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Letter to editor regarding "Characterizing an angle of cannula insertion for lumbar medial branch radiofrequency neurotomy: A retrospective observational study"

Dear Editor,

We wholeheartedly agree that there is a need for a method of teaching standardized approach to needle insertion in a lumbar medial branch radiofrequency coagulation (LRFC), and using cross-sectional imaging to improve procedural planning. We find that the methodology proposed by Patel, Chang, Haffey, Mainkar, and Gulati [1] may be incomplete, and offer our thoughts and comments for consideration.

As illustrated by this study, cross-sectional imaging of the lumbar spine is an excellent tool for pre-procedural planning. It provides visualization of the bony landmarks used on fluoroscopy, allows examination of soft-tissue structures that may inform procedural decisions, and can be annotated using commonly available electronic imaging software.

The authors suggest deriving the best angle of declination of radiofrequency cannulae based on the cortical margin of the cephalad aspect of the transverse process (TP), and suggest that such a measurement may be preferred over the more acutely declined position described in SIS guidelines [2]. The declination recommended in this study doesn't fully reflect the known anatomy of the medial branch, so the methodology could likely be improved.

Anatomical studies demonstrate consensus that the medial branch (MB) courses from its origin at the dorsal ramus arising of the spinal nerve along the lateral neck of the superior articular process (SAP) where the root of the TP begins to slope away from the lateral SAP [3–5]. The MB is fixed rostrally in a leaf of the intertransverse ligament near the junction of the SAP and TP, while caudally the medial branch is fixed by the mammillary-accessory ligament (MAL) [5]. Anatomists have described this trajectory as representing a declination of approximately 45° from the reference plane of the superior endplate of the vertebra that the MB traverses [2–4]. More recent work has suggested that the angle of declination of the medial branch may vary, so the authors' effort to describe a method to individualize technique based on cross-sectional imaging has great merit [6].

The author's method appears to be based on the parasagittal cross-section of the TP, in a slice where the TP meets the SAP at its dorsal aspect, as in Fig. 1 [1]. The dorsal aspect of this bony structure is a reasonable approximation of the likely location for the MAL. However, this cross-section does not incorporate the 3-dimensional contours of the bony structures, resulting in demonstration of a part of the more lateral aspect of the ventral TP that is not consistently reflective of the structure of interest to the authors: the lateral SAP where it meets the root of the TP. The authors could have corrected for this using multiplanar reconstruction with the angle of the slice resolved to the lateral margin of the SAP, to more completely delineate the root of the TP and the lateral SAP, or by using multiple parasagittal slices to impute the appropriate declination.

Another landmark of interest in the use of cross-sectional imaging to describe the trajectory of the medial branch is the location of the nerve root where it exits the foramen - the origin of the medial branch. The ventral tip of the author's demonstrated optimal projection does not appear to approach the nerve root at the lateral aspect of the intervertebral neural foramen.

In conclusion, the authors' method of measurement of declination of the cephalad cortex of TP are reliable measurements, but may not fully reflect the trajectory of the medial branch at this location, compromising the method's utility to improve procedural planning for LRFC.

As an additional note, when making procedural recommendations based on anatomical samples, it seems prudent to avoid recommendations based on averages. Averages inadequately represent the range of observations, conflating dissimilar specimens. Reporting the range of observations and frequency distributions within the range can encourage clinicians to be vigilant to the variance that can be observed between and within individuals so they are prepared to make the appropriate adjustments to the technique to maximize the safety and efficacy of the procedure for each patient.

The authors point out that procedural planning may be unrealistic and time consuming. We suggest that if procedural planning can be shown to result in improved technical decisions and improved clinical outcomes, the consequence may be a net reduction in procedural time, effort, and patient suffering.

We greatly appreciate the author's work examining the use of cross-sectional imaging to plan LRFC. We do believe this kind of work is essential to begin developing a standardized method to evaluate individual patient anatomy to perform efficient, effective LRFC.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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