Neurosurgical Forum LETTERS TO THE EDITOR

Spontaneous facet fusion

TO THE EDITOR: The article by Meleis et al.¹ is interesting and significant to us (Meleis A, Larkin MB, Bastos DCDA, et al. Single-center outcomes for percutaneous pedicle screw fixation in metastatic spinal lesions: can spontaneous facet fusion occur? *Neurosurg Focus*. 2021;50[5]:E9). For the phenomenon of spontaneous facet fusion we have some comments, as follows.

First, the authors described facet fusion as “the complete union with cartilage reabsorption across the facet joints at the stabilized segments” in the *Methods* section, and the authors also use Fig. 2 for further illustration. However, the legend to Fig. 2 reads as follows: “Left: Scan obtained immediately postoperatively showing that the joints are not ankylosed.” We speculate that the left panel of Fig. 2 should be called a preoperative instead of a postoperative CT scan as described by the authors, because we do not find any postoperative signs including screws and/or cement. The article also did not mention how to divide patients into the fusion group and the nonfusion group. We are confused whether all of the following categories of patients should be assigned to the fusion group: patients with only unilateral facet joint fusion at any stabilized segment, with bilateral facet joint fusion at any stabilized segment, or with bilateral facet joint fusion at all stabilized segments. We suggest that the fusion status of all facet joints in stabilized segments be discussed separately—in patients with partial joint fusion and in those with fusion in all joints.

Second, the article analyzed the factors that influenced the occurrence of spontaneous facet fusion. This could help us identify the causes of this phenomenon so that we can intervene if necessary. However, there were some vital preoperative patient conditions that were not taken into account, including preoperative facet joint osteoarthritis, body mass index, and the existence of spondylolisthesis. These have been reported to play important roles in spontaneous facet fusion.^{2–4} As such, the evaluation of spontaneous facet fusion in this article would be more accurate if these updated conditions were applied.

Third, facet joint violation (FJV) is important and worthy of consideration. It has been reported that the incidence of FJV after percutaneous pedicle screw fixation was 13.2%.⁵ FJV has the possibility to cause spontaneous facet fusion, which should not be ignored. Additionally,

Fig. 1 showed that pedicle screws did not insert into the fractured vertebral body. This means that the violation in the facet joint of the superior fractured vertebral body may be different from the other facet joints at the stabilized segments. However, it has been confirmed that the pedicle screw causes the superior adjacent FJV.^{6,7} Therefore, investigation of the impact from FJV in spontaneous facet fusion is needed.

We appreciate Dr. Meleis and his colleagues for their contribution. We hope our comments with regard to the article are constructive.

Xingxiao Pu, MD
Shishu Huang, PhD
Xiandi Wang, MD
Jiancheng Zeng, MD

West China Hospital, Sichuan University, Chengdu, PR China

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Disclosures

The authors report no conflict of interest.

Correspondence

Jiancheng Zeng: tomzeng5@163.com.

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DOI: 10.3171/2021.11.FOCUS21701.

Response

We thank Dr. Pu and colleagues for their interest in our article and for the comments. Regarding Fig. 2, left panel, we appreciate the feedback and indeed it is an immediate preoperative CT scan of the thoracic spine. The goal of our article was to describe the outcome of a consecutive cohort of patients undergoing cement-augmented percutaneous pedicle screw stabilization for spinal metastasis. To our knowledge, the occurrence of facet fusion after percutaneous pedicle screw stabilization in the oncological population has not been studied. We appreciate the suggestion to break down how many cases had evidence of unilateral or bilateral facet fusion at the stabilized segments. However, given that we did not find statistical correlation between presence and absence of facet fusion in terms of hardware failure, pain, and complications, we believed that describing further subgroups of facet fusion with nonstatistical correlation with outcome would not bring useful information to the reader.

Regarding the second comment, we agree that other factors may play a role in the occurrence (or lack thereof) of spontaneous facet fusion after percutaneous spinal sta-

bilization in patients with spinal metastasis. We were able to identify age older than 60 years as a predictor of facet fusion. We believe age is a surrogate for other factors like pre-existing facet osteoarthritis that could influence the development of facet ankylosis. Our median image follow-up was 11.3 months, and we agree that further research is needed to identify other factors related with the development of facet fusion and how this finding impacts the long-term outcome in cancer patients.

The comment regarding FJV is interesting, but given that all of our procedures were performed with a percutaneous technique, we found it difficult to verify and quantify the degree of facet disruption and how much this would correlate with fusion across the instrumented levels. Overall the occurrence or absence of facet joint fusion did not influence the outcomes of our patients during our follow-up.

Pu et al. raise important questions and we hope that further studies shed light in this subject, especially the durability of the spinal stabilization and the clinical outcome as new advancements in cancer therapy translate into longer survival in a significant subset of oncological patients.

Claudio E. Tatsui, MD

MD Anderson Cancer Center, Houston, TX

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DOI: 10.3171/2021.12.FOCUS21759.

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