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ALTERATION OF TASTE SENSATION FOLLOWING MIDDLE EAR SURGERY: A CROSS-SECTIONAL STUDY

Otorhinolaryngology

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ABSTRACT

Background: Taste disturbance is a recognized but often under-reported complication of middle ear surgery, primarily due to injury or manipulation of the chorda tympani nerve (CTN). Such disturbances may significantly affect postoperative quality of life. **Objectives:** To evaluate the presence and pattern of altered taste sensation following middle ear surgeries and to correlate postoperative taste changes with the type and degree of intraoperative CTN injury. **Materials and Methods**: A hospital-based cross-sectional study was conducted in patients undergoing middle ear surgeries at a tertiary care centre in Central India. Taste sensation was assessed postoperatively using chemical taste testing for sweet, salty and sour modalities. Intraoperative CTN status was documented as intact, manipulated, or cut. Patients were followed up to assess persistence or recovery of taste disturbances. **Results:** A proportion of patients developed postoperative taste alteration, with higher incidence observed in cases where the CTN was manipulated or cut intraoperatively. Canal wall down mastoidectomy showed a greater association with taste disturbance compared to less extensive procedures. Partial or complete recovery was observed in several patients over follow-up. **Conclusion:** Alteration in taste sensation is a significant postoperative outcome of middle ear surgery and correlates strongly with the extent of CTN handling. Meticulous surgical technique and nerve preservation, whenever feasible, are essential to minimize postoperative dysgeusia.

KEYWORDS

Chorda tympani nerve; Middle ear surgery; Taste disturbance; Chronic otitis media

INTRODUCTION

Taste sensation plays a vital role in nutrition, appetite regulation, and overall quality of life. Gustatory perception from the anterior two-thirds of the tongue is primarily mediated by the chorda tympani nerve (CTN), a branch of the facial nerve that traverses the middle ear cavity. Owing to its exposed and variable anatomical course, the CTN is particularly vulnerable during middle ear surgeries. [6,7]

Middle ear procedures such as tympanoplasty, mastoidectomy, and stapedotomy are commonly performed for chronic otitis media and related pathologies. During these surgeries, the CTN may be manipulated, or sacrificed to achieve adequate disease clearance and surgical exposure. Injury to the CTN can result in postoperative taste disturbances ranging from transient dysgeusia to persistent ageusia. [1,4,5]

The present study was undertaken to evaluate the incidence and recovery pattern of taste alteration following various middle ear surgeries and to assess the relationship between postoperative taste disturbance and the intraoperative status of the chorda tympani nerve. [1,2,3]

MATERIALS AND METHODS

This was a hospital-based cross-sectional observational study conducted in the Department of Otorhinolaryngology at a tertiary care teaching hospital in Central India over the study period corresponding to the academic years 2023–2025. Patients undergoing middle ear surgery for chronic otitis media were enrolled after obtaining written informed consent. Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study.

Patient posted for middle ear surgery after obtaining voluntary informed written consent included in study.

Patients having preop unreliable response for taste sensations and altered taste sensations in pre-operative assessment were excluded from the study.

The surgical procedures performed included tympanoplasty, canal wall up mastoidectomy, and canal wall down mastoidectomy, stapedoctomy depending on the extent and type of disease. During surgery, the status of the chorda tympani nerve was carefully noted and categorized as:1) Intact 2) Manipulated 3) Cut Postoperative taste sensation was assessed using chemical taste testing. Standard solutions for sweet, salty and sour tastes were prepared using 10gm sugar and 1gm sodium chloride dissolved in 100ml distilled water and lemon juice respectively. Taste testing was performed on the anterior two-thirds of the tongue on the operated side, with the contralateral side serving as control. Patients were asked to identify the taste perceived, and any alteration was documented. [8]

Patients were evaluated preoperatively day before surgery and postoperatively on day 1 for subjective taste disturbance and were followed up at 1 month and 3 months to assess persistence or recovery of symptoms. [2,4] The primary outcome measure was the presence or absence of altered taste sensation, while secondary outcomes included correlation with type of surgery and degree of chorda tympani nerve injury.

