

CANAL WALL DOWN TYMPANOPLASTY

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SUMMARY :

Purpose : The aim of this study is to present and discuss the results of the open cavity (canal wall down tympanoplasty - CWDT) technique. **Methods :** Eighty patients (32 male, 48 female) underwent a CWDT operation between October 1993 and December 1994. Their average age was 30.3 (between 9-65) years and 24 patients were under the age of 16 years. Average follow up period was 26 (between 18-36) months. Columellar reconstruction was performed in 52 cases (65 %). **Results :** The anatomical results were as follows; graft uptake rate was 65%, graft perforation rate was 20%, graft retraction rate was 15%. The cavity was epithelialized in 75 % of cases in the 3rd postoperative month. However there was granulation in the cavity in 20 cases (25 %), and they became epithelialized at the end of the 6th postoperative month of follow-up by employing regular aural toilet in the form of aspiration and topical antibiotic drops. According to 500-2000 Hz pure tone hearing level averages of the 52 cases, the hearing levels of 14 cases (27 %) were found to be under 30 dB postoperatively while only 6 (12 %) had this level preoperatively. Postoperative air-bone gap (ABG) closure to within 20 dB was achieved in 26 cases (50 %). **Conclusion :** We conclude that CWDT is an encouraging technique, especially in cholesteatomatous cases.

Key Words : Tympanoplasty, Cholesteatoma.

INTRODUCTION

Surgical treatment of chronic otitis media is still controversial. Although there has been great improvement in the surgical techniques for chronic otitis media in the last 20-30 years, there is still not any strict technique for cholesteatoma surgery. However there is a tendency towards open cavity techniques in chronic otitis media with cholesteatoma recently. The aim of this study is to present and to discuss the results of CWDT.

PATIENTS AND METHODS

Eighty cases (32 male, 48 female) underwent a CWDT operation between October 1993 and December 1994. Their average age was 30.3 (between 9-65) years. The patients (24 cases, 30 %) under the age of 16 years were admitted as the pediatric group (PG) and the others as the adult group (AG). There was a history of a prior ear operation (intact canal wall tympanoplasty-ICWT) in 48 cases (60 %).

There was perforation of the tympanic membrane (TM) or graft in 47 ears (59 %),

retraction in 33 ears (41 %) and cholesteatoma in 68 ears (85 %). While the cholesteatoma was localized to the attic and/or antrum in 54 (79 %) out of 68 cases, it was extended to the tympanic cavity and/or mastoid in the rest 14 cases (21 %). Temporal muscle fascia (TMF) was used as a graft material in 60 ears (75 %) and composite tragal cartilage with TMF in 20 ears (25 %). Underlay grafting technique was used in 72 ears (90%) and overlay technique in 8 ears (10%).

Ossicular reconstruction (OR) was performed in 52 cases (65%) and the others were staged. According to the ossiculoplasty classification of Tos, type I ossiculoplasty was performed in 7 of the 52 ears (14 %), type II in 34 ears (65 %), and type III in 11 ears (21 %). Type II ossiculoplasties were performed with otograft ossicles in 27 of 34 ears (79 %) and with homograft ossicles in 7 ears. Type III ossiculoplasties were performed with an 'L' shaped tragal cartilage in 2 of 11 ears, with a homograft malleus in 3 ears, and with plastipore TORP in 6 ears.

Average follow up period was 26 (between 18-36) months. Functional results were evaluated in terms of ABG, hearing level (HL) and hearing gain (HG) by considering preoperative and postoperative pure tone audiological examinations. Anatomical results were evaluated by otoscopic and microscopic examinations.

RESULTS

At the last follow-up examination, there was an intact graft in 52 of the 80 ears (65 %), graft

	Av. HL	0-30 dB	31-40 dB	41-50 dB	>51 dB
PrO HL	50 dB	6 (12%)	10	14	22
PsO HL	45 dB	18 (34%)	12	7	15

PrO, Preoperative; PsO, Postoperative; HL, Hearing level; Av, Average.

Table 1: Preoperative and postoperative hearing levels of the 52 ears which underwent ossicular reconstruction.

	ABG (dB)		HL (dB)	
	0-10	0-20	0-20	0-30
Ped n:12	2 - 16%	4 - 33%	-	4 - 33%
Adult n: 40	4 - 10%	22 - 55%	4 - 10%	14 - 35%
Total n:52	6 - 11%	26 - 50%	4 - 14%	18 - 34%

PsO, Postoperative; HL, Hearing level; ABG, Air bone gap; Ped, Pediatric

Table 2: Postoperative hearing levels and air bone gaps of the 52 ears which underwent ossicular reconstruction.

perforation in 16 ears (20 %), and graft retraction in 12 ears (15 %). The cavity was epithelialized in 60 ears (75 %) in the 3rd postoperative month. However there was granulation in the cavity in 20 ears (25 %), and 18 of 20 ears became epithelialized at the end of the 6th postoperative month by employing regular aural toilet in the form of aspiration and topical antibiotic drops. The other 2 ears had suffered from osteitis and granulation and ultimately underwent revision operations.

