

Surgical Outcomes of Mastoidectomy for Facial Nerve Identification during Parotidectomy

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ABSTRACT

Objective: To analyze a series of patients undergoing parotidectomy with concurrent mastoidectomy. To describe characteristics of patients requiring mastoidectomy for facial nerve identification and post-operative outcomes.

Study Design: A case series with chart review of patients undergoing parotidectomy and mastoidectomy between 2005-2014.

Methods: Clinical and operative notes were analyzed to record indication for mastoidectomy, pathology, other operative/reconstructive procedures, and preoperative and postoperative facial nerve function.

Results: 75 patients were identified. 60 were excluded (29 lateral temporal bone resections, 17 malignancy identified at the stylomastoid foramen, 14 facial nerves sacrificed due to malignancy). The 15 remaining patients were analyzed. All had preliminary mastoidectomies with successful identification of the facial nerve. The median age was 53 with 60% being women. Eleven had a benign process while 4 had carcinoma. All had previous parotid surgery. Parotidectomies performed were: superficial (2), total (6), partial (2), revision (5). On follow-up, 10 had normal facial nerve function while 5 had decreased function.

Conclusion: Mastoidectomy is considered an adjunct to parotidectomy in selected patients to assist in facial nerve identification. While facial nerve function is preserved in most, a portion of patients can have a permanent deterioration.

Level of Evidence: Individual Cohort Study (2b)

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INTRODUCTION

Parotidectomy is a common Otolaryngologic procedure with facial nerve identification and preservation a key component. In the majority of cases this is a straightforward surgical exercise. The nerve can be identified at the stylomastoid foramen or by retrograde dissection. Occasionally, identification of the facial nerve using traditional landmarks is not safe and more proximal identification, in the mastoid bone, is required.

In cases of complicated parotid gland resections without tumor invasion of the facial nerve, isolated mastoidectomy and resection of the mastoid tip can be used to provide the necessary exposure without additional resection. Understanding the indications for and surgical outcomes of adjunctive mastoidectomy is an important component of surgical planning for patients undergoing parotidectomy.

To our knowledge, pre-operative characteristics and outcomes after isolated mastoidectomy for facial nerve identification has not been well described. In this study we review our institution's experience with parotidectomy with concurrent mastoidectomy for facial nerve identification and discuss patient characteristics, indications, and surgical outcomes.

METHODS AND MATERIALS

This study was approved by the Institutional Review Board of the Oregon Health and Science University. We performed a case series with chart review of patients who underwent parotidectomy with concurrent mastoidectomy at a tertiary academic medical center between January 1, 2005 and December 31, 2014.

Patients who required mastoidectomy to facilitate facial nerve identification were analyzed for surgical and clinical characteristics, clinical course, tumor histology, surgical pathology, and operative outcomes.

RESULTS

All patients who required adjunctive isolated mastoidectomy for facial nerve identification had undergone prior parotid surgery. The complete facial nerve was preserved in 80% of patients. Three patients who initially had successful identification of the facial nerve via mastoidectomy, ultimately required nerve sacrifice due to suspicion for nerve infiltration during the parotidectomy portion of the operation.

Table 1. Patient demographics and preoperative data

Age (years)	53 (14-90)
Gender	
Male	6 (40%)
Female	9 (60%)
Primary Disease	0 (0%)
Recurrent Disease	15 (100%)
Prior surgery	15 (100%)
Prior radiation	1 (6%)
Prior chemotherapy	1 (6%)
Pre-operative HB grading	
1	9 (60%)
2	2 (13%)
3	2 (13%)
4	1 (6%)
5	0 (0%)
6	1 (6%)

Table 2. Preoperative tumor pathology

Pathology	
Benign	11 (73%)
Pleomorphic Adenoma	3 (20%)
Warthin tumor	1 (6%)
Parotiditis	1 (6%)
Reactive follicular hyperplasia	2 (13%)
Branchial arch cyst	1 (6%)
Schwannomatosis	1 (6%)
Oncocytic adenomatosis	1 (6%)
Exploration for injury	
Malignant	4 (27%)
Mucoepidermoid carcinoma(MEC)	1 (6%)
Squamous cell carcinoma	2 (13%)
Adenocarcinoma	1 (6%)

Table 4. Pre-op and post-op House-Brackmann grading score and associated surgical pathology

Patient	Pathology	Preoperative HB grade	Immediate Postoperative HB grade	Last follow-up HB grade
1	Warthin tumor	1	1	1
2	Pleomorphic adenoma	1	1	1
3	1 st branchial arch cyst	1	1	1
4	MEC	1	1	1
5	Schwannoma	1	3	1
6	Reactive hyperplasia	1	3	1
7	Reactive hyperplasia	2	3	2
8	Chronic sialadenitis	2	4	2
9	SCC	3	3	3
10	Facial nerve injury	6	6	6
11	Oncocytic adenomatosis	1	4	2
12	Adenocarcinoma	1	6	4
13	SCC	4	6	6
14	Pleomorphic adenoma	3	6	5
15	Pleomorphic adenoma	1	6	5

DISCUSSION

Approximately 5% of parotidectomy operations will require adjunctive temporal bone resection usually secondary to tumor invasion. Isolated mastoidectomy can also be performed primarily to facilitate early identification of the facial nerve. Revision parotidectomy is the most common reason. Facial nerve identification in these cases may be difficult due to scarring or abnormal dissection planes. The risk to the facial nerve is high. Identification of the normal facial nerve in the mastoid is usually easily accomplished and allows for distal dissection and preservation of the nerve.

In the majority of cases facial nerve function is preserved. At our institution, we evaluate patients for need for adjunctive mastoidectomy which can potentially improve exposure and assist with identification. Patients that have undergone previous parotidectomy or have pathology at the stylomastoid foramen that will obscure traditional landmarks and make dissection difficult are candidates for a mastoidectomy.

In our study population, the main facial trunk was identified and preserved initially via isolated mastoidectomy in all patients. However, ultimately 20% of patients had facial nerve sacrifice due to suspicion of nerve involvement distal to the stylomastoid foramen during the completion of the parotidectomy.

Table 3. Surgical management, indications and adjuvant therapy and pathologic data.

Parotidectomy	
Superficial	2 (13%)
Partial	2 (13%)
Total	6 (40%)
Revision	5 (4%)
Indication for mastoidectomy	1 (6%)
Referral for aborted parotidectomy	12 (80%)
Identification in the setting of scarring	2 (13%)
Decompression	
Nerve Preserved	12 (80%)
Nerve Sacrificed	3 (20%)
Main trunk	2 (13%)
Lower segment	1 (6%)
Indication for nerve sacrifice	
Gross tumor involvement	2 (13%)
Non-functional and edematous nerve	1 (6%)
Additional procedures	
Nerve graft	3 (20%)
Neck Dissection	3 (20%)

CONCLUSIONS

- Mastoidectomy was performed primarily to facilitate early identification of the nerve and optimize preservation
- Revision parotidectomy is the primary reason for adjunctive mastoidectomy
- 73% of cases were for benign disease
- 80% of patients had preservation of the facial nerve
- 33% had diminished function at last follow-up
- Adjunctive mastoidectomy may be helpful in select cases of recurrent parotid disease

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