Reviewer's report

Title: Magnetic resonance imaging after most common form of concussion

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Reviewer: Erin Bigler

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The goals of this project are laudatory given the commonness of concussion and the lack of objective clinical neuroimaging findings associated with concussion; however, methodologically, the study is hampered by use of a 1.0 Tesla machine and only clinical ratings of the scans in just 20 subjects. The authors readily acknowledge this, but it is also the major limitation. If one is to study the most subtle effects of brain injury, including concussion, then the highest field strength is required along with innovative methods for assessing potential parenchymal abnormality. The standard in the imaging field is 3.0 Tesla or higher (4.0 T is now being used in clinical research) with special sequences most sensitive to the pathology of TBI. For example, susceptibility-weighted imaging at 3.0T is the standard for detection of subtle hemorrhage, and field strength less than 3.0T may simply be not sensitive enough and diffusion tensor imaging for detecting subtle white matter pathology (the authors should look at the recent study published in Brain by Niogi et al.). The authors do acknowledge these points, so I'm not sure how their study adds to the literature. The absence of abnormalities in their study may merely be a reflection of the insensitivity at 1.0 T, 5 mm slice thickness and only using qualitative ratings by neuroradiologists viewing the images. There is no reported automated image analysis, digital quantification or application of imaging metrics (i.e. diffusion coefficients) to independently assess white matter integrity – the entirety of the study is based on clinical rating. Incidentally, in the title ‘MR’ followed by ‘resonance’ is redundant.

Given the limitations above, the strengths of this investigation are that a baseline scan within 24 hours followed up with the same protocol at 3 months is a very positive design and this does offer some important conclusions – none of these concussed patients developed macroscopic abnormalities that could be clinically (visually) detected and related to TBI. Since there was a baseline scan this permits the characterization of the follow-up based on the prior scan and such a within subjects design, strengthens the conclusions of absence of abnormality with simple concussion in this group of 20 subjects.

Level of interest: An article of limited interest

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.
Declaration of competing interests:

'I declare that I have no competing interests'