



Mastoidectomy in an Inpatient Population: An analysis of patient comorbidities, complications, diagnosis, and procedure type

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Abstract

- Objectives:** Characterize inpatient mastoidectomy with respect to patient demographics, comorbidities, diagnosis, procedure type, and 30-day postoperative complications.
- Study Design:** Retrospective analysis using the NSQIP database.
- Methods:** NSQIP was queried for all cases of mastoidectomy from 2005-2013 using current procedural terminology (CPT) codes. Patients were identified as inpatient (n=314) or outpatient (n=1572) and compared via bivariate analyses.
- Results:** Of the 1896 mastoidectomies identified, 16.6% were performed as inpatient procedures. Inpatients were more likely to be aged 61-80 (p=0.003), and had significantly higher rates of several comorbidities including hypoalbuminemia, wound infection, systemic sepsis, emergency procedure, and elevated ASA class (p<0.001). Inpatient procedures were associated with higher rates of postoperative complications (8.9% vs. 2.1%, p<0.001), including superficial surgical-site infection (p=0.035), bleeding (p<0.001), unplanned readmission (p=0.008), and reoperation (p=0.035). Inpatients were more likely to undergo mastoidectomy alone (24.2% vs. 5.0%, p<0.001), while outpatients more commonly underwent mastoidectomy with tympanoplasty (tympanomastoidectomy) (61.5% vs. 82.7%, p<0.001). Postoperative diagnoses were distributed differently between groups, with inpatients more frequently diagnosed with malignant neoplasm (p<0.001) and chronic nonsuppurative otitis media (p<0.001) and outpatients with cholesteatoma (p<0.001).
- Conclusions:** Mastoidectomy is a relatively safe procedure with minimal morbidity and thus is infrequently performed as an inpatient procedure. Inpatients undergoing this procedure, however have significantly higher rates of comorbidities and postoperative complications. Furthermore, the frequency of specific procedure type and postoperative diagnosis varies significantly between groups.

Introduction

- Mastoidectomy is a common otologic procedure performed to remove disease involving the mastoid air cells or access deeper structures
- There are 5 types of mastoidectomy. In order of increasing extent, they are: Simple, Canal Wall Up, Canal Wall Down, Modified Radical, and Radical^{1,2}
- The most common indications for mastoidectomy are chronic otitis media, cholesteatoma, cochlear implantation, & removal of lateral skull base neoplasms
- Concurrent procedures such as tympanoplasty and ossicular chain reconstruction are often required to improve functional outcomes³
- The most commonly reported post-operative complications in mastoidectomy are non-otologic-specific such as bleeding and infection. Common otologic-specific complications include facial nerve injury, hearing loss, vertigo, change in taste, fistula formation, dural injury, and vascular injury⁴⁻⁶
- Mastoidectomies are relatively safe with low rates of overall complications, and are therefore most often performed on an outpatient basis
- There are no single-institution or national database studies assessing the rate or characterizing the clinicopathologic features of inpatient mastoidectomies
- Inpatient procedures frequently carry higher rates of postoperative complications, but this may be a function of patient comorbidities and operative indications⁷
- The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) is a validated multi-institution outcomes database
- The goal of this study is to utilize the NSQIP variables to analyze the pre-operative comorbidities, diagnoses, procedure type, and post-operative complications associated with inpatient mastoidectomy

Methods

- The NSQIP database was queried for all cases of mastoidectomy using relevant Current Procedural Terminology (CPT) codes for primary procedure
- Cases were stratified into inpatient and outpatient cohorts and compared for rates of procedure type and postoperative diagnosis, identified by ICD-9 code
- Cohorts were also compared for distribution of demographic variables, preoperative characteristics, and postoperative outcomes
- Significance was assessed via bivariate chi-squared analysis using SPSS Version 23

Results

Figure 1. Distribution of Mastoidectomy Procedure Types (%)

