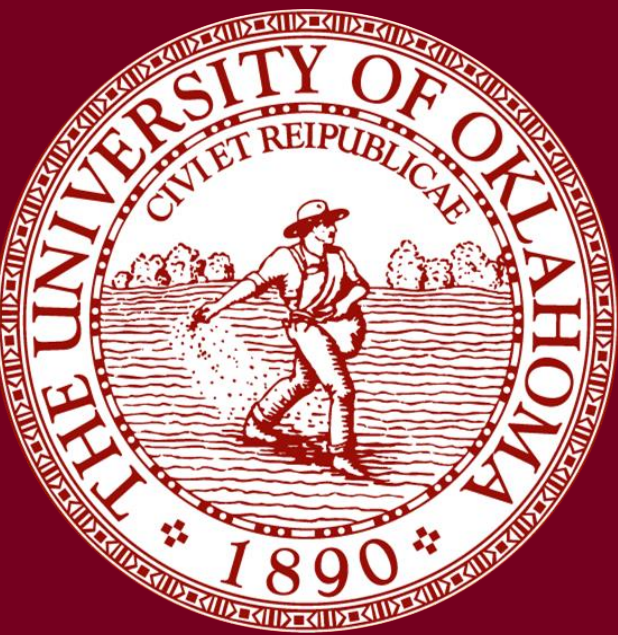


Ultrasound-Guided Needle Biopsy of Major Salivary Gland Tumors: Fine-Needle Aspiration with Selective Use of Core Needle Biopsy Based on Preliminary Cytopathology

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INTRODUCTION

- Major salivary gland malignancies are uncommon; head and neck specialty programs typically manage patient care
- Prompt delivery of care depends upon efficient, effective diagnostic protocols
- Lesion etiology can be determined by process of ultrasound-guided (UG) fine-needle aspiration (FNA) or core needle biopsy (CNB), with on-site cytopathologic assessment prior to submitting specimens for pathologic analysis
- No known documented literature about performance of FNA with selective use of CNB

OBJECTIVES

- Understand current literature regarding advantages and disadvantages of both FNA and CNB
- Describe and analyze protocol of primarily performing UG FNA with selective utilization of CNB when indicated by preliminary cytopathology and communicated to radiologist at time of the procedure
- Evaluate diagnostic accuracy for identifying malignancy; calculate sensitivity and specificity using cases with surgical excision and pathology result for verification standard

METHODS & MATERIALS

- Conducted retrospective review of US FNA and CNB of parotid and submandibular glands between March 2012 and April 2015 performed by Department of Radiology
- Lesion criteria for inclusion:
 - Arising from parotid or submandibular gland
 - Demonstrating radiographic contact to gland
 - Involving intraparotid or periparotid lymph nodes
- 25 or 22 gauge used needles for FNA
- 18 gauge Biopince or Bard Mission needle used for CNB
- Procedures performed by Department of Radiology; collected specimens subsequently analyzed and resulted by Department of Pathology

RESULTS

Table 1: Categorization of needle biopsies as 'Adequate' or 'Inadequate' based on final pathology

	Needle Biopsy Pathology Result							
	Adequate				Inadequate			
	Dx	SDDx	CL	Total	IS	ACN	IDDx	Total
FNA Only	68	13	14		2	6	3	
FNA with selective CNB	15	8	1		0	1	1	
CNB Only	2	1	0		0	0	0	
Total				122				13

Table 1 Key
Adequate Subcategories:
Dx – Diagnosis
SDDx – Sufficient differential diagnosis
CL – Cystic lesion
Inadequate Subcategories:
IS – Inadequate specimen
ACN – Atypical cells, nondiagnostic
IDDx – Insufficient differential diagnosis

- Based on pathology, rate of an adequate result was 122/135 cases, or 90.4% (95% CI, 84.1%–94.8%)
- 3 of 13 'Inadequate' still contributed to decision-making when result was considered in context of overall clinical picture → 125/135 cases
- Protocol of UG FNA and selective use of CNB when indicated was adequate for guiding clinical decision-making 92.6% (95% CI, 86.8%–96.4%) of the time**

