

Original Research Article

Outcomes of tympanoplasty as a day case surgery under local anesthesia: a prospective study

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ABSTRACT

Background: Tympanoplasty is a commonly performed procedure for the management of chronic tympanic membrane perforations and associated hearing loss. Performing tympanoplasty as a day-case surgery under local anesthesia offers potential advantages, including reduced hospital stay and healthcare costs. This study aimed to evaluate the outcomes of tympanoplasty performed as a day-case procedure under local anesthesia.

Methods: This prospective study was carried out in the Department of Otolaryngology and Head-Neck Surgery at Bangladesh Medical College and Hospital, Dhaka, between January 2008 and September 2008. A total of 100 patients with chronic suppurative otitis media (CSOM), tubo-tympanic type, planned for day-case tympanoplasty under local anesthesia were included in the study. Data analysis was done using SPSS version 26.0.

Results: The study showed that most patients were aged 25–35 years (63.0%), male (58.0%) and from the middle socioeconomic class (78.0%). Postoperatively, hearing improved significantly, with the mean air conduction threshold reducing from 32.4 dB to 16.68 dB. Among successful cases, 91.3% achieved hearing gain, indicating good functional outcomes after tympanoplasty.

Conclusions: Tympanoplasty carried out as a day-case procedure under local anesthesia shows favorable clinical outcomes, with a high rate of graft success and significant improvement in hearing. The technique is generally well tolerated, allowing most patients to be managed on an outpatient basis without requiring hospital admission or general anesthesia. The results of this study suggest that day-case tympanoplasty under local anesthesia is a safe, effective and economical option for carefully selected patients with chronic suppurative otitis media, especially the tubo-tympanic type.

Keywords: Day case surgery, Local anesthesia, Tympanoplasty

INTRODUCTION

Chronic otitis media (COM) remains a major public health problem worldwide and is a common cause of preventable hearing impairment, particularly in developing countries.

Persistent tympanic membrane perforation associated with COM can result in recurrent ear discharge, conductive hearing loss, reduced quality of life and social disability. Tympanoplasty is a well-established surgical procedure aimed at eradicating disease, closing tympanic membrane perforations and restoring hearing function through

reconstruction of the sound-conducting mechanism of the middle ear.^{1,2} Traditionally, tympanoplasty has been performed under general anesthesia with inpatient admission. However, advances in surgical techniques, anesthetic methods and perioperative care have facilitated the transition of many otologic procedures to outpatient or day-case settings.^{3,4} Day-case surgery refers to planned surgical procedures in which patients are admitted, operated upon and discharged on the same day. This approach has gained increasing acceptance because of its potential to reduce hospital stay, lower healthcare costs, minimize disruption to patients' daily activities and improve hospital resource utilization.^{4,5} Local anesthesia has emerged as an attractive alternative to general anesthesia for selected tympanoplasty patients. The technique provides several advantages, including avoidance of risks associated with general anesthesia, reduced postoperative nausea and vomiting, shorter recovery time, earlier ambulation and lower overall treatment costs.⁶

Furthermore, the vasoconstrictive effect of adrenaline-containing local anesthetic solutions may contribute to a clearer surgical field, facilitating meticulous middle-ear surgery.⁷ Several studies have reported that tympanoplasty under local anesthesia is well tolerated by patients and is associated with high levels of patient satisfaction and favorable surgical outcomes.^{6,8} The growing emphasis on minimally invasive and patient-centered healthcare has further encouraged the adoption of outpatient otologic surgery. Endoscopic and microscopic tympanoplasty techniques have demonstrated high graft uptake rates and significant postoperative hearing improvement while maintaining safety in day-case settings.² Moriguchi reported satisfactory hearing outcomes and minimal complications following one-day tympanoplasty under local anesthesia, highlighting the feasibility of outpatient management for appropriately selected patients.⁹

Similarly, studies evaluating local anesthesia without sedation have demonstrated excellent patient compliance, low complication rates and substantial cost-effectiveness, particularly in resource-limited healthcare systems.^{5,8} Despite these advantages, concerns remain regarding patient comfort, anxiety, intraoperative pain and postoperative complications when tympanoplasty is performed as a day-case procedure under local anesthesia. Variations in patient selection, surgical techniques and perioperative protocols have resulted in differing reports regarding outcomes and patient experiences.^{5,8} Consequently, continuous evaluation of clinical outcomes is necessary to determine the effectiveness and safety of this approach in different healthcare settings.

