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### *Reply:*

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## REPLY:

**W**e thank Bolger et al for their commentary regarding our recent article. CT guidance is still a relatively new technique for cervical transforaminal epidural steroid injections (TFESIs), with the optimal methodology for many details of the procedure yet to be elucidated by empiric investigation. We hope that academic discussion will improve procedural methodology for all practitioners.

In response to the first issue raised by our colleagues, we argue that bupivacaine is an important component of cervical TFESIs because it provides an almost immediate local analgesic effect, which allows us to assess pain relief before the patient leaves our procedure facility. This diagnostic information is invaluable to our referring surgeons, who often use our cervical TFESIs as a presurgical planning tool to determine the exact level of radiculopathy before spine surgery. In these cases, determining the patient's almost immediate response to bupivacaine is the clinician's principal goal, not long-term pain relief from steroid. The clear benefit of bupivacaine in these cases must be balanced against what appears to be a largely theoretical risk of complications from intravascular injection of bupivacaine at the small doses we use: During more than 2 decades of performing thousands of cervical injections, we have never had a known minor or major complication attributable to bupivacaine.

We also argue that the trial contrast dose is a valuable step in cervical TFESI. Our use of the trial contrast dose, nevertheless, was followed, in many cases, by intravascular injection of steroid. Concluding, however, that contrast should not be used falls into

the nirvana fallacy (that is, reasoning that because a solution is imperfect, it should be rejected). In our article, the trial contrast dose was successfully used to identify intravascular needle-tip position, with subsequent needle repositioning and no intravascular injection of steroid, in 10/13 (77%) large-volume intravascular injections. If one used the technique described by Bolger et al, these intravascular needle positions would be missed, and all steroids for these cases would be injected intravascularly. This result would effectively remove the local delivery of anti-inflammatory steroid from the region of the targeted nerve root, which is, for Bolger et al, the intent of the procedure. In regard to the small risk of contrast reaction, we follow the American College of Radiology recommendations for premedication.<sup>1</sup> If the patient has a mild allergy (hives), then we premedicate with oral prednisone and diphenhydramine; if the allergy is more severe, then we do not use iodinated contrast and may not perform the procedure at all, at the discretion of the proceduralist. During more than 2 decades of performing cervical injections, we have never had a known complication attributable to contrast reaction.

## REFERENCE

1. Manual on Contrast Media. Version 10.1, 2015. American College of Radiology Committee on Drugs and Contrast Media. <http://www.acr.org/Quality-Safety/Resources/Contrast-Manual>. Accessed May 29, 2016

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