

Preoperative Assessment of Benign Parotid Masses: Further Imaging and When?

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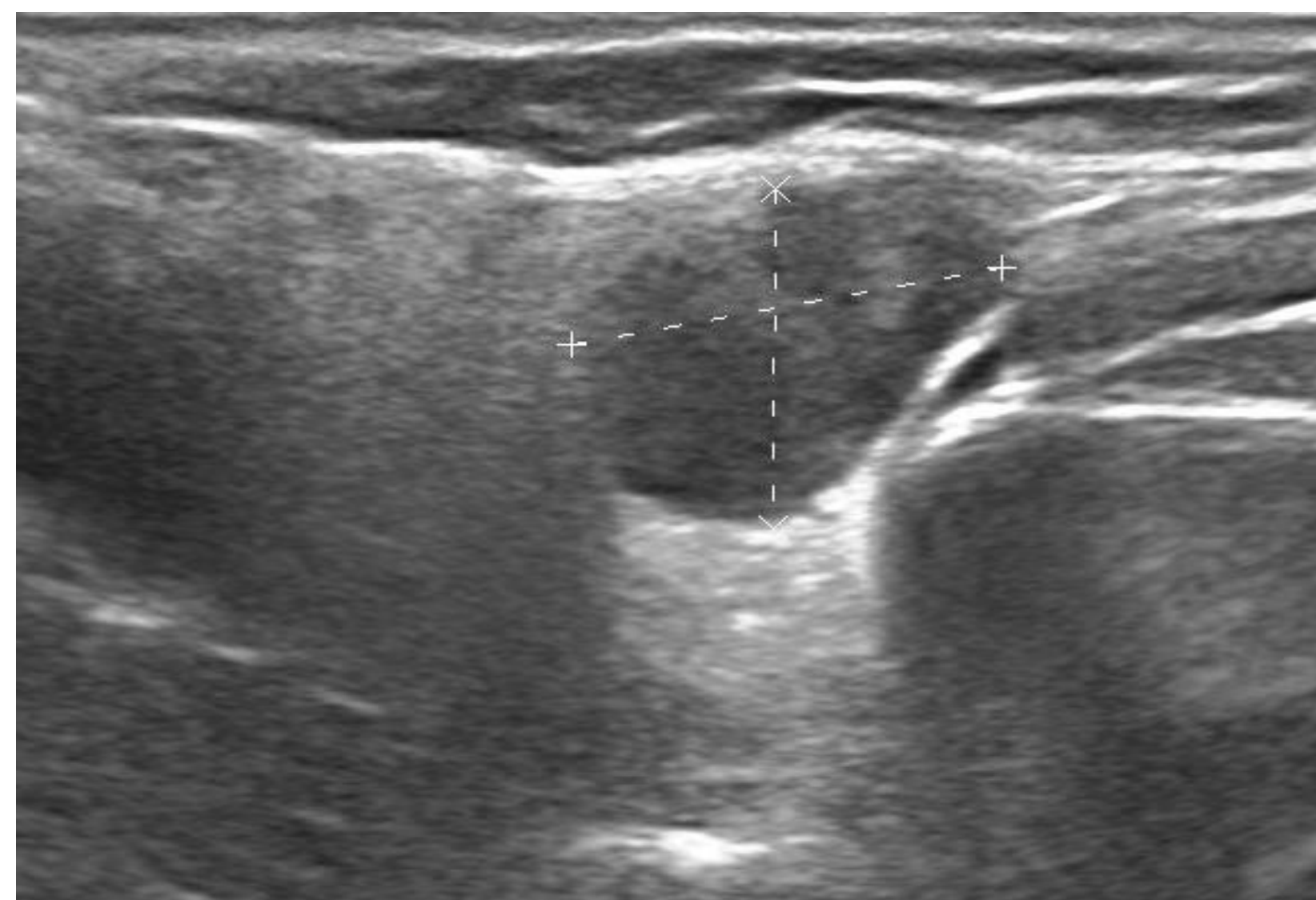
Abstract

There is a movement in literature towards the sole use of ultrasound (US) and fine needle aspiration (FNA) in the pre-operative work up of benign superficial lobe parotid masses.^{1,2} Authors have argued that further imaging does not provide surgeons with additional information unless the deep margin of the tumor is difficult to assess, there is concern for malignancy, or in cases of anatomically challenging tumors. To our knowledge, no study exists which has published post-operative complications following these guidelines. We present a 6-year retrospective study examining 32 patients with benign parotid masses. When US/FNA findings suggested a benign mass and the mass was clearly circumscribed in the superficial lobe, no additional imaging was undertaken. When there was concern for malignancy, difficult anatomical considerations, or an unclear deep margin, further imaging was done. Patient demographics and outcomes were collected. Six of 32 total patients (18.8%) had complications. Total complication rate in this study compared favorably to large single center studies examining complication rates in parotidectomy for benign parotid masses. Our results represent the first report on complication rates of benign parotid mass parotidectomies when integrating ultrasound into pre-operative decision-making. We suggest favorable complication rates as well as a theoretically cost-effective approach.

