



Clinical Utility and Accuracy of MR Spectroscopy in Diagnosing Solitary Brain Lesions

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Introduction

To address the diagnostic challenge of differentiating non-neoplastic, metastatic and primary brain lesions magnetic resonance spectroscopy (MRS) was created to improve diagnostic accuracy. The purpose of this study is to evaluate the diagnostic accuracy of MRS at a single institution and thus its clinical utility in the treatment of brain lesions.

Methods

A retrospective analysis of all MR spectroscopy examinations from 2006 – 2011 at LSUHSC was conducted. Inclusion criteria consisted of availability of MRI and MRS imaging, surgical pathology results either by biopsy, resection and/or CSF analysis and MRS imaging prior to obtaining tissue sample. Patients were excluded on the basis of MRS for differentiation of tumor recurrence versus radiation necrosis.

Results

The search for MR spectroscopy examinations yielded 74 patients. Eleven patients were excluded due to previous resection and eight patients were excluded due to unavailability of tissue pathology. Of the 55 patients included in the study, tissue pathology revealed 30 patients with primary brain lesions, 10 patients with metastatic lesions, 12 patients with demyelinating lesions, 2 abscesses and 1 hematoma. Of the 30 patients with tissue diagnosis of primary brain lesions, 22 patients had an MRS report concluding primary neoplasm, 3 concluding neoplasm without distinction of primary vs. metastatic lesion, 3 stating metastatic lesion, 2 reporting inflammatory process. Of the 10 metastatic lesions, 8 were reported as metastatic and 2 as primary lesions. All demyelinating lesions and abscesses were reported by MRS as such. Calculated sensitivity of MRS for primary vs. metastatic lesions was 88% and specificity was 80%; positive predictive value was 92%. Calculated sensitivity for neoplastic vs non-neoplastic lesions was 92.8%, specificity and positive predictive value were 100%.

Conclusions

The results of this study illustrate that MRS is a useful tool in classifying solitary brain lesions and can assist in decreasing the need for biopsy.

Learning Objectives

By the conclusion of this session, participants should be:

1. Aware of the clinical utility and diagnostic accuracy of MR spectroscopy in solitary brain lesions
2. Consider use of MR spectroscopy in their practice for diagnosing solitary brain lesions