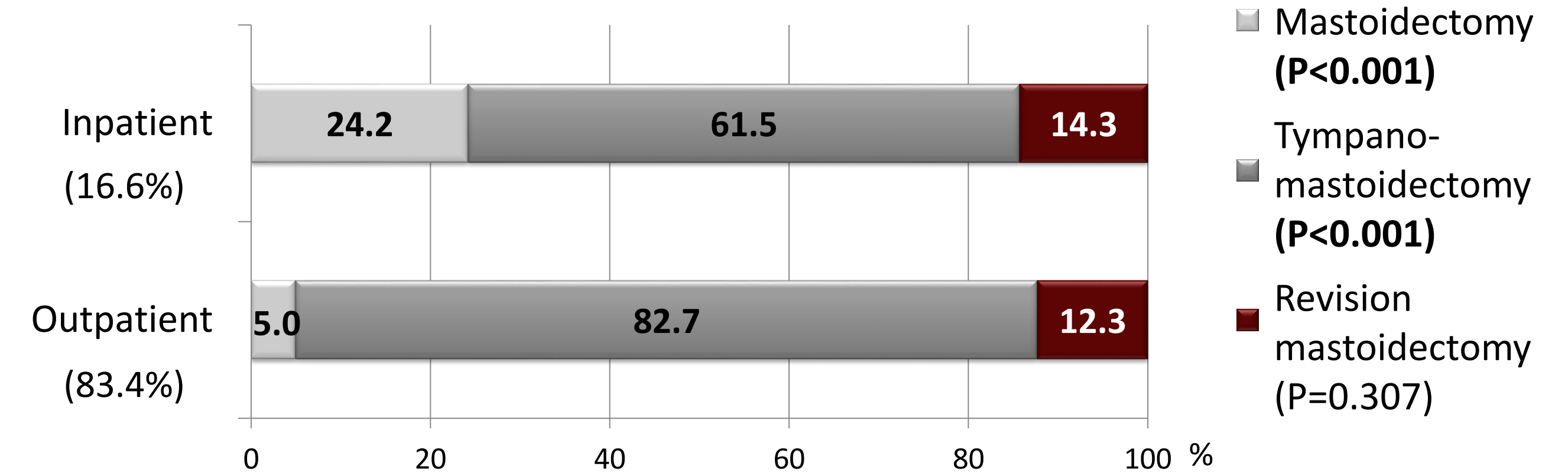


Table 1. Rates of Postoperative Diagnoses in Inpatient (In) & Outpatient (Out) Mastoidectomies

	N	In (%)	Out (%)	P
Cholesteatoma	513	18.8	28.7	<0.001
Mastoiditis	159	8.6	8.3	0.882
Suppurative Otitis Media	102	7.3	5.0	0.094
Hearing Loss	97	2.5	5.6	0.024
Perforated Tympanic Membrane	67	1.6	3.9	0.044
Neoplasm	50	11.5	0.9	<0.001
Chronic Non-Suppurative Otitis Media	37	4.5	1.5	<0.001

Table 2. Significant Comorbidities

	In %	Out %	P
ASA Class 3+4	36.3	22.0	<0.001
Dyspnea	5.7	3.0	0.014
Previous Cardiac Surgery	5.3	2.1	0.014
Alcohol Use	4.8	1.8	0.017
Wound Infection	3.8	0.9	<0.001
Corticosteroids	3.8	1.3	0.001
Bleeding Disorder	3.2	1.1	0.004
Systemic Sepsis	3.5	0.3	<0.001
Emergent Surg.	3.5	0.3	<0.001
CNS Tumor	1.6	1.0	0.026

Insignificant variables include Age, Sex, Race, Smoking, Obesity, Diabetes, Hypertension (on meds), COPD, On Dialysis, Prior Stroke

Table 3. Significant Complications

	In %	Out %	P
Superficial SSI	2.9	1.3	0.035
Bleeding	2.9	0.0	<0.001
Ventilator >48 hours	1.0	0.0	0.005
Pneumonia	1.0	0.1	0.016
Stroke	1.0	0.0	0.005
MI	0.6	0.0	0.027
Graft failure	0.6	0.0	0.027
Sepsis	0.6	0.0	0.027
Surgical Comps.	6.7	2.0	<0.001
Medical Comps.	3.2	0.1	<0.001
Overall Comps.	8.9	2.1	<0.002

Insignificant variables include DVT, UTI, Septic Shock, Pulmonary Emboli, Nerve Injury, Deep SSI, Wound Disruption. SSI = Surgical Site Infection

Discussion & Conclusions

- Mastoidectomy is a relatively safe procedure with an overall complication rate of 3.2%, with the majority of these being surgical (2.7%)
- Patients undergoing this procedure as an inpatient have significantly higher rates of surgical, medical, and overall complications (Table 3)
- It is likely that inpatients have increased complication rates as a consequence of numerous comorbid conditions and more extensive pathology
- This is supported by our analysis of postoperative diagnosis, which reveals outpatients are more likely to undergo mastoidectomy for benign, chronic conditions such as cholesteatoma, with inpatients associated with pathologic diagnoses such as neoplasms (Table 1)
- Inpatients have inferior preoperative health status with higher rates of various risk factors, and are more likely to require an emergent operation (Table 2)
- The distribution of procedure type varies between these cohorts, with inpatients more likely to undergo mastoidectomy only
- Further work should seek to better identify the admission indications for these inpatient mastoidectomies and better account for comorbid conditions in these patients when analyzing the complications associated with inpatient mastoidectomy procedures

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