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### *Reply:*

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## REPLY:

We would like to thank the authors of a letter in reference to our recently published study, “MR Imaging of the Cervical Spine in Nonaccidental Trauma: A Tertiary Institution Experience.” The word “clearance” was not in the title of the study as suggested by the preceding letter, and our article did not address whether the MR imaging findings could determine cervical spine stability or instability. However, MR imaging with negative findings has been shown to be useful in clearing the cervical spine,<sup>1</sup> which would have been the case in 31% of our patients. We agree that positive findings relating to instability are less well-defined and posterior ligamentous injury is likely a stable injury. The additional findings of capsular injury with distension (13%) and tectorial ligament injury (4%) are more worrisome, and we believe these would alter management, but again this was not the purpose of our study.

These children do not necessarily have a history of a traumatic incident, and positive findings on MR imaging may be helpful to define the injury as traumatic. We do not advocate the use of MR imaging for defining a ligamentous injury as accidental or nonaccidental because these injuries have similar findings, but the positive findings are significantly more common in the nonaccidental cohort as reported by Choudhary et al.<sup>2</sup> Most interesting, the presence of spinal subdural hemorrhage, likely from redistribution, may be indicative of a nonaccidental mechanism because it was rarely seen in the accidental cohort.<sup>3</sup> Spinal subdural hemorrhage was seen in 18% of our patients.

In our study, the cervical spine injuries were statistically associated with parenchymal brain injury; therefore, poor outcome may not be due to the cervical spine injury but related to the associated brain injury. We realize that the prior study by Kadom et al<sup>4</sup> did not find an association between outcome and cervical spine injury as diagnosed on MR imaging and further study is needed. Additionally, a positive finding on cervical MR imaging would strengthen the case for trauma as an etiology for the brain injury.

The letter indicates that only 43% of the MR imaging studies in our study were of superior quality, but studies of all patients were categorized as superior or diagnostic. It is more important to realize the inherent insensitivity of cervical radiographs in the eval-

uation of cervical spine injury, especially in young children.<sup>5</sup> Also, most of our injuries were at the cervical-occipital junction, and CT criteria for evaluating this injury have recently been re-evaluated and found to be suboptimal.<sup>6</sup>

In this vulnerable population, MR imaging of the cervical spine may provide additional answers. Many of these examinations can be performed in conjunction with brain MR imaging without additional sedation/anesthesia. A small number of children in our study had normal brain imaging findings and evidence of cervical spine injury. This information would be extremely helpful in the evaluation of a child with suspected nonaccidental trauma. We believe our study supports the use of cervical MR imaging in this cohort of patients.

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