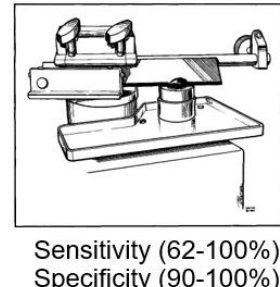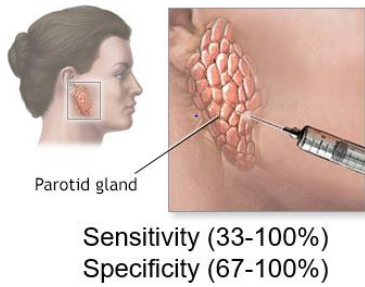# Ability for Fine Needle Aspiration and Frozen Section to Predict Extent of Parotidectomy

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INTRODUCTION

- Ideal preoperative diagnostic techniques should help elucidate necessity of intervention, the urgency of intervention, and the extent of surgical treatment

Parotid gland
Sensitivity (33-100%)
Specificity (67-100%)

Sensitivity (62-100%)
Specificity (90-100%)

AIMS

Actionability   Accuracy   Extent of Surgery

To compare the diagnostic actionability, accuracy, and ability to accurately predict extent of surgery for FNA and frozen section during the evaluation of a parotid mass

METHODS

- **Actionability:** Results that indicated a benign neoplasm or the histopathological grade of a malignant lesion were deemed actionable as they provided clear and useful information for the surgeon to act upon

- **Accuracy:** Determined using final pathology report. "Accurate" - correctly identified a benign/low-grade neoplasm from an intermediate/high-grade neoplasm. "Inaccurate" - misclassified a benign/low-grade neoplasm as an intermediate/high-grade neoplasm or vice versa. "Indeterminant" - could not elucidate the histopathological grade of the lesion

- **Extent of surgery:** The predicted extent of surgery by FNA and frozen section was compared with the extent of surgery indicated by final pathology to determine the accuracy of the predicted extent of surgery
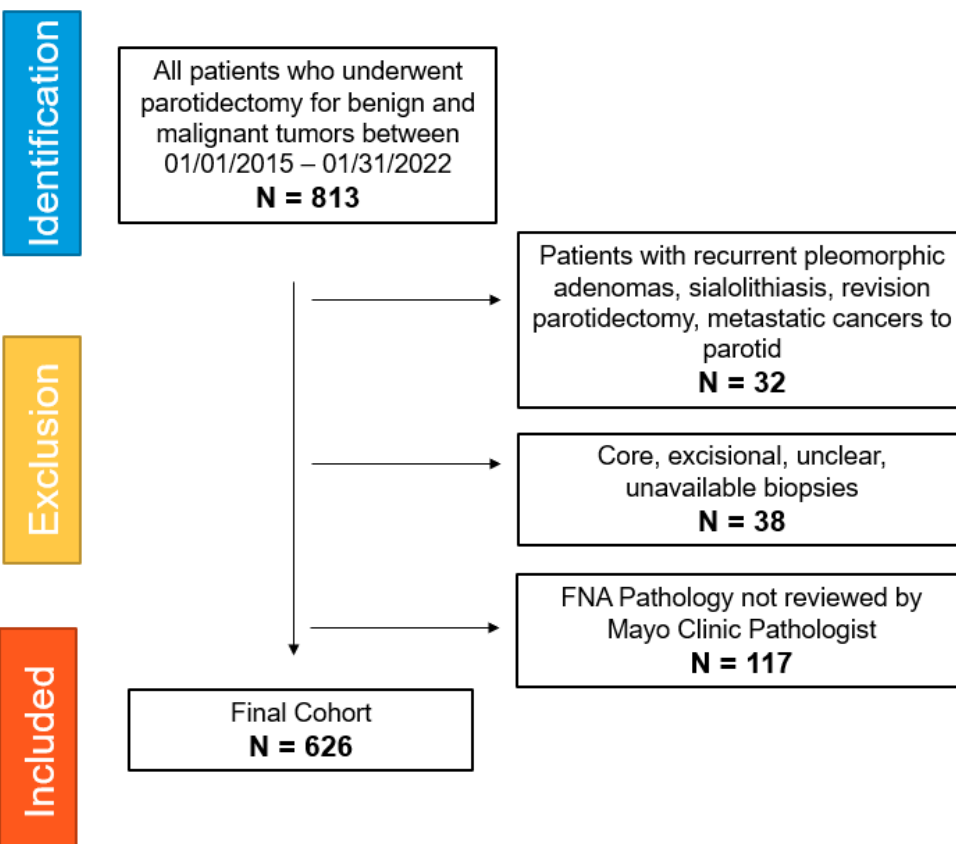
Identification
All patients who underwent parotidectomy for benign and malignant tumors between 01/01/2015 – 01/31/2022
N = 813

Exclusion
Patients with recurrent pleomorphic adenomas, sialolithiasis, revision parotidectomy, metastatic cancers to parotid
N = 32

Core, excisional, unclear, unavailable biopsies
N = 38

FNA Pathology not reviewed by Mayo Clinic Pathologist
N = 117

Included
Final Cohort
N = 626

Figure 1: Flow chart demonstrating inclusion and exclusion criteria to determine the final cohort