Statistical analysis was done using Fischer exact test.

RESULTS

A total of 100 patients undergoing middle ear surgery were included in the study. The majority of patients belonged to the 21–30-year age group, and there was a male predominance with a male-to-female ratio of approximately 1.9:1.

Seventeen patients (17%) developed altered taste sensation in the immediate postoperative period (postoperative day 1). The taste alteration progressively decreased over follow-up, with 14% at one month and 6% at three months postoperatively.

Association With Intraoperative Chorda Tympani Nerve Status

Taste disturbance was strongly associated with the intraoperative status of the chorda tympani nerve. None of the patients in whom the CTN was preserved intact developed taste alteration at any follow-up point. In contrast, patients with manipulated or cut CTN showed a significantly higher incidence of taste disturbance. (Table 1)

Table 1: Proportion Of Patients With Altered Taste At POD 1, 1 Month & 3 Months Follow Up With Respect To Intraoperative Chorda Tympani Nerve Status(n=100)

Intraop Chorda Tympani Status	Taste At POD 1		Taste At 1 Month		Taste At 3 Month	
	NORMAL	ALTERED	NORMAL	ALTERED	NORMAL	ALTERED
INTACT	66(66%)	0(0%)	66(66%)	0(0%)	66(66%)	0(0%)

MANIPULATED	14 (14%)	8(8%)	17(17%)	5(5%)	19(19%)	3(3%)
CUT	3(3%)	9(9%)	3(3%)	9(9%)	9(9%)	3(3%)
TOTAL	83(83%)	17(17%)	86(86%)	14(14%)	94(94%)	6(6%)
p value	<0.001	<0.001	<0.001			

Table 2: Proportion Of Patients With Altered Taste At POD1, 1 Month & 3 Months Follow Up After Middle Ear Surgeries (n=100)

Middle Ear Surgery	Taste At POD 1		Taste At 1 Month		Taste At 3 Months	
	NORMAL	ALTERED	NORMAL	ALTERED	NORMAL	ALTERED
TYMPANOPLASTY	48(48%)	1 (1%)	48(48%)	1(1%)	49(49%)	0(0%)
CORTICAL MASTOIDECTOMY WITH TYMPANOPLASTY	4(4%)	0(0%)	4(4%)	0(0%)	4(4%)	0(0%)
CANAL WALL DOWN MASTOIDECTOMY	22 (22%)	9(9%)	24(24%)	7(7%)	26(26%)	5(5%)
CANAL WALL UP MASTOIDECTOMY	6(6%)	7(7%)	7(7%)	6 (6%)	12(12%)	1 (1%)
STAPEDOTOMY	3(3%)	0(0%)	3(3%)	0(0%)	3(3%)	0(0%)
TOTAL	83(83%)	17 (17%)	86 (86%)	14(14%)	94(94%)	6(6%)
p value	<0.001		<0.001		0.022	

Association With Type Of Surgery

Taste disturbance occurred most commonly following canal wall down mastoidectomy (52.9%) and canal wall up mastoidectomy (41.2%). Tympanoplasty accounted for only one case (5.9%) of taste alteration, while cortical mastoidectomy with tympanoplasty and stapedotomy were not associated with postoperative taste disturbance in this study. However, when adjusted for CTN status, the type of middle ear surgery did not show a statistically significant association with taste outcome. (Table 2)

Recovery Pattern

Among the 17 patients who developed taste disturbance, 11 patients (64.7%) showed complete recovery of taste sensation by the three-month follow-up. Six patients (35.3%) had persistent taste alteration at three months, the majority of whom had intraoperative transection of the CTN. (Table 3)

