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E. Kapsalaki and K.N. Fountas

AJNR Am J Neuroradiol 2010, 31 (8) E67

doi: <https://doi.org/10.3174/ajnr.A2159>

<http://www.ajnr.org/content/31/8/E67>

This information is current as
of November 30, 2023.

Proton MR Spectroscopy of Brain Abscesses

We read with great interest the article by Pal et al.¹ The authors reported on their experience with the application of proton MR (¹H-MR) spectroscopy in the imaging evaluation of patients harboring intracranial abscess. In their retrospective study, they examined 194 patient charts and imaging studies, and they concluded that the detection of cytosolic amino acids is a strong indication of an abscess of pyogenic origin, without ruling out nonpyogenic etiology. In addition, they postulated that though the presence of acetate or succinate is highly suggestive of anaerobic bacterial pathogens, there are cases in which facultative anaerobic microbes may be implicated. We congratulate the authors on their well-organized large-scale study and their meticulous spectroscopic protocol. However, there are a few questions raised by their article.

The role of ¹H-MR spectroscopy in establishing the diagnosis of an intracranial abscess and differentiating it from other look-alike ring-enhancing lesions has been adequately explored in the literature.²⁻⁴ However, the sensitivity and the specificity of ¹H-MR spectroscopy remain to be defined. It would be of great interest if the authors could provide their data regarding the sensitivity and specificity of ¹H-MR spectroscopy in establishing the diagnosis of an intracranial abscess in their cohort. They reported in their article that 210 patients with the diagnosis of an intracranial abscess were examined, but they provided no data on how the diagnosis was established, the diagnostic accuracy of ¹H-MR spectroscopy versus the conventional MR imaging, and its sensitivity and specificity in comparison with the biopsy results. In what percentage of their cases could ¹H-MR spectroscopy accurately establish an abscess diagnosis along with conventional MR imaging? What was the respective percentage after applying diffusion-weighted imaging in their series? In how many cases was ¹H-MR spectroscopy not possible due to technical limitations? Most interesting, the authors mentioned that in 56.2% of their patients, spectroscopic imaging was performed after systematic antibiotic initiation. Do they believe that antibiotic administration could alter the spectral characteristics of the studied abscesses?

Furthermore, there are no reports in their article regarding the methodology of spectroscopic analysis. Did the neuroradiologists review the spectroscopic studies in a double-blinded fashion? Were they aware of the biopsy results when performing their reviews, considering that this was a retrospective study? The authors reported no interobserver variation in the analyses of the obtained spectra between the 2 involved neuroradiologists. This finding is quite remarkable for spectroscopic analysis because numerous previously published series have reported lower interobserver agreement, even for conventional brain MR imaging.⁵

The authors mentioned that an aspiration biopsy was performed and an appropriate specimen was sent for cultures in all their cases. However, there are no details regarding the time interval between

¹H-MR spectroscopy study and the surgical aspiration. This set of data may be of paramount importance because it is well known that spectroscopic characteristics of abscesses are rapidly evolving and continuously changing.³

There are several reports in the pertinent literature regarding the role of ¹H-MR spectroscopy in monitoring the abscess response to antibiotic treatment.³ Have the authors any data regarding the role of ¹H-MR spectroscopy in the evaluation of treatment response in their patients? We assume that in a retrospective study, there is a follow-up period long enough for evaluating this. Did the authors perform spectroscopy in any of their patients during antibiotic treatment?

The authors provide no data regarding the presence of lipids in their study. Did they detect lipids in all their cases? If not, what was the actual percentage of lipid presence in their cohort? It has been previously shown that the presence of lipids may be indicative of malignancy in ring-enhancing lesions.^{2,6} Although this finding remains controversial, the presence or absence of lipids and their diagnostic importance remains a black box for spectroscopy. We would like the authors to enlighten us regarding their findings on this subject.

We congratulate the authors again on their significant scientific contribution. We agree that ¹H-MR spectroscopy constitutes a valuable diagnostic tool for intracranial abscesses, evaluating their evolution and treatment response. However, caution needs to be exercised in identifying the causative pathogen and categorizing abscesses based on the spectroscopic findings.

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E. Kapsalaki

K.N. Fountas

University Hospital of Larissa

Departments of Diagnostic Radiology and Neurosurgery

School of Medicine

University of Thessaly

Larissa, Greece

DOI 10.3174/ajnr.A2159