According to 500-2000 Hz pure tone hearing level average of the 52 ears, while 6 ears (12 %) were under 30 dB preoperatively, 18 cases (34 %) were found to be under 30 dB postoperatively, (Table 1). Postoperative ABG closure to within 20 dB was achieved in 26 ears (50 %), (Table 2). Regarding HG, hearing was improved in 10 ears (19 %), serviceable in 16 ears (31 %), did not change in 14 ears (27 %), and was spoiled in 12 ears (23 %), (Table 3).

DISCUSSION

Until recently, ICWT was based upon the belief that results would be better than that in CWDT (1-3). Nowadays, the ICWT technique is being questioned whether it is accurate or not. Especially in children, some authors like Sheehy prefer CWDT because cholesteatoma progresses rapidly and is hard to eradicate (4). In this series 30 % of the patients were under the age of 16 years. On the other hand, Tos and many other do apply ICWT (5).

Today, the most serious problem that emerges in CWDT is the postoperative open cavity problem

Ossiculoplasty Type	0-10 dB	11-20 dB	>21 dB	Spoiled
Type I n: 8	-	2 (25%)	6 (75%)	-
Type II n:34	10 (29%)	8 (24%)	4 (12%)	12 (35%)
Type III n:10	4 (40%)	6 (60%)	-	-
TOTAL n:52	14 (27%)	16 (31%)	10 (19%)	12 (23%)

Table 3: Hearing Gains according to 500-2000 Hz pure tone audiogram.

(6,7). Formation of an open cavity which is in continuity with the outer atmosphere brings about several problems. These include, firstly, the necessity of a lifetime maintenance of the cavity, cleaning it with intervals and prevention of moisture and discharge originating from the convenient milieu of the cavity. In this study, 75 % of the cavities epithelialized in the 3rd postoperative month. However, granulation was permanent in 20 cavities and 18 of the 20 cases were epithelialized at the end of 6th postoperative month by employing regular aural toilet in the form of aspiration and administration of topical antibiotics. The other commonly seen postoperative complication was graft insufficiency. Graft insufficiency appeared in 3 % of the cases in the first 6 months and a delayed type of insufficiency with a rate of 2% was subsequently seen. In this study, we encountered graft insufficiency in 9 out of the total 80 cases (11 %) and graft retraction in 18 cases (23 %).

Postoperative hearing results are regarded as unsuccessful in 41% of cases of CWDT because ossicular destruction due to cholesteatoma is a widespread problem in these sort of cases. Lindsay reported that 94% of cholesteatomatous cases had malleus and/or incus destruction, although the stapes suprastructure was also found to be eroded in 63 % of them (6). In this study, ossicles were completely intact in only 8 of the 80 cases (10 %). There was cholesteatoma in 68 of the 80 cases (85 %) and the intact ossicle rate was only 3%. Cholesteatoma was limited to the attic and/or the antrum in 54 of 68 cases (79 %), and it extended to the tympanic cavity and/or the mastoid in 14 cases. While a defect in stapes suprastructure was seen in 19% of the former 54 cases, the rate was 93% in the latter 14 cases. Thus, ossicular reconstruction and hearing results are expected to be worse especially in widespread cholesteatomatous cases due to erosion of the stapes. As a result of this ossicular defect, placement of a prosthesis may be required between the footplate and the tympanic membrane,

and you may encounter a high rate of failure (4, 6).

While postoperative bad hearing results were declared in 55% of middle ear cholesteatoma cases, the results were better in cases having an attic cholesteatoma (8, 9). In this study 52 of the 80 cases (68 %) underwent an ossicular reconstruction. Type I ossiculoplasty was applied in 8 cases (15.5 %), type II in 34 cases (65.5 %) and type III in 10 cases (18 %). If a postoperative air conduction hearing level of 10 dB or more over the preoperative hearing level was obtained, it was accepted as a Hearing Gain (HG). According to this, HG was achieved in 26 of the 52 cases (50%). HG was observed in 12 of 34 cases (35%) who underwent type II ossiculoplasty and in 6 of 10 cases (60%) who underwent type III ossiculoplasty. The differences are not statistically significant. In the type I ossiculoplasty group, HG was achieved in all 8 cases ($p < 0.01$). The HG rates in the literature vary between 43 and 83 %.

Contrary to former opinions, today not only the illness is eradicated thoroughly, but acceptable functional results are obtained with CWDT, as well.

The benefit provided with ICWT is more in comparison with CWDT (10). But CWDT also ensures HG although at a smaller rate. On the other hand the cholesteatoma recurrence is extremely low and was observed in only 2 of the 80 cases (2.5 %) in this series.

CONCLUSION

We conclude that CWDT is an encouraging technique, especially in cholesteatomatous cases. Both the anatomical and functional results of the CWDT technique are as well as those of the ICWT techniques.

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