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**Reply:**

J.C. Benson and J.M. Morris

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## REPLY:

We thank Drs. Ghosh, Tiwari, Garg, Khera, and Elhence for their interest in our recent manuscript titled “Exophytic Lumbar Vertebral Body Mass in an Adult with Back Pain.” We appreciate their valuable insight on this subject and thank them for sharing a case of a spinal chordoma that exemplifies many of the imaging characteristics we described.

First, we agree that the intervertebral disk may be invaded by chordomas; Firooznia et al<sup>1</sup> described occasional disk involvement, and other previously published case reports<sup>2,3</sup> have similarly shown disk invasion. Although chordomas classically spare the intervertebral disks, all types of pathologies can have atypical findings. Disk involvement should therefore not dissuade radiologists from raising the possibility of a chordoma.

Next, we believe that it is an oversimplification to state that biopsy of suspected chordomas is not encouraged. True, chordomas are prone to dissemination along a biopsy tract. However, in the setting of an uncertain diagnosis, tissue is often still needed for pathologic confirmation of imaging findings, particularly given the complexity and morbidity of potential surgeries such as sacrectomy. In such cases, a biopsy may still be performed as long as the percutaneous biopsy tract is known so that it can be resected at the time of surgery.

Finally, Ghosh et al are correct in saying that atypical hemangiomas can share imaging features with more sinister skeletal lesions, such as metastases, multiple myeloma, and chordomas.<sup>4</sup> To our knowledge, however, time-resolved imaging of contrast kinetics (TRICKS) has not been shown to confidently distinguish between hemangiomas and chordomas. TRICKS is a recently introduced MR technique that allows for dynamic MR imaging during the arterial, capillary, and venous phases.<sup>5</sup> Dynamic enhancement curves have been offered as a method to distinguish atypical hemangiomas (typically with minimal and delayed enhancement) from metastases (often demonstrating a sharp rise in enhancement with a high peak followed by quick washout).<sup>6</sup> However, literature on this

subject remains extremely sparse. Even the Hurley et al<sup>7</sup> article referenced by the authors does not mention marked early arterial enhancement or specific prominence of the feeding vessels in hemangiomas. Instead, much of our current understanding of the contrast dynamics of vertebral hemangiomas comes from angiography. On DSA, hemangiomas have been described as having a diffuse blush of enhancement that persists into the capillary phase.<sup>1</sup> However, their appearance is not specific and can vary based on the aggressiveness of the lesions. For now, we believe that more evidence is needed before dynamic MR can be labeled a useful tool for differentiating aggressive hemangiomas from chordomas.

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 J.C. Benson

 J.M. Morris

Mayo Clinic

Department of Neuroradiology  
Rochester, Minnesota

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