METHODS

This prospective study was conducted in the Department of Otolaryngology and Head-Neck Surgery, Bangladesh Medical College and Hospital, Dhaka, from January 2008 and September 2008. A total of 100 patients diagnosed

with CSOM, tubo-tympanic variety, who were scheduled for day-case tympanoplasty under local anesthesia, were enrolled in the study. Eligible patients were aged between 12 and 60 years and had dry ears free from discharge for at least 6 weeks before surgery. Patients younger than 12 years or older than 60 years, those with active ear discharge, systemic diseases such as hypertension, myocardial infarction or bleeding disorders, attico-antral disease, inner ear pathology, vertigo, labyrinthine fistula or otitis externa were excluded. All patients underwent tympanoplasty using the underlay technique with temporalis fascia graft under local anesthesia. Detailed demographic data, clinical history, examination findings and perioperative and postoperative outcomes were recorded.

Postoperative follow-up was conducted weekly during the first month, at 3 months, at 6 months and thereafter as required. The mean follow-up duration was 14 weeks (range: 10–22 weeks). Surgical outcome was considered successful when the operated ear remained dry and the tympanic membrane was intact and mobile on follow-up examination. Audiological assessment was performed three months after surgery according to international organization for standardization (ISO) standards and hearing outcomes were evaluated by comparing preoperative and postoperative air-bone gaps. Descriptive statistics were adopted in this study. Data analysis was done using SPSS version 26.0. Ethical clearance was obtained from Bangladesh Medical College and Hospital.

RESULTS

Among the 100 study participants, the majority were aged 25–35 years (63.0%), followed by 15–25 years (21.0%) and 35–55 years (16.0%). Male patients constituted 58.0% of the study population, while females accounted for 42.0%. The surgical success rate was higher among males (94.82%) than among females (88.09%). Regarding socioeconomic status, most patients belonged to the middle-class group (78.0%), whereas 12.0% were from poor-class families and 10.0% from higher-class families. The highest age-specific success rate was observed in the 25–35 years age group (95.24%) (Table 1).

All patients (100.0%) presented with a history of intermittent otorrhoea, making it the most common symptom, followed by hearing loss (70.0%) and tinnitus (22.0%). Unilateral ear involvement was observed in 63.0% of patients and was associated with a higher graft success rate (95.24%) than bilateral involvement (86.49%).

Medium-sized perforations were the most frequent (62.0%), followed by small (20.0%) and subtotal perforations (18.0%). Small perforations demonstrated the highest success rate (95.00%), whereas subtotal perforations showed the lowest (83.33%). Regarding perforation site, anterior perforations were the most common (48.0%), followed by posterior (34.0%) and

subtotal perforations (18.0%). Graft success rates were comparable between anterior (93.75%) and posterior (94.12%) perforations, while subtotal perforations had a lower success rate (83.33%) (Table 2).

The endaural approach was the most commonly used surgical route, accounting for 86.0% of cases, followed by the trans canal approach (8.0%) and the postauricular approach (6.0%). The highest graft success rate was observed with the endaural approach (93.02%), while the trans canal and postauricular approaches showed success rates of 87.50% and 83.33%, respectively (Table 3). All 100 patients underwent tympanoplasty as a day-case procedure under local anesthesia. No patient received general anesthesia. The overall surgical success rate was

92.0%, with successful graft uptake achieved in 92 of the 100 cases (Table 4). Before surgery, the majority of patients (58.0%) had an air conduction threshold between 20 and 40 dB, while 25.0% had thresholds between 40 and 50 dB and 12.0% had thresholds below 20 dB. The mean preoperative air conduction threshold was 32.4 dB. Postoperatively, a marked improvement in hearing was observed, with 65.0% of patients achieving an air conduction threshold between 0 and 20 dB, compared to only 12.0% before surgery. The mean postoperative air conduction threshold decreased to 16.68 dB. Among the 92 patients with successful graft uptake, hearing gain was achieved in 84 (91.3%) patients, whereas only 8 (8.7%) patients showed no significant improvement (Table 5).

Table 1: Demographic and socioeconomic characteristics of the study participants and surgical outcomes (n=100).

Variables	Category	Total patients, N (%)	Successful cases, N (%)
Age group (in years)	15–25	21 (21.0)	18 (85.71)
	25–35	63 (63.0)	60 (95.24)
	35–55	16 (16.0)	14 (87.50)
Sex	Male	58 (58.0)	55 (94.82)
	Female	42 (42.0)	37 (88.09)
Socioeconomic status	Poor class	12 (12.0)	—
	Middle class	78 (78.0)	—
	Higher class	10 (10.0)	—

Table 2: Clinical characteristics, perforation features and surgical outcomes of the study participants (n=100).

