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Endoscopic versus microscopic stapes surgery

Ozgur Surmelioglu *, Suleyman Ozdemir, Ozgur Tarkan, Ulku Tuncer, Muhammed Dagkiran, Fikret Cetik

Department of Otorhinolaryngology, Faculty of Medicine, Cukurova University, Adana, Turkey

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ABSTRACT

Objective: The aim of this study to compare the outcomes and complications of endoscopic stapes surgery versus microscopic stapes surgery.

Methods: This study involved patients who underwent stapedotomy at the Department of Otorhinolaryngology, Faculty of Medicine, Cukurova University between January 2012 and July 2014. The patients were divided into two groups. Patients in group I were operated with endoscope and patients in group II were operated with microscope. Pure tone audiometry was carried out in all patients preoperatively. Peroperative surgical findings, complications, and duration of surgery were noted and compared between the two groups. Air conduction and bone conduction thresholds were measured at frequencies of 500, 1000, 2000, and 4000 Hz, and the mean (±SD) air-bone gap was noted.

Results: Mean preoperative air-bone gap was 36.9 ± 6.8 dB (23.3–50 dB) in group I and 35.1 ± 6 dB (26.6–50 dB) in group II. Mean postoperative air-bone gap was 9.3 ± 7.1 dB (0–30 dB) in group I and 13.5 ± 9.7 dB (1.6–35 dB) in group II. The difference in preoperative and postoperative air-bone gap between the two groups was statistically significant ($p = 0.023$). Patients in group I did not complain of postoperative pain but this was felt in four patients in group II. The difference was statistically significant ($p = 0.045$).

Conclusion: Endoscopic stapes surgery has many benefits such as good visualization, and easy accessibility to the stapes, oval window niche, and facial nerve. Removal of the scutum and manipulation of the chorda tympani nerve are less frequent with the endoscopic technique.

1. Introduction

For stapes surgery, most surgeons use the transcanal or endaural approach. Some authors choose a retroauricular incision for evaluation of the external auditory canal and middle ear. These approaches are used especially on patients with a narrow or curved external auditory canal. All of these surgical procedures are usually performed under microscopic view. Surgical microscopes ensure good magnification and allow both hands to be used during surgery. Patients who undergo stapes surgery, particularly with endaural or retroauricular incision, may suffer complications such as pain, auricular numbness, or cosmetic problems. Because of anatomical variations, a narrow external auditory canal, or hidden stapes and oval window, this surgery can be technically difficult and may result in complications. When the stapes and oval window are not exposed, the scutum may be removed to improve exposure. During this procedure, the chorda tympani nerve can be damaged [1]. Many patients who undergo stapes surgery suffer from postoperative taste defects. A number of studies have shown that postoperative taste disorders and tongue symptoms can be present in 20–60% of patients after this

* Corresponding author.
E-mail address: surmeli2004@yahoo.com (O. Surmelioglu).

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surgery [1–6]. Removal of the posterior part of the bony canal may result in subluxation of the ossicular chain [7–9].

Endoscopes were first used for otologic surgery 15 years ago. Many reports have been published on endoscopic ear surgery and this is a suitable technique for chronic otitis media, ossiculoplasty, and otosclerosis [11–13]. In 2000, Poe described endoscope-assisted stapedotomy [10]. Endoscopic stapes surgery offers many benefits such as good visualization, and easy accessibility to the stapes, oval window niche, and facial nerve. Removal of the scutum and manipulation of the chorda tympani nerve are less frequent with this technique [13]. On the other hand, endoscopic ear surgery has some limitations such as one-handed surgery, experience is required, and there is a lack of sense of depth [10,13,14].

In this study, we aimed to compare the outcomes and complications of endoscopic stapes surgery versus microscopic stapes surgery.

2. Materials and methods

This study involved a retrospective analysis of patients with conductive hearing loss who underwent stapedotomy at the Department of Otorhinolaryngology, Faculty of Medicine, Cukurova University between January 2012 and July 2014. Local Ethics Committee approval was received. Only stapedotomy patients were included in this study. The patients were divided into two groups. In group I, 22 patients were operated with an endoscope, and in group II, 24 patients were operated with a microscope. Diagnosis of the patients was based on clinical history and normal otoscopic examination. All patients were evaluated with audiological tests and computed tomography. Patients with an air-bone gap greater than 30 dB, and with normal otoscopic examination and normal computed tomographic findings, were included in this study. Patients who have large external auditory canal were randomly selected for the study and patients with narrow external auditory canal and patients who were not operated transcanally were excluded for the study. Pure tone audiometry was carried out preoperatively in all patients. Air conduction and bone conduction thresholds were measured at frequencies of 500, 1000, 2000, and 4000 Hz and the mean (±SD) air-bone gap was noted.

