Letter by Knight et al Regarding Article, “Validation of In Vivo Magnetic Resonance Imaging Blood–Brain Barrier Permeability Measurements by Comparison With Gold Standard Histology”

To the Editor:

We read with great interest the recent paper by Hoffmann et al1 on the validation of magnetic resonance imaging (MRI) measurements of blood-brain barrier (BBB) permeability. The authors reported that they measured changes in BBB permeability in rodent models of focal cerebral ischemia using MRI methods in conjunction with a Gd-based MRI contrast agent; they then validated these measures by comparing them with Cresyl violet histology and Evans Blue extravasation. The Patlak-based estimates of vascular leakage were obtained using the Patlak graphical method to calculate the blood-to-brain transfer constant (K_i).

In recent years, there has been a great deal of interest in the development of noninvasive imaging techniques capable of accurately measuring changes in acute BBB permeability after stroke to predict probability of hemorrhagic transformation. However, the authors appear to be unaware of a sizable body of work in this field that used MRI for such investigations; they only cite manuscripts that used computed tomography techniques in conjunction with Patlak plot methodology to estimate BBB permeability. We would like to bring to the authors’ attention several such studies, at least some of which deserved citations in their publication.

Employing an almost identical animal model as did the authors, Knight et al2 demonstrated using MRI and gold standard hematoxylin and eosin histology that regions with Gd-enhancement showed hemorrhagic transformation at 24 hours. The use of Patlak methods to estimate BBB permeability in brain tumors using MRI was first described by Kenney et al.3 In this study, the influx rate values obtained were confirmed by comparing them with radiotracer values from another set of experiments. This was later improved on by Ewing et al.4 who validated the MRI-Patlak plots via gold-standard radiotracer techniques in conjunction with Patlak plot methodology to estimate BBB permeability. We would like to bring to the authors’ attention several such studies, at least some of which deserved citations in their publication.

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Given the amount of peer-reviewed, published past work in developing and using MRI-Patlak plot and gold-standard quantitative autoradiography and histology techniques to evaluate BBB, we feel acknowledging that fact would have added greatly to the discussion and conclusions of the work by Hoffmann et al1 Even unintended oversights of this nature are not without consequence to those whose previous work goes unrecognized; this constitutes an error in scholarship.

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