Pleomorphic adenoma of the major salivary glands: Diagnostic Utility of FNAB and MRI

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ABSTRACT

INTRODUCTION

Pleomorphic adenoma (PA) is the most common, benign tumor of the major salivary glands. Surgical resection is the treatment of choice. Preoperative workup of major salivary gland neoplasms often includes fine needle aspiration biopsy (FNAB) and magnetic resonance imaging (MRI). Our objective was to assess the positive predictive value of FNAB and MRI in the evaluation of PA arising within the major salivary glands.

METHODS

Inclusion Criteria:
1. Diagnosis of pleomorphic adenoma (PA) of the major salivary glands based on the interpretation of a FNAB specimen by a UCSF cytopathologist.
2. Surgical excision at the University of California, San Francisco from 2001-2011.

FNAB slides were reviewed by a cytopathologist for the presence or absence of:
- Fibrillary stroma (right arrow)
- Mesenchymal elements
- Plasmacytoid myoepithelial cells (left arrow)
- Epithelial cells forming ducts or tubules
- Nuclear atypia

MRI studies were reviewed by a neuroradiologist for findings suggestive of PA including:
- Homogenous T2 hyper-intensity, well-circumscribed borders, and solid contrast enhancement.

RESULTS

Of 367 patients identified who underwent a FNAB at UCSF with a definitive or presumptive diagnosis of PA, 146 patients met the remainder of the inclusion criteria. Sixty-eight (47%) of the patients with a cytologic diagnosis of PA or presumptive PA and final surgical pathology results were obtained.

A summary of findings is given in the table below:

<table>
<thead>
<tr>
<th>Variable</th>
<th>PPV</th>
<th>Std. Err.</th>
<th>95% Conf. Interval</th>
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</thead>
<tbody>
<tr>
<td>-FNAB diagnosis of pleomorphic adenoma</td>
<td>97.83%</td>
<td>0.0125</td>
<td>0.9377</td>
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<tr>
<td>-Fibrillary stroma</td>
<td>96.58%</td>
<td>0.0151</td>
<td>0.9359</td>
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<tr>
<td>-Mesenchymal elements</td>
<td>96.60%</td>
<td>0.0150</td>
<td>0.9363</td>
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<tr>
<td>-Plasmacytoid myoepithelial cells</td>
<td>97.22%</td>
<td>0.0137</td>
<td>0.9451</td>
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<tr>
<td>-Solid contrast enhancement</td>
<td>97.98%</td>
<td>0.0142</td>
<td>0.9516</td>
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<tr>
<td>-Absence of nuclear atypia and/or mitotic figures</td>
<td>96.18%</td>
<td>0.0146</td>
<td>0.9131</td>
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</tbody>
</table>

MRI studies were reviewed by a neuroradiologist for findings suggestive of PA including:
- Homogenous T2 hyper-intensity (figure below)
- Well-circumscribed borders
- Solid contrast enhancement

DISCUSSION

While the utility of FNAB and MRI for diagnosis of PA has been studied individually, no studies have determined the yield of these diagnostic modalities when done in concert. Our current study shows a diagnostic accuracy of 97.83% for FNAB and 96.23% for MRI for PA diagnosis. The constellation of fibrillary stroma or other mesenchymal elements, plasmacytoid myoepithelial cells, and epithelial cells forming ducts or tubules is unique to PA. These findings, along with the absence of nuclear atypia, as would be expected in a benign tumor, are highly suggestive of PA and bolsters the cytopathologic diagnosis. MRI findings including homogenous T2 hyper-intensity, well-circumscribed borders, and solid contrast enhancement show a high PPV and may be used adjunctively with FNAB to establish a diagnosis of PA.

CONCLUSIONS

FNAB is an accurate modality for diagnosis of pleomorphic adenoma of the major salivary glands. Specific MRI characteristics, when present, are highly suggestive of a diagnosis of PA and can be used in conjunction with cytopathologic evaluation to formulate a reliable preoperative diagnosis.

REFERENCES