RESULTS

Table 1: Baseline features and final pathology, N=626

Age at surgery in years	61 (49-69)
Sex	
Female	356 (57)
House-Brackmann grade at presentation (N=614)	
I	589 (96)
II-VI	25 (4)
Tumor size in cm (N=625)	2.0 (1.4-2.9)
Cervical lymphadenopathy	10 (1.5)
Final diagnosis	
Pleomorphic adenoma	319 (51)
Warthin's tumor	121 (19)
Oncocytoma	45 (7)
Mucoepidermoid carcinoma	40 (6)
Lymphoepithelial cyst	20 (3)
Basal cell adenoma	18 (3)
Acinic cell carcinoma	17 (3)
Adenocarcinoma	11 (2)
Adenoid cystic carcinoma	11 (2)
Salivary duct carcinoma	11 (2)
Carcinoma ex-pleomorphic adenoma	8 (1)

*Summarized with median (interquartile range) or n (%). Sample sizes for features with missing data are indicated in italics in parentheses.

Table 2: FNA utilization and Milan Criteria, N=626

FNA utilization	
No FNA	230 (37)
FNA	396 (63)
Milan criteria (N=396)	
Non-diagnostic	27 (7)
Non-neoplastic	24 (6)
Atypia of undetermined significance	24 (6)
Benign neoplasm	210 (53)
Salivary neoplasm of uncertain malignant potential	70 (17)
Suspicious for malignancy	1 (<1)
Malignant	40 (10)

*Summarized with n (%). Milan criteria were summarized for the subset of 396 patients with FNA.

Parotid Mass
→ FNA N=396, 63%
→ No FNA N=230, 37%

FNA:
Actionable N=318, 80%
→ Accurate N=294, 92.5%
→ Inaccurate N=13, 4%
Non-actionable N=78, 20%
→ Indeterminant N=11, 3.5%

Frozen Sections N=626:
Actionable N=616, 98%
→ Accurate N=600, 98%
→ Inaccurate N=14, 1.7%
Non-actionable N=10, 2%
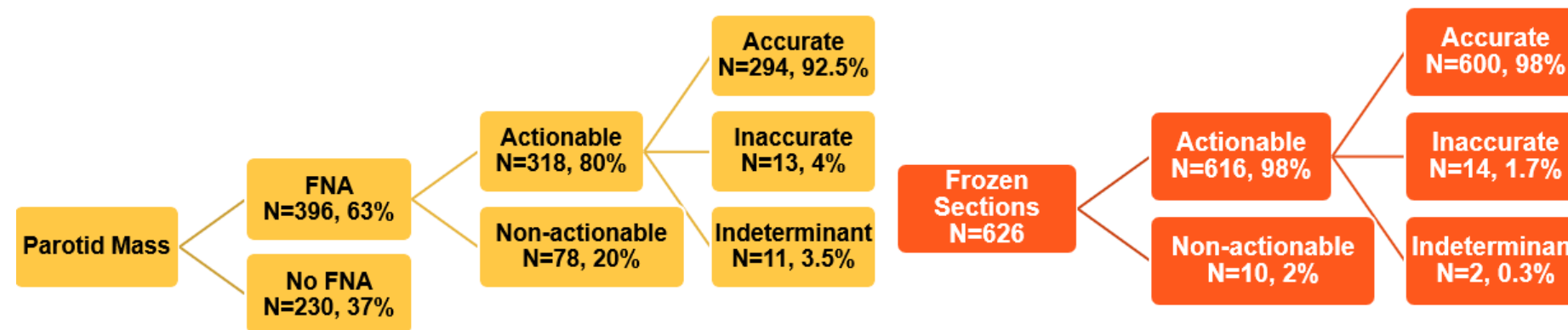→ Indeterminant N=2, 0.3%

Figure 2: Actionability and Accuracy of FNA vs Frozen Section in the Workup of a Parotid Mass

Table 3: Ability for FNA and frozen section pathology to accurately predict extent of surgery	FNA N=396	Frozen Section N=626
Appropriate extent of surgery	294 (74)	600 (96)
Inadequate surgery	9 (2)	10 (2)
Too much surgery	4 (1)	4 (1)
Does not help guide extent of surgery	89 (22)	12 (2)

*Summarized with n (%).

DISCUSSION

- Frozen section had *lower rates of non-actionable results.* 20% of FNA vs 2% of frozen section results were non-actionable results → Not useful in preoperative counseling

- Frozen section had *lower rates of inaccurate results.* 8% of FNA vs 2% of frozen section results were inaccurate. High false negative rate for FNA (14% - 48%) & low negative predictive value (77%)

- Frozen section was *more accurate at predicting extent of surgery* (p<0.001). Provides actionable results such as tumor type, histological grade, margin status, status of intra- or extra-parotid lymph nodes

CONCLUSIONS

- During the evaluation of a parotid mass, our series demonstrates that intraoperative frozen section analysis was more likely to yield actionable and accurate results compared to FNA.

- Additionally, frozen section was better at predicting the appropriate extent of surgery than FNA.

- **Our results advocate for the utilization of intraoperative frozen section to guide surgical decision making.**

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