



Adverse Events Following Vestibular Schwannoma Surgery: A Comparison of Surgical Approach Using the National Surgical Quality Improvement Program Database

Anthony M. Tolisano, MD¹; Philip D. Littlefield, MD¹
¹Department of Otolaryngology, Tripler Army Medical Center, Honolulu, HI, USA

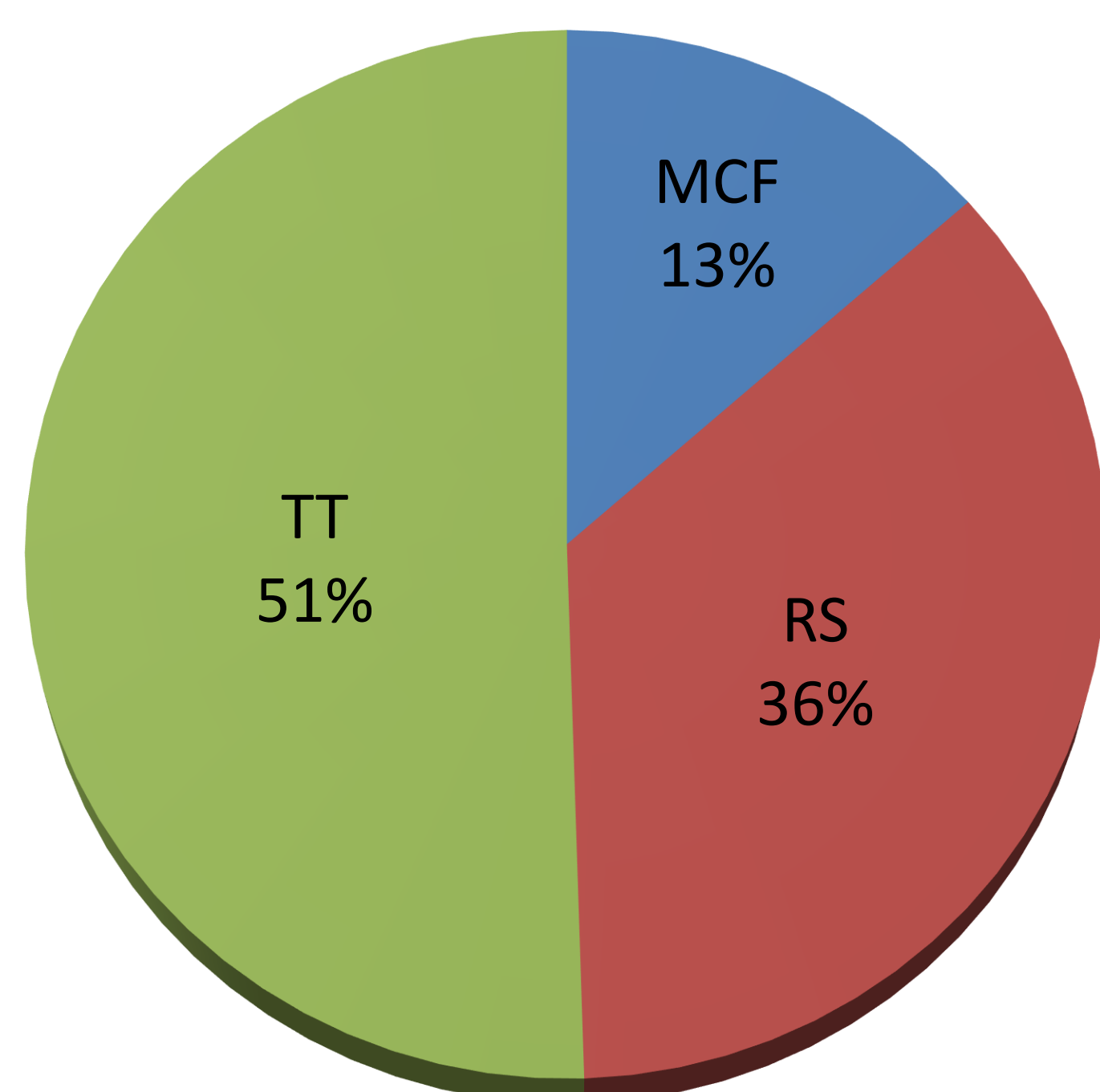
Introduction

The three traditional surgical approaches to vestibular schwannoma (VS) are middle cranial fossa (MCF), retrosigmoid (RS), and transtemporal (TT). The Accreditation Council for Graduate Medical Education has identified each of these approaches as essential to neurotology fellowship competency.¹ As such, the complication rates among these approaches is important in the context of neurotology training. However, most studies evaluating complications from VS surgery are from a single-institution. In contrast, the American College of Surgeons-National Surgical Quality Improvement Program (ACS-NSQIP) is a multi-institutional database consisting of over 700 hospitals nationwide,² and provides a standardized means to assess complications over a broader subset of this patient population. This tool has previously been used to evaluate complications in otolaryngology, including for tonsillectomy,³ parotidectomy,⁴ and pituitary tumor excision.⁵ A recent study by McCutcheon and colleagues⁶ used ACS-NSQIP to evaluate the relationship between patient age and surgical resection of VS, but did not differentiate among surgical approaches. The primary objective of the present study is to evaluate complication rates among VS approaches, with a secondary objective of evaluating the impact of trainee involvement.

Methods

The 2008-2013 ACS-NSQIP participant use files were used to identify adult patients with (1) diagnosis from the International Classification of Diseases, 9th Revision, code 225.1 (benign neoplasm of cranial nerves); (2) surgical specialty classification: otolaryngology (ENT); and (3) Current Procedural Terminology (CPT®) code correlating with TT, RS, or MCF approach. Complications were categorized as medical, surgical, or a return to the operating room. Patient demographics, intraoperative factors, and surgical approach were analyzed to determine predictors of postoperative complications. The approaches with the potential for hearing preservation (RS and MCF) were compared to the hearing sacrificing TT approach. Additionally, trainee presence was compared to no trainee involvement.

Surgical Approach



CPT® Codes

	n
Middle cranial fossa	15
61590	3
61591	5
61605	2
61606	2
61608	3
Retrosigmoid	40
61520	18
61595	9
61615	4
61616	9
Transtemporal	56
61526	35
61530	13
61596	8

Results