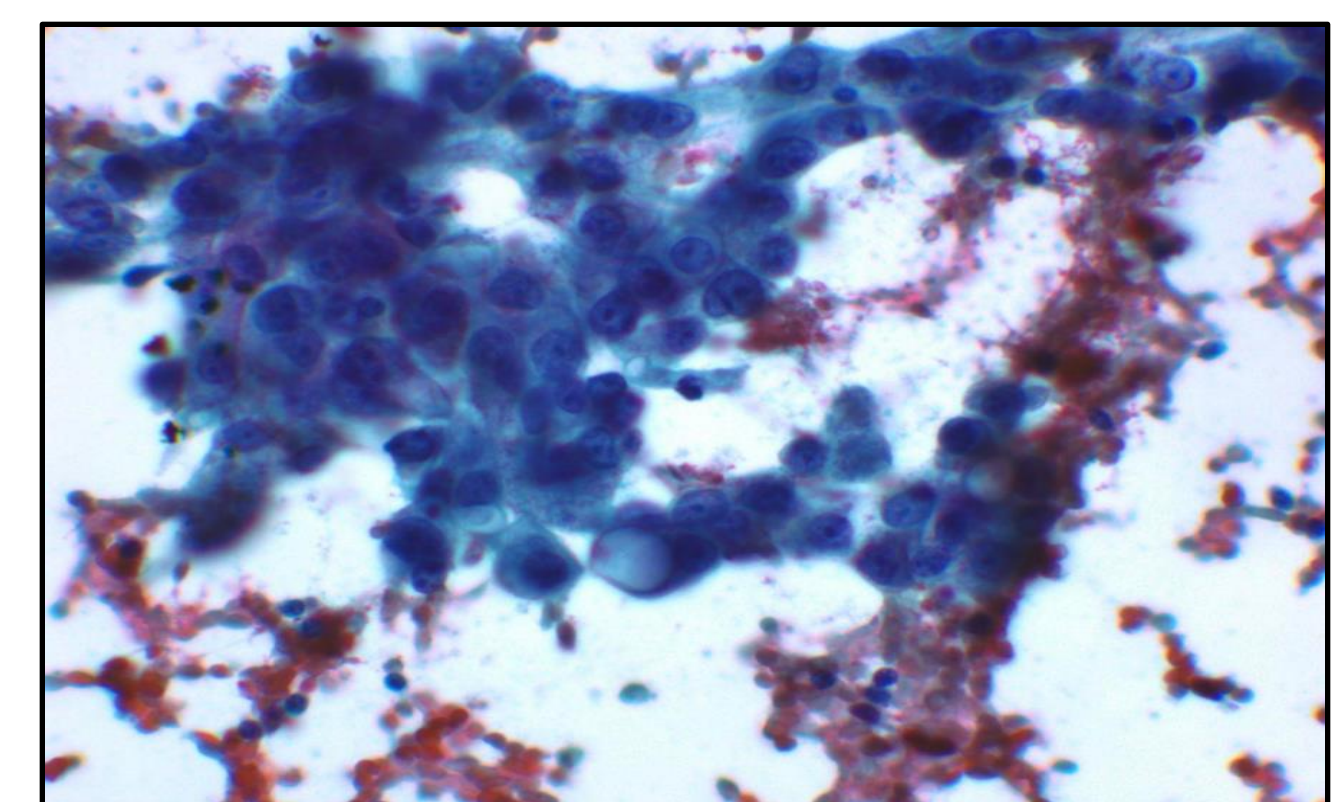
Table 2: Sensitivity and specificity of 41 cases with subsequent surgical excision and final pathology

	Surgery Pathology Result	
	Positive	Negative
Needle Biopsy Result Positive	15	2
Needle Biopsy Result Negative	0	24

- 100% Sensitivity (95% CI, 79.6%–100%), 92.3% Specificity (95% CI, 75.9%–97.9%) for detecting malignancy**
- Minor complications occurred in 8 patients:
 - 2 mild facial muscle weakness
 - 1 small extracapsular hematoma
 - 2 mild soreness
 - 1 pain, swelling, facial muscle paralysis
 - 2 possible infection



US: Right parotid demonstrating 3 cm lesion with irregular borders and heterogeneous pattern.



Histopathology: Biopsy specimen with Pap stain, diagnosed mucoepidermoid carcinoma.

DISCUSSION

- Protocol sensitivity of 100% is higher than the average sensitivities of FNA alone (80%) and CNB alone (92%), while its specificity of 92.3% is less than averages for FNA (98%) and CNB (100%)^{1,2}
- Patients with minor complications had 100% recovery or no further documented symptoms
- Limitations:
 - Verification bias (overestimate sensitivity and underestimate specificity)³
 - Failure to perform CNB (due to operator comfort) when would have potentially been helpful
 - Small number of cases had surgical excision and pathology for "gold standard" comparison
 - 1 possible false-negative (with plan to monitor)

CONCLUSIONS

- First study demonstrating needle biopsies performed according to protocol of UG FNA with selective use of CNB based on cytopathology provided diagnostic information allowing clinical management to move forward 92.6% of the time, with only 22% of cases needing CNB
- Offers possible solution to debate between FNA vs. CNB and has potential to reduce patient exposure to risks associated with CNB without tradeoff of diagnostic uncertainty (and possible indecisiveness in clinical management) due to lower sensitivity of FNA

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