Conductive/Mixed Hearing Loss: Our Experience with FIMOS Carina of Otologics

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INTRODUCTION

Objectives: To determine the safety of FIMOS Carina fully implantable cochlear implant (FICI) with middle ear adaptation technique (bipolar, step, round window), and to evaluate the effectiveness and functional outcomes in severe to moderate conductive/ mixed hearing loss patients. "Methology: Retrospective clinical evaluation Period: July 2008 to September 2009. Condition studied: middle ear and CIC implants in conductive/mixed hearing loss subjects. Subjects: seven patients (4 adults, 3 children) with moderate to severe conductive hearing loss. Intervention: FIMOS Carina (Otologics) was developed in order to couple the transducer to different sites of the pathologic chain/pathologic middle ear anatomy. In the last few years a new way of adaptation of the FIMOS Carina has been developed in order to couple the transducer to different sites of the pathologic chain/pathologic middle ear anatomy.

RESULTS

Pure tone audiometry has been realized before and after 2 months (unaided) from implantation for each patient (Chart 1) to verify the impact of the surgery and the reversibility of the audiometric outcomes. The level of air conduction (AC) was almost unchanged after surgery. Thus Pure Tone Average (PTA for 500, 1000, 2000 and 3000) for AC was calculated before surgery 70 dB (min 53, max 85, SD 16.3) whereas after surgery 76.8 dB (min 47.5, max 97.5, SD 16.1). The average value of PTA for AC for FIMOS Carina (FIC) was calculated for 4 patients (Chart 2). The mean value of PTA for AC all frequencies (Chart 2) was 32.2 dB (min 29, max 35.9, SD 2.9). The mean value of PTA for BC was found at 250 Hz and 3000 Hz. The maximum PTA value was at 750 Hz. The distribution of the amplitude of the PTA for the other frequencies was quite homogeneous.

Speech discrimination (Sp. Discr.) was assessed and the Postoperative Functional Gain (FG) with FIMOS Carina (FIC) was calculated for 4 patients (Chart 3). The mean value of FG at all frequencies (Chart 3) was 32.2 dB (min 29, max 35.9, SD 2.9). The mean value of FG was calculated for 10 frequencies (Chart 4). The mean value of Functional Gain (FG) including all frequencies was 32.2 dB HL (min 29, max 35.9, SD 2.9). The minimum value of FG was found at 250 Hz and 3000 Hz. The maximum FG value was at 750 Hz. The distribution of the amplitude of the FG for the other frequencies was quite homogeneous.

CONCLUSIONS

In our experience FIMOS Carina seems to be a promising alternative in severe to moderate conductive/mixed hearing loss rehabilitation (not easy to relate with conventional hearing aids). The degree of satisfaction has been very high. One patient had to be reimplanted for implant failure after direct trauma over the device. No surgical revision of the device was needed. No life threatening complications occurred.

REFERENCES


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Fig. 1. FIMOS Carina components

Fig. 2. Prosthesis developed for middle ear adaptation

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Fig. 2. Prosthesis developed for middle ear adaptation

Fig. 3. Footprint adaptation

Fig. 4. Footsteps adaptation

Fig. 5. Round window adaptation

Table 1. Type of adaptation

Table 2. Speech Perception Unaided and Aided with FIMOS Carina