Abstract #296.docx

A new methods for fusion assessment following anterior cervical discectomy and fusion using dynamic plain radiographs

Introduction/Aim: The purpose of this study was to develop novel fusion assessment methods on dynamic radiographs for anterior cervical discectomy and fusion and to evaluate their diagnostic accuracy and reliability.

Materials and Methods: Two new methods of fusion assessment were designed by modifying existing ones, named as inter-vertebral angle (IVA) method and inter-spinous distance 2 (ISD2) method. A threshold value for the diagnosis of nonunion for the 2 methods as well as for the conventional inter-spinous distance (ISD1) method was determined by using receiver operator characteristic (ROC) analysis on dynamic radiographs of 120 patients. Finally, the areas under the ROC curves (AUCs) and kappa statistics were utilized to compare those methods.

Results: All of the three methods had 'high' discriminating ability for the diagnosis of nonunion (AUCs 0.970 to 0.975), without statistically significant differences. The optimum threshold values of the IVA, ISD1, and ISD2 methods were 1.6°, 1.4 mm, and 1.2 mm, respectively. With these threshold values, sensitivity and specificity as well as intra- and inter-observer reliability on kappa statistics were highest with ISD2 methods, followed by IVA methods and ISD1 methods respectively.

Discussion: Clinically, if the goal is to maximize sensitivity as a screening test, at the expense of poorer specificity, so as to minimize the possibility of missing a pseudarthrosis, a 1° or 1 mm threshold may be desirable.

Conclusion: These results demonstrate that the ISD2 and IVA methods proposed by the authors are superior to the conventional ISD1 method.