INTRODUCTION

Initially introduced in the 1970’s, bone-anchored hearing aids (BAHAs) have become a widely accepted treatment in certain individuals with conductive or mixed hearing loss as well as those with single-sided deafness. The device transmits sound from a processor through an osseointegrated titanium implant embedded in the temporal bone, and stimulates the cochlea through bone conduction. BAHAs have provided significant benefits for individuals who are not candidates for surgery or hearing aids, and have shown improvements in auditory gain of 10 to 25 dB when compared to traditional bone conduction hearing aids.

Multiple variations for placement of the percutaneous BAHAs have been developed, and unfortunately continue to be beleaguered by soft tissue complications including skin flap necrosis, flap infection, skin growth over the abutment, failure of osseointegration, and extrusion of the titanium implant. BAHAs are further classified according to duration until first use of the BAHA, operative complications, and aesthetic concerns.

RESULTS

A total of 88 patients (43 female, 45 male) were included in data analysis. A total of 80 complications were documented, and these complications were classified based on the Holgers criteria (Tables 1 & 2). A significant difference in total postoperative complications existed between the six techniques used (ANOVA; p<0.01) (Table 3). Moreover, regarding operative time, a significant difference existed between the six techniques employed (ANOVA; p<0.01). The average duration of time until fitting the BAHA processor between the various techniques trended towards but did not reach statistical significance (ANOVA; p=0.16).

DISCUSSION

In this study, we compared the complication rates and operative times among six different techniques for BAHA implantation performed by a single surgeon. As shown in Table 3, a total of 80 complications occurred among the 88 procedures performed. Although many patients experienced multiple complications, only 47.7% of the entire population experienced no soft tissue reactions postoperatively. Moreover, among the percutaneous surgeries, the rate of cases performed without complications was best for the dermatome technique, having only half the cases experiencing adverse soft-tissue reactions.

In contrast to the high rate of soft-tissue complications among percutaneous BAHA implantations in this and other series, use of the magnetic Attract system resulted in significantly fewer complications in our series. Indeed only one complication occurred in the Attract group, and was classified as a Holgers class 1 complication. In addition, 92.3% of the Attract cases did not experience any complications. These results are supported by the study by Briggs et al. in that only 4 cases of mild skin erythema were noted in their series of 27 implanted patients, and no major complications occurred. The erythema noted in each case is likely due to the pressure on the soft tissues from the magnet. Although a cause for irritation from the pressure exerted, it seems to carry less risk for bacterial seeding and chronic inflammation of the soft tissues than a percutaneous implant.

An analysis of our data demonstrated another advantage of the Attract system in comparison to percutaneous techniques for BAHA implantation, in that time to fitting the processor was shortest for the Attract population. Given the potential reduction in healthcare cost associated with decreased OR time, this finding can have substantial impact. Moreover, a similar finding was made by Gordon and Coelho in demonstrating that the biopsy punch technique could be performed in significantly less time than the linear incision technique. Thus, when comparing the Attract and biopsy punch techniques, the decreased operative time for the biopsy punch technique must be weighed against its significantly greater risk of soft-tissue reactions.