AJNR

What's your favorite PET story?

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AJNR Am J Neuroradiol 1998, 19 (3) 590
http://www.ajnr.org/content/19/3/590.citation

amino acid resonance (0.9–1.0 ppm) representing valine, leucine, or isoleucine, have never been reported in the in vivo proton MR spectra from human brain tumors (2).

The apparent weakness of the technique is the ubiquity of lactate, by virtue of its production during glycolysis, and the lack of correlation between measurable lactate levels and histologic grading of cystic tumors. More specific biochemical profiles are possible, though, with the use of in vivo spectroscopic imaging methods. These permit more efficient sampling of both the cystic/necrotic and solid components of intracranial masses, resulting in additional resonance lines (*N*-acetylaspartate, creatine/phosphocreatine, choline-containing compounds, *myo*-inositol, and others) that aid in characterization and can be displayed as color maps of metabolite distribution. Also, powerful in vitro methods such as two-dimensional shift correlation (COSY) spectroscopy have yet to be applied to the analysis of fluid or tissue samples in the interventional MR setting. The clinical testing and development of these newer approaches are the challenges radiologists must meet if this initial success at lesion characterization is to be extended and accepted as part of the evaluation of intracranial masses, particularly the ring-enhancing lesion.

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Editorial Board

References

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What's Your Favorite PET Story?

A recent confluence of positron emission tomography (PET)-related events is indeed interesting, but unfortunately also confusing. The FDA has been ordered to stand down on its restrictive regulations of PET-related radiopharmiceuticals and HCFA will now consider reimbursement for certain oncologic studies (carcinoma of the lung). These decisions should make clinical PET imaging more practical and economically feasible. On the other hand, the article by Ricci et al in this issue of *AJNR* challenges the clinical value of one of the more highly touted clinical PET studies—fludeoxyglucose (FDG) PET of recurrent brain tumor versus radiation necrosis. Almost 10 years ago, DiChiro et al suggested that FDG PET might be useful for determining the pathologic grade of brain tumors, prognosticating their clinical behavior and differentiating recurrent tumor from radiation necrosis. While intrigued and hopeful, I was skeptical. As the years have passed, I remain so. I must admit, however, that my opinion, reflected in this editorial, is not based so much on scientific evidence as on anecdotal experience with this dreaded disease.

This discussion, and Ricci et al's paper, are focused on the ability of FDG PET to differentiate recurrent glioma, particularly malignant glioma, from iatrogenic radiation necrosis. This particular focus is clinically critical. In my experience, these tumors remain one of the most difficult of all to treat successfully and most prove lethal to the patient within a few years. Furthermore, the cause of death is usually related to recurrent tumor, rarely if ever to radiation necrosis. This position leads to these corollaries: *(a)* there is nearly always recurrent tumor, and *(b)* radiation necrosis is not critical in determining patient outcome. The current problem is not one of diagnosis, but of treatment.

The literature on this problem is conflicting and confusing. Some of the confusion is due to differences in study populations, imaging criteria, and endpoint measurements. Given the pathologic heterogeneity of gliomas, variations in scanning equipment and parameters, and the use of many different endpoint measurements (gross pathologic grade, labeling indices, CT and MR imaging, clinical grade, survival curves, etc), it is not surprising that different conclusions have been reached about the clinical value of FDG PET for this purpose. While all these factors are important, I do not think they are the root of the problem. A common methodological problem is the poorly posed question: tumor or radiation necrosis? The unfortunate answer in most cases is both. This position is most strongly supported by patients' poor outcomes and pathologic reports on gross total resections that typically show great heterogeneity in the specimen with areas of gliosis, low- to high-grade tumor, and necrosis (tumorous and iatrogenic). I fear that we have, in effect, created a "straw man" hypotheses to test with our imaging technique. Our results and conclusions are, therefore, often clinically irrelevant.

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