Introduction

Total stapedectomy was described by Shea in 1956 as the surgery of choice for the management of otosclerosis. Since that time, the technique employed, the goal remains the same: to close the air-bone gap (ABG) to ≤10dB and to maintain stability over the long term with a low rate of complications and/or revisions.

Various prostheses have been developed to accommodate the changes in technique, while maximizing the transfer of acoustic energy from the incus to the inner ear. The interface of the incus with the piston is a critical factor that can impact long-term hearing results (i.e. loose prosthesis, incus erosion, displaced prosthesis). Little is known about the rates of damage to the incus for the various prostheses.

Some recent reports have raised concerns about increased rates of prosthesis displacement and/or incus erosion necessitating revision surgery. Given these concerns, we decided to perform a retrospective chart review and look at our series of stapedectomies over the past decade to assess our own rates of revision, early success, and hearing stability. We hypothesized that a bucket handle prosthesis would yield excellent long-term hearing success with few revision surgeries required.

Methods and Materials

A retrospective chart review was performed on all patients undergoing stapedectomy by the senior author in the past 10 years. IRB approval was obtained for the project. Demographic information and operative notes were obtained. Audiograms were also performed for the preoperative, postoperative, and long-term follow-up visit.

Operative technique involves a partial stapedectomy procedure with temporalis fascia harvest and placement over the posterior half of the foot plate following down-fracture and removal. Pure tone averages were calculated for air and bone conduction using 500Hz, 1000Hz, 2000Hz, and 3400Hz. Rates of ABG closure to ≤10dB were calculated and stability of results determined.

Results

Of 240 surgeries, 158 ears (138 patients) had adequate postoperative audiometric data. A Robinson 4.0-4.5 piston prosthesis was used in 95% of cases and the rate of ABG closure (≤10dB) was 87% in primary cases (96% had ≤15dB ABG). Nearly 90% of patients maintained this level of hearing postoperatively (n=67 pts with audio data >1 year postoperatively, mean f/u of 48.5 months, range 1.2-9.5 years).

Conclusions

Our technique for stapedectomy compares favorably to quoted ABG closure rates, with 87% of primary patients closing ABG to ≤10dB. 3 ears (2.3%) required revision surgery for recurrent or persistent CHL; none were found to have incus erosion but all were performed early (3-6 months post-op). There were no major complications and hearing stability was excellent. Maintenance of incus integrity is expected with bucket-handle prostheses.

Discussion

Of 128 primary stapedectomy cases, 110 closed the ABG to ≤10dB (87%). 12 additional patients closed their ABG to 10-15dB range, for an overall rate of closure to within 15dB in 96%.

Thirty revision cases were analyzed, yielding closure to ≤10dB in 53.3% of cases (≤15dB in 70%). Chi-square testing showed significant difference in post-op ABG closure between primary and revision cases (p<0.0001).

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References