Introduction

Parotid gland neoplasms comprise approximately 80% of salivary gland neoplasms. The sensitivity and specificity of FNA cytology of parotid glands is operator and study dependent. A large meta-analysis done by Schmidt et al in 2011 revealed a specificity of 0.96 for malignancies and 0.98 for neoplasia³. Conversely, the sensitivity was 0.79 in malignancies and 0.96 for neoplasia. Therefore, there is an inherent uncertainty for providers after receiving FNA results even when consistent with a benign parotid mass. Studies have shown that MRI or CT combined with FNA does not improve this sensitivity and may result in unnecessary radiation in the case of cytologically confirmed benign parotid masses⁴.

Ultrasonography is being increasingly used both to assess anatomical considerations as well as to aid in the FNA procedure itself. To our knowledge, our study is the first of its kind to examine complication rates of parotidectomies when utilizing bedside ultrasound in cytologically confirmed benign parotid masses. We hypothesize a cost-effective, low-complication approach to the pre-operative assessment of parotid masses. This research is becoming increasingly relevant as bedside imaging expands the capabilities of what a surgeon can complete during the course of one office visit.



Right sided homogeneous parotid mass with posterior acoustic enhancement. Fine needle aspiration confirmed a pleomorphic adenoma.

Methods

Study Design: The study was a 6-year retrospective cohort study derived from a parotidectomy database developed between 2011 and 2016.

Data Collection: Large database designed. The most salient data included:

- Demographics
- Pre-operative findings: FNA cytology, bedside ultrasonography findings, and additional imaging findings when indicated.
- Intraoperative Complications: CNVII transection, capsular rupture, incomplete resection, or other
- Early Postoperative Complications (discharge-follow up #1): Hematoma, wound infection, seroma, salivary fistula, flap failure, or other
- Postoperative Complications (follow up #1-follow up #n): CNVII paresis, CNVII paralysis, recurrence, Frey's syndrome, or other
- Pathology Report: Histology, margins, invasion, or other

Inclusion Criteria: Patients included in the study had cytologically confirmed benign parotid masses involving the superficial or deep lobe as well as patients receiving either superficial or total parotidectomy.

Statistics: Complication rates were compared using Fisher's exact test to determine statistical significance.

Results

Complications

Overall 6 of the 32 patients (18.8%) had 7 total complications when managed according to the previously described imaging algorithm.

Ultrasound vs. Additional Imaging

A total of 2 out of the 14 patients receiving only US plus FNA had complications versus 4 of the 18 patients receiving additional imaging ().

	Bedside Ultrasound	Additional Imaging (CT, MRI)
Complication	2	4
No Complication	12	14

$p = 0.67$, Fisher's exact test

Complication Types

Of the 7 total complications, 1 was intraoperative and 6 were perioperative. There were no late complications documented. These complications are listed below.

Patient	Complication	Procedure
1 (Ultrasound)	Wound infection	Superficial
2	Wound infection- abdominal incision	Total
3	Sialocele	Superficial
4	Capsular rupture (Intraoperative)	Total
	CNVII Paresis	
5 (Ultrasound)	CNVII Paresis	Superficial
6	Seroma	Superficial

FNA/Ultrasound vs. Histology

In the 32 patients examined, there were no cases in which FNA cytology was discordant with histology. Furthermore, there was no ultrasound exam documenting warning signs such as microcalcifications, irregular borders, or abnormal lymphadenopathy.

Discussion

Our results add to the body of evidence supporting the use of ultrasonography in conjunction with FNA in the preoperative assessment of benign parotid masses. Our complication rates compare favorably to the largest single-center trials, although a larger power study is necessary to statistically solidify this approach. In comparison, Lichius et al. performed 963 operations with an overall complication rate of 35%⁵ and Nouraei et al. performed 162 operations with an overall complication rate of ~40%.⁶

Our results also show no significant difference between complication rates of patients receiving ultrasound versus additional imaging. This supports the safety of bedside ultrasound as a tool for preoperative assessment of benign parotid masses. Furthermore, a simple bedside procedure can provide the operator with important information about the positioning and shape of the mass.

The majority of complications were found to be in the perioperative period and resolved without long term morbidity, further supporting the safety of this approach.

A cost-benefit analysis was not done, however given that the ultrasound findings were documented from bedside examination our supposition is that this is a cost-effective means of obtaining a thorough pre-operative evaluation for a benign parotid mass.

Conclusion

The emergence of bedside ultrasound has expanded the capabilities of what providers can accomplish in a single office visit. Our study argues that in cytologically confirmed benign parotid masses, ultrasound may be sufficient preoperatively to aid with FNA acquisition, examine parotid mass anatomy, and rule out the presence of a malignancy when combined with cytology. Our preliminary outcomes following this approach are comparable to large single center studies and the role of ultrasound in parotid masses should continue to be investigated.

Contact

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