Usefulness of CT and MRI in Predicting Parotid Gland Tumor Histopathology

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INTRODUCTION

Parotid tumors comprise 3-6% of all head and neck neoplasms. They include a large variety of histologic types. The extent of surgical intervention is dictated by the pathologic process. For this reason, being able to close the uncertainty gap between benign and malignant disease is helpful in counseling patients preoperatively. The use of fine needle aspiration biopsy and imaging with CT and/or MRI are routinely used to evaluate parotid lesions. Our objective was to review our experience to determine which imaging modality is superior in predicting histopathology.

METHODS

From August 2002 to October 2009, 32 patients undergoing primary parotidectomy for mass lesions of undetermined pathology underwent preoperative imaging which included either CT (16 patients), MRI (6 patients) or both (1 patient). Imaging reports were reviewed to determine whether malignancy and specific histologic diagnosis were suggested by the interpreting radiologist. The radiologic interpretation was then compared to the final pathologic diagnosis.

The positive and negative predictive values for malignancy was determined for both imaging modalities, as was the correlation between radiologic and specific histopathologic diagnosis. False negative and false positive results were also determined.

RESULTS

Histopathology of Patients in Our Study

The PPV and NPV of CT and MRI in Correctly Identifying Malignant Disease

Correctly Predicting Specific Pathologic Diagnosis

Imaging Modality Specific Pathologic Diagnosis Correctly Predicted
CT Pleomorphic Adenoma, Lymphoepithelial Cyst
MRI Pleomorphic Adenoma, Mucoepidermoid Carcinoma, Lipoma, Chronic Sialoadenitis, Lipoma

Imaging Modality Pathology of Tumors that were incorrectly predicted to be Benign
CT Acinic Cell Carcinoma, Lymphoma, Squamous Cell Carcinoma

Imaging Modality Pathology of Tumors that were incorrectly predicted to be Malignant
CT Warthin’s Tumor, Lymphoepithelial Cyst, Granulomatous Inflammation

DISCUSSION

The PPV of correctly identifying malignant disease was slightly better for MRI versus CT, although neither modality was able to reliably predict malignancy. Our study is in agreement with other radiologic studies, in that MRI may be better able to predict parotid gland tumor histopathology. MRI can therefore be used as a non-invasive technique to identify patients who are more likely to have malignant disease. Combined with fine needle aspiration biopsy, MRI may improve detection of malignant disease and guide management of these tumors. In the future, the differentiation of benign and malignant masses may be further improved with newer MRI techniques, such as diffusion-weighted MR imaging, MR spectroscopy and dynamic contrast-enhanced MR imaging.

CONCLUSION

While CT and MRI may be helpful in defining the size, location, and extent of parotid masses, neither are able to reliably predict malignancy when used preoperatively. Although the numbers are small, MRI appears to offer an advantage over CT when suggesting a specific histologic diagnosis.

REFERENCES