Table 3: Proportion Of Patients Who Recovered Altered Taste At 3 Follow Up With Respect To Chorda Tympani Nerve Injury (n=17)

Intraop Chorda Tympani Nerve Status	Post Op Taste Altered	Taste Recovered At 3 Month F/U
INTACT	0(0%)	0(0%)
MANIPULATED	8(47.1%)	5(29.4%)
CUT	9(52.9%)	6(35.3%)
TOTAL	17(100%)	11(64.7%)

Among the 17 patients who developed postoperative taste alteration, analysis based on the type of middle ear surgery revealed that taste disturbance was most frequently observed following canal wall down mastoidectomy (52.9%) and canal wall up mastoidectomy (41.2%). Tympanoplasty accounted for only one case (5.9%), while no taste alteration was noted following cortical mastoidectomy with tympanoplasty or stapedotomy. Of the affected patients, 64.7% demonstrated complete recovery of taste sensation within three months, with the highest recovery rates observed in patients undergoing canal wall up mastoidectomy. (Table 4)

There was a statistically significant association between intraoperative chorda tympani nerve status and 3-month postoperative chorda tympani nerve findings ($p < 0.001$). Altered outcomes were more frequent in the manipulated and cut groups, while all patients with intact CTN status had normal findings at 3 months. Although taste disturbance was more frequently observed following canal wall down and canal wall up mastoidectomy, the type of surgery did not show a statistically significant association with taste outcome once CTN status was accounted for.

Table 4: Proportion Of Patients Who Recovered Altered Taste At 3 Follow Up After Middle Ear Surgeries(n=17)

Middle Ear Surgery	Post Op Taste Altered	Taste Recovered At 3 Month F/U
TYMPANOPLASTY	1(5.9%)	1(5.9%)
CORTICAL MASTOIDECTOMY WITH TYMPANOPLASTY	0(0%)	0(0%)
CANAL WALL DOWN MASTOIDECTOMY	9(52.9%)	4(23.5%)
CANAL WALL UP MASTOIDECTOMY	7(41.2%%)	6(35.3%)
STAPEDOTOMY	0(0%)	0(0%)
TOTAL	17(100%)	11(64.7%)

DISCUSSION

The present study demonstrates that postoperative taste disturbance is a relatively common but predominantly transient complication following middle ear surgery, with an overall incidence of 17%. This finding is consistent with previously published literature, including the study by Gopalan et al., who reported an incidence of 14%, and Rehman et al., who reported an incidence of approximately 18%. [1,3]

A key finding of this study is the strong association between postoperative taste disturbance and the intraoperative status of the chorda tympani nerve. Patients in whom the CTN was preserved intact did not develop taste disturbance at any follow-up point, underscoring the importance of meticulous surgical technique. In contrast, manipulation or transection of the CTN significantly increased the risk of postoperative dysgeusia. [9]

Patients with CTN manipulation commonly experienced transient taste disturbance with gradual recovery over time. This pattern is likely attributable to neuropraxia or mild axonotmesis, where nerve conduction is temporarily impaired but recovery occurs through resolution of oedema, axonal regeneration, or central compensation via the glossopharyngeal nerve and contralateral CTN. [10]

Transection of the CTN was associated with a higher incidence of persistent taste disturbance and poorer short-term recovery. In the present study, 35.3% of symptomatic patients had persistent taste alteration at three months, most of whom had a transected nerve. Gopalan et al. reported a higher overall recovery rate of 92% by 12 months, suggesting that longer follow-up may reveal further improvement in patients with severe nerve injury.

CONCLUSION

Alteration of taste sensation is a clinically significant but often temporary complication of middle ear surgery. The intraoperative status of the chorda tympani nerve is the most critical factor influencing postoperative taste outcomes. Preservation of the nerve effectively prevents taste disturbance, while manipulation or transection increases both the incidence and duration of dysgeusia. Longer follow up and objective taste assessment methods would be more reliable.

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