Anterior Cervical Instrumentation Enhances Fusion Rate in Multi-level Reconstruction in Smokers
Bikash Bose, MD (Newark, DE)

INTRODUCTION: Multi-level anterior cervical decompression and fusion (ACDF) surgery in smokers provides a significant challenge. Higher non-fusion rates in smokers have been reported previously. Cigarette smoking has been shown to interfere with bone metabolism and revascularization and suppress bone formation. This study evaluated the effect of anterior plating on multi-level ACDFs in smokers.

METHODS: One hundred and six patients underwent ACDF using autograft or fibular allograft and anterior plating. Twenty-four patients had locking plates (Synthes 23, Codman 1) and non-constrained Caspar plates were used in 82. Minimum follow-up was 12 months. There were 47 males and 59 females with a mean age of 50.12 +/- 11.72 years (range 27-80). Fibular allograft was used in 16 patients and autologous triconical crest graft was used in 90 patients. Mean number of levels fused was 2.74 (+/- 0.61). Sixty patients (56.6%) were smokers. Comparability analysis between the smoking and nonsmoking groups was conducted to explore potential confounding factors. Mantel-Haenszel chi-square test was used in between-group comparisons. Statistical significance level was set to 0.05.

RESULTS: Nine patients had four levels fused, 60 had three levels fused and 37 had two levels fused. Successful fusion was achieved in all but three patients, with an overall successful fusion rate of 97.17%. The fusion success rates were similar in the smoking group and the nonsmoking group (96.6% vs. 97.83%; chi squared=0.723, p=0.723). The conclusion was the same even when the outcome was adjusted for age (chi squared=0.0003, p=0.975), gender (chi squared=0.117, p=0.732), number of levels fused (chi squared=0.087, p=0.769) and graft type (chi squared=0.002, p=0.966). In a logistic regression model including all five study variables, number of fusion levels was the only significant factor identified (p=0.0176, odds ratio=18.395 per level). Two of the 9 patients who had four-level fusions failed, while only one in 60 of the three-level fusion patients failed. None of the two-level fusion patients failed.

DISCUSSION/CONCLUSION: A high fusion rate of 97% was accomplished in multi-level ACDF using anterior plating. No difference in fusion rates between smokers and nonsmokers was seen. Anterior cervical plating markedly improved the fusion rate in smokers.