Variables	Category	Total patients, N (%)	Successful cases, N (%)
Presenting symptoms	History of intermittent otorrhoea	100 (100.0)	—
	Hearing loss	70 (70.0)	—
	Tinnitus	22 (22.0)	—
Ear involvement	Unilateral	63 (63.0)	60 (95.24)
	Bilateral	37 (37.0)	32 (86.49)
Size of perforation	Small	20 (20.0)	19 (95.00)
	Medium	62 (62.0)	58 (93.55)
	Subtotal	18 (18.0)	15 (83.33)
Site of perforation	Anterior	48 (48.0)	45 (93.75)
	Posterior	34 (34.0)	32 (94.12)
	Subtotal	18 (18.0)	15 (83.33)

Table 3: Distribution of surgical approach and surgical outcomes (n=100).

Surgical approach	Total patients, N (%)	Successful cases, N (%)
Postauricular	6 (6.0)	5 (83.33)
Endaural	86 (86.0)	80 (93.02)
Transcanal	8 (8.0)	7 (87.50)
Total	100 (100.0)	92 (92.0)

Table 4: Distribution of type of anesthesia and surgical outcomes (n=100).

Type of anesthesia	Total patients, N (%)	Successful cases, N (%)
Local anesthesia	100 (100.0)	92 (92.0)
General anesthesia	0 (0.0)	0 (0.0)
Total	100 (100.0)	92 (92.0)

Table 5: Preoperative and postoperative hearing outcomes following tympanoplasty (n=100).

Variables	Category	No. of patients (%)
Preoperative air conduction threshold	0–20 dB	12 (12.0)
	20–40 dB	58 (58.0)
	40–50 dB	25 (25.0)
	Mean (dB)	32.4
Postoperative air conduction threshold	0–20 dB	65 (65.0)
	20–40 dB	22 (22.0)
	40–50 dB	5 (5.0)
	Mean (dB)	16.68
Hearing outcome (n=92 successful cases)	Hearing gain	84 (91.30)
	No improvement	8 (8.70)

DISCUSSION

Patient's age has generally been considered to influence surgical outcomes. In the study, the maximum success rate was in the age group 25-35 years (95.38%), followed by 85.71% and 87.5% in the age group of 15-25 years and 35-45 years, respectively. Vrabee et al found better success with active age.⁹ This is due to lower incidence of upper airway infections and better eustachian tube function in this age and the relative immaturity of the immune system in younger children. Males outnumbered the females in a ratio of 1.38:1. There was no significant difference in surgical outcome (94.82% vs 88.09% in males and females, respectively). The majority of the patients in our study came from middle-class families (78%) and H/O intermittent otorrhoea (previously) and hearing loss were the major symptoms of this series. 100% of the patients had complained of intermittent otorrhoea previously and 73% of the patients had hearing loss. Sixty-three out of the one hundred patients had unilateral and thirty-seven bilateral diseases.

The surgical success (operation done only on one ear) rate was 95% in the former and 86% in the latter, a difference that was not statistically significant. The discrepancy between our results and those of Kessler et al and Denoyelle et al who found that a pathological contralateral ear independently influences the risk of graft material, seems to be related to the fact that our cases did not show any inflammatory changes in the contralateral ear.^{10,11}

Concerning the role of the size of perforation, small (95%) and medium-sized (93%) perforations had a higher success rate than subtotal perforation (83%). The site of perforation statistically affects outcome in our series, as has been previously reported by others.¹² Success rates of posterior perforation (94%) and anterior perforation (93.75%) are more than that of subtotal perforation (83%). Success rates among the three surgical approaches are: the success rate was 83.33% in post-auricular, 93.02% in endaural and 87.5% in trans-canal approach. In the study, all patients (100 cases) were given local anesthesia and were treated as a day case surgery. The surgical success

rate is 92%. The mean pre and post-operative air conduction threshold in the successful cases was 32.4 dB and 16.68 dB, respectively, with a mean audiological improvement of 15.72 dB.

Limitations

It was conducted in a single tertiary care center with a relatively limited sample size, which may restrict the generalizability of the findings to a broader population. The follow-up period was relatively short, which may not adequately reflect long-term surgical outcomes and late complications. Additionally, the study lacked a comparative group undergoing tympanoplasty under general anesthesia or inpatient care, which would have provided stronger evidence regarding the relative advantages of day-case surgery under local anesthesia.

CONCLUSION

Tympanoplasty performed as a day-case surgery under local anesthesia demonstrates excellent clinical outcomes with a high rate of graft uptake and satisfactory hearing improvement. The procedure is well tolerated, with most patients successfully managed in an outpatient setting, thereby avoiding the need for hospital admission and general anesthesia. The findings of this study indicate that day-case tympanoplasty under local anesthesia is a safe, effective and cost-efficient approach for appropriately selected patients with chronic suppurative otitis media, particularly the tubo-tympanic variety.

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