One hundred eleven patients underwent VS resection between 2008 and 2013. Patients were predominantly female (57%), white (78%), and older than 50-years (69%). The TT approach accounted for half of all cases, while RS (36%) and MCF (14%) were less common. The mean operation length was 389 minutes, and patients spent an average of 4.6 days in the hospital. There was no difference in hospital length of stay when comparing surgical approaches ($p=0.423$).

There was an overall complication rate of 17%. There were no deaths. Nearly half of all complications were classified as a return to the operating room. There were an equal number of medical and surgical complications. Smoking status, obesity, advanced age, and elevated American Society of Anesthesiologists (ASA) classification did not predict complications. There was no difference in the overall complication rates among approaches. Additionally, there was no difference in the overall, surgical or medical complication rates, or rates of return to the operating room between hearing-preservation and hearing-sacrificing approaches.

The presence of a trainee was known for 47 patients, of which 83% involved a trainee. Trainee involvement did not change the length of the operation (374 minutes vs. 376 minutes, $p=0.977$) or hospital length of stay (4.3 days vs. 4.5 days, $p=0.813$). There was no difference in complications with trainee involvement.

Hearing preservation vs. non-hearing preservation approaches

	Retrosigmoid + Middle cranial fossa	Transtemporal	P-value
Any complication	11	8	0.460
No complication	44	48	
Surgical complication	3	3	1.000
No surgical complication	52	53	
Medical complication	1	4	0.364
No medical complication	54	52	
Return to OR	9	4	0.708
No return to OR	46	52	

Conclusions

Complication rates following removal of vestibular schwannoma are no different when comparing TT, RS, or MCF approaches. Trainee involvement did not affect complication rates. This study is limited by the inability to evaluate procedure-specific variables (e.g. facial nerve weakness and hearing preservation rates), but offers a unique survey of global 30-day complication rates reported to a large, multi-institutional database.

Disclosures

The American College of Surgeons National Surgical Quality Improvement Program and the hospitals participating in it are the source of the data used herein; they have not verified and are not responsible for the statistical validity of the data analysis or the conclusions derived by the authors.

The views expressed in this manuscript are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the US Government.

Contact

Anthony M. Tolisano, MD
Tripler Army Medical Center
Email: anthony.tolisano@gmail.com

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