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Is the anterior bone loss affected by modic change in anterior cervical discectomy and fusion?

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Background: Few studies have focused modic change (MC) in cervical spine let alone its effect on patients underwent anterior cervical discectomy and fusion (ACDF). Some of research have reported that MC may affect the clinical and radiological outcomes of ACDF. Anterior bone loss (ABL) is a bone remodeling process and have been reported to happen after ACDF. Interestingly, both MC and ABL happened at the anterior 1/3 of vertebrae.

Research question: Weather MC would affect ABL after ACDF.

Design: We retrospectively reviewed 96 patients who underwent single-level ACDF from 2010-2019 with a minimum follow-up of 24 months.

Methods: Clinical outcomes and Radiological measurements, including overall (Cobb C) and segmental cervical angle (Cobb S), anterior disc height (ADH), posterior disc height (PDH), fusion rate, subsidence rate, as well as ABL were recorded to observe weather MC would affect these radiological parameters.

Results: The overall incidence of MC was 44.15%. The incidence of ABL was 44.1% in MC group and 81.4% in non-MC group. ABL in non-MC group was significantly more common than that in MC group ($P<0.05$). Subsidence rate and anterior disc height (ADH) loss was significantly higher in non-MC group (Fig. 1) compared with MC group ($P<0.05$) (Fig. 2). Clinical outcomes, fusion rate, Cobb C, Cobb S, as well as posterior disc height (PDH) showed no significant difference between two groups ($P>0.05$). Logistic regression analysis showed that MC was negatively correlated with ABL but not significantly associated with subsidence. Univariate linear regression analysis showed that MC was associated with ADH, but not associated with PDH.

Discussion: The overall prevalence of MC and ABL was 44.15% and 65.6%. MC has nothing to do with pre-operative and post-operative clinical outcomes, as well as cervical alignment. However, pre-operative MC was significantly correlated with ABL and ADH but was not significantly associated with PDH and subsidence.

Fig. 1



Fig. 2

