fusion is a well-known technique in degenerative cervical disc disease. However, one of the late undesirable complications is adjacent disc degeneration, which affects about 91% of patients in ten years. Many factors can be effective in causing this complication, but some are still debatable. Discovering these risk factors and eliminating them can improve the quality of life. Methods: This is a retrospective cohort study. All patients who underwent anterior discectomy and fusion surgery in the neurosurgery ward of Imam Khomeini Hospital between 2013 and 2016 were evaluated. Their demographic information was collected. All patients were visited and examined for radiculopathy, myelopathy, and muscular force. At the same visit, all patients were asked to have a facelift, and neck profile, as well as a neck MRI(General Tesla 3). Preoperative graphs were used to measure the diameter of the cervical canal(Pavlov ratio) and to evaluate sagittal alignment(Cobb Angle). Preoperative MRI of patients was reviewed for anterior and posterior longitudinal ligament calcification. Result: In this study, 57 patients were studied. The mean age of patients was 50.63 years, and 49.1% were male. Only 3.5% of patients had anterior and posterior longitudinal ligament calcification. Symptomatic ASD was observed in 26.6%. The X-rays and MRIs showed evidence of 80.7% radiological ASD. Among patients who underwent one-level surgery, 20% had symptomatic ASD, but among patients who underwent two-level surgery, the rate of ASD was 50%.In other words, the higher the number of surfaces that are operated and fused, the higher the probability of symptomatic ASD(P-value <0.05). The X-rays and MRIs showed 80.7% of radiological ASD. Among patients who underwent surgery at one level, 78% had radiological ASD, and this number was 92% among patients who underwent two-level surgery(P-value> 0.05). Demographic variables such as age, sex, height, weight, and BMI did not have a significant effect on the incidence of radiological ASD(P-value> 0.05), but sex and height were two influential factors on symptomatic ASD(P-value <0.05). Other related variables such as family history, smoking and exercise also have no significant effect(P-value> 0.05). Radiographic variables such as Pavlov ratio and sagittal alignment were also unaffected by the incidence of radiological and symptomatic ASD(P-value> 0.05). The number of surgical surfaces and the incidence of anterior and posterior longitudinal ligament calcification before surgery also had no statistically significant effect(P-value> 0.05). In the study of the ability of the neck to move in different directions, none of these variables are statistically significant in the two groups with radiological and symptomatic ASD and the non-affected group(P-value> 0.05). Conclusion: According to the findings of this study, this disease is considered to be a multifactorial disease. The incidence of radiological ASD is much higher than symptomatic ASD (80.7% vs. 26.3%) and sex, height and number of fused surfaces are the only factors influencing the incidence of symptomatic ASD and no variable influences radiological ASD.

Keywords : risk factors, anterior neck disectomy and fusion, adjucent segment degeneration, complication
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