All patients were operated under local anesthesia. A transcanal approach was used for all patients. Zero or thirty degree angled, 4-mm diameter, 18-cm length endoscopes and a high-definition monitor with a camera head (Karl Storz, Germany) were used for group I and an operative microscope was used for group II. The same surgical steps were performed on all patients and by the same two surgeons. Both surgeons are experienced on the stapes surgery. One of them has performed stapes surgery microscopically for 30 years. He was performed 35 stapes surgery per year. The other surgeon has performed stapes surgery for 12 years and he was performed 25 stapes surgery per year. One surgeon performed only microscopic stapes surgery (ten patients were operated by microscope) and the other one performed both surgical techniques (twenty-two patients were operated by endoscope and 14 by microscope).

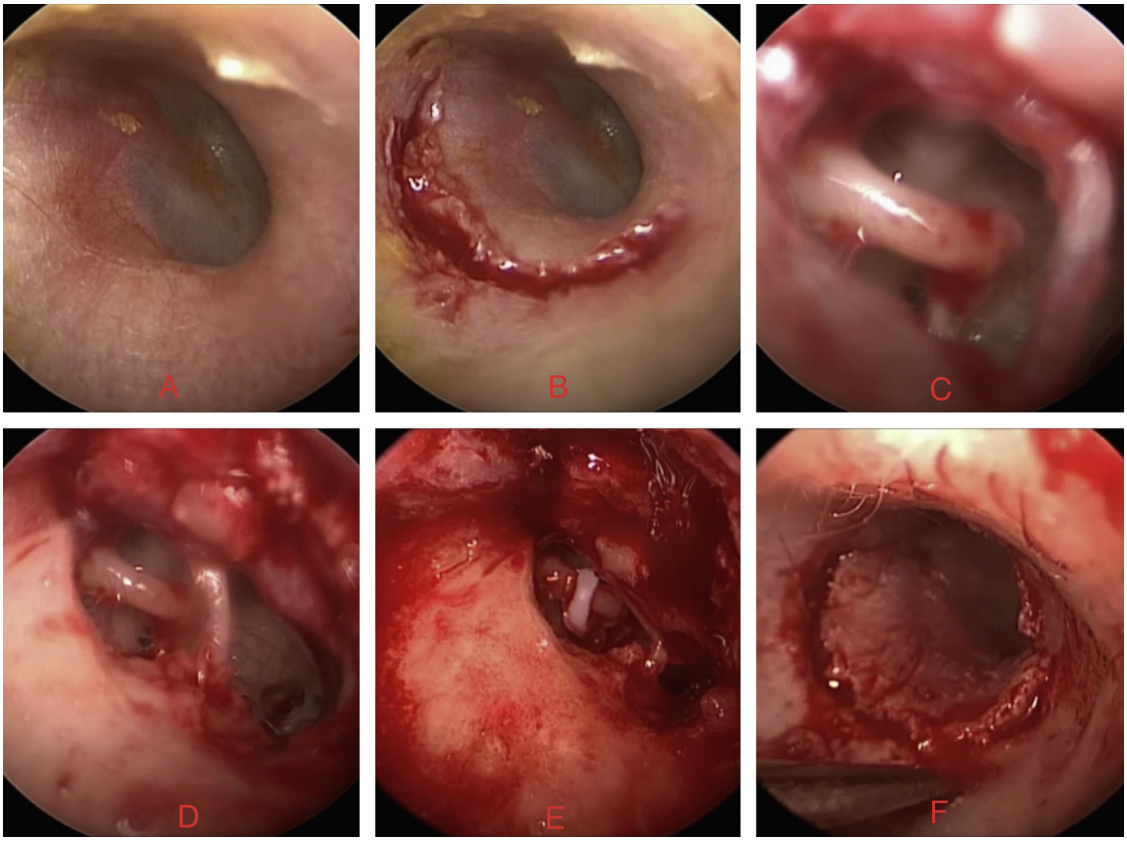

Fig. 1. Operative steps of stapedotomy. (A) Endoscopic view of the external auditory canal and tympanic membrane; (B) tympanomeatal incision; (C) incudostapedial joint and stapedial tendon; (D) opening a small fenestra; (E) insertion of the prosthesis; (F) closing the tympanomeatal flap.

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