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Letter to the Editor

Reply to the Letter to the Editor for "Use of fluoroscopic-guided transsacral block for the treatment of iatrogenic post-injection sciatic neuropathy: Report of three cases"

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We would like to respond to the authors for their ironic interest in our article.[1] However, we regretfully noticed that there are some great misunderstandings about a number of points, including one about the difference between terminology of 'block' and 'epidural steroid injection' used in our report, and also on our technique, 'fluoroscopy-guided injection', which they discredit as being done only with bony landmarks. Having better epidural localization and detection of vascular uptake with contrasts used, when the needle passes behind those bony landmarks, where ultrasound (US) cannot detect, fluoroscopy-guided injection is not a blind injection with superiority in spinal epidural procedures than US-guided ones. We believe that this provides us an opportunity to further discuss the basics of our intervention for this type of persistent and excruciating neuropathic pain due to iatrogenic post-injection-induced sciatic nerve injury.[2]

As intriguingly claimed by the authors, the problem is not limited to what we can visualize in the sciatic nerve and its surroundings. Unfortunately, a growing number of evidence in the literature distinctly shows that the problem is not solely at the level of injury.[3-5] In an experimental study, sciatic nerve injury-induced rats were subjected to pulsed electrical stimulation in the epidural space between T10 and L3 for about two months and, following the electrical stimulation, an increase in the number of neurons in the dorsal root ganglion (DRG) and in the anterior horn were detected with increased myelinated fibers of the sciatic nerve.[3] As reported previously, inflammation in the lesion area subsequent to the peripheral nerve injury also affects and impairs ipsilateral DRG and dorsal horn through axons.[4] On the other hand, it has been shown that sciatic nerve injury induces type 1 collagen synthesis and extracellular matrix accumulation through fibroblasts around the ipsilateral DRG.[5] These data suggest that aforementioned alterations in the DRG and spinal cord neurons contribute to neuropathic pain associated with sciatic nerve injury. Considering the current data regarding the pathological changes which occur in the neuronal structures proximal to the lesion site subsequent to a nerve injury and the case series reported by Eker et al.,[6] transsacral block was a reasonable alternative treatment of persistent neuropathic pain for the presented cases.

The authors reported that they disagreed in our diagnostic algorithm for neuropathic pain in cases with iatrogenic post-injection-induced sciatic nerve injury. We made the and differential diagnosis based on a very typical history occurring right after the intramuscular injection, clinical examination, and clear electrophysiology (EMG) findings in these three cases. Moreover, all patients met the neuropathic pain criteria of the International Association for the Study of Pain (IASP).[7] Nonetheless, we do not ignore the role of US imaging in the diagnosis and predicting prognosis in these traumatic peripheral nerve injuries and we have been using US imaging in our routine clinical practice for a long time. However, given the

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clear diagnosis with an EMG-proven lesion site and the interventional region that we targeted in our cases, i.e., S1-2-3 (S1-3) epidural region, the use of US would not provide an additional benefit for the diagnosis. On the other hand, our primary goal for reporting these three cases was to report our observation in which we targeted a point proximal to the lesion, in alleviating the intractable, chronic neuropathic pain. Therefore, we believe that, in this report, the use of US would not change the overall scenario in our hands contrary to the authors' claims.

The transforaminal approach used to deliver epidural steroids and local anesthetics around the nerve roots is believed to interrupt the inflammatory cascade in the affected DRG, which is directly responsible for neuropathic pain and, thus, can alleviate neuronal damage and pain.[8] After S1-3 transforaminal epidural steroid injections (TFESI), neuropathic pain and symptoms reduced by more than 50% in our two cases, while a significant improvement was yet to be achieved in the third case. The failure of pain relief in the latter case may be also related to insufficiency of S1-3 TFESI for a neuropathic condition, where the lower lumbar roots are more likely to be involved. Yet, we have already addressed this issue in our report. Furthermore, we are aware of that US could have clearly identified many pathological findings pertaining to the sciatic nerve itself, although it is not the scope of our case series and it may be a subject of another study. In addition, US is not superior to EMG in providing which divisions or fascicles of the sciatic nerve are affected to which extent.[9] We primarily attempted to report the results for this particular treatment which is basically sacral TFESI. Possible findings of the sciatic nerve on US imaging would not be a drawback for transsacral block, since ours is an intervention primarily targeting the spinal level which is believed to be an important responsible area for persistent neuropathic pain after iatrogenic post-injection sciatic nerve injury.

Several techniques for US-guided TFESI have been described in previous studies.[10,11] However, the depth of the needle tip position is not visible in US-guided injection within the sacral foramina during S1-3 TFESIs. Therefore, the needle may pass too deeply into the ventral foramen and cause visceral injury. Under the US guidance, while the needle is passing through the ventral foramen, the drug may be injected merely to the sacral spinal (S1-3) nerves; however, it does not guarantee being in the epidural space. It would be also noteworthy to add that it is not always likely to recognize vascular uptake during the US use due to the sacrum bony structures. Furthermore, the incidence of intravascular injection during an S1 TFESI has been reported to be 16.5 to 27.8%, which is much higher than that of TFESIs in the lumbar spine.[12] Therefore, although there is a disadvantage of radiation exposure, fluoroscopy-guided applications are still preferred as a standard in sacral TFESIs. In a recent study, Park et al.[13] described a novel method for performing S1 TFESI using both US and fluoroscopic guidance to retrieve disadvantages of either imaging methods alone. However, there are no data available yet on the use of this method in routine clinical practice. Even if we would have decided using US during our S1-3 TFESIs, we would also have done additional fluoroscopy with one or more images as well to confirm the proper contrast distribution in the epidural area, but not in the vascular region.

Finally, as far as neuropathic pain is concerned, we should not just focus on the site of injury, due to its complex and multifactorial nature. Although the experiences in musculoskeletal US imaging are promising, it does not seem to be reliable and safe currently as a guide in these interventional procedures, the TFESIs in the axial spine. Still being in an unclear zone for these patients, and looking at the diagnostic side of US, if the authors consider that some kind of classification of post-injection sciatic nerve injuries is needed for the literature, we look forward to seeing their study with a sufficient number of sciatic neuropathy cases after intramuscular injections. However, with today's US technology with difficulty in identification of the needle tip within the sacral foramina, we do not recommend using US for sacral transforaminal epidural injections, since it is unsafe for the patient.

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