Neurosurgical Forum
LETTERS TO THE EDITOR**Innovative procedure to decompress the craniocervical junction**

TO THE EDITOR: Mandel et al.¹ present a very accomplished study in their well-written article, published recently in the *Journal of Neurosurgery: Spine* (Mandel M, da Silva IAF, Paiva W, et al. Minimally invasive foramen magnum durectomy and obexostomy for treatment of craniocervical junction–related syringomyelia in adults: case series and midterm follow-up. *J Neurosurg Spine*. Published online April 17, 2020. doi:10.3171/2020.2.SPINE2032). However, we would like to make some comments about this report of their procedure.

The authors are correct in stating that minimally invasive spine surgery (MISS) techniques have been used since 2016 to achieve extradural bony decompression of the craniocervical junction (CCJ).^{2–6} However, in 2019 Quillo-Olvera et al.⁷ described in detail how to perform a microscopic technique very similar to that reported by Mandel et al., through a 2-cm skin incision by using a Gelpi retractor to address the bony decompression of CCJ in a patient with Chiari malformation type I. The MISS procedure described by Quillo-Olvera et al.⁷ allowed intradural exploration, and the authors at that time pointed out some of the procedure-related advantages also reported by Mandel et al.¹ Due to the novelty and similarities of the approaches presented by Mandel et al.¹ and Quillo-Olvera et al.,⁷ we consider some points to be worth clarifying.

First, the technique presented by Quillo-Olvera et al.⁷ should have been taken into consideration by Mandel et al. and included in the discussion or references of their report, in case some other centers are interested in replicating this technique and then reporting their own clinical and radiological outcomes. Second, the innovation that must be highlighted in the procedure used by Mandel et al.¹ is that the dura is left open (durectomy), rather than the specifics of the alternative MISS procedure that Mandel et al. describe in their discussion, because those details regarding this approach were previously reported by Quillo-Olvera et al.⁷ Third, Mandel et al. presented MRI evidence of the “pseudomeningocele” formed after the dura was left open, which can be seen on the MR image in their article, but this image does not show the bony decompression achieved by using this MISS technique.

We would like to emphasize this last point because

readers interested in MISS techniques should remember that achieving “smaller skin incisions” is not the only goal. As Quillo-Olvera et al. emphasize, performing smaller skin incisions plus achieving the same outcomes as open approaches are the goals of MISS for bony decompression, but Quillo-Olvera et al. also suggest that 3D CT scans be obtained postoperatively for further analysis, especially if a novel technique is being reported and long-term outcomes are still to be unveiled. Doing this will be useful for tracking the radiological outcomes of MISS procedures such as the one presented by Mandel et al. and will help readers to adopt these techniques in an organized and stepwise fashion.

Finally, it is fundamentally important to state that performing CCJ decompression through a 2-cm skin incision by using the microscopic minimal detachment muscle-splitting technique employing a Gelpi retractor can be challenging for surgeons with no experience in MISS. This is another reason for authors to include as much evidence as possible in their descriptive reports, to allow the readers to replicate these techniques in an efficient and, most importantly, safe manner.

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Disclosures

The authors report no conflict of interest.

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Response

We are grateful to Dr. Quillo-Olvera and colleagues for their interest in our article about a minimally invasive foramen magnum (FM) durectomy and obexostomy technique to treat craniocervical junction–related syringomyelia (CCJS) and for providing some insightful comments.

We agree with Dr. Quillo-Olvera and colleagues that minimally invasive surgery (MIS) has been previously described for the treatment of Chiari malformation. We cite in our article authors who have presented these novel minimally invasive alternatives.^{1–5} Similarly to the authors of these previous reports, we performed a 2- to 3-cm² bony decompression (as stated in the *Methods* section and shown in Video 1 of our article), but we did not include postoperative 3D CT scans in our report as multiple groups have reported achieving adequate FM bony decompression using this MIS technique.^{1–5} Instead, our focus was on prospectively evaluating the pathophysiology of CSF flow dynamics and syrinx cavity expansion using MRI in CCJS. We read with great interest the case report published by Quillo-Olvera et al.⁶ of a 16-year-old patient with Chiari malformation, but we did not cite this article as the report was not associated with CCJS and also in part because we cited other authors' reports of larger series using a similar surgical technique.^{1–5}

We emphasize that the novelty of the procedure reported in our paper lies in the combination of an MIS decompression with a durectomy and obexostomy targeting the pathophysiology of CCJS in adult patients. All of our patients had CCJS. Our technique was not focused on patients with Chiari malformation alone. We hypothesize that the treatment of CCJS can be achieved by creating a permanent submuscular pressure-leak pouch at the FM through an FM durectomy and obexostomy, which equilibrates the pressure between the spinal canal and subarachnoid space. The minimally invasive approach reduces the risk of CSF fistula formation because the use of a minimal skin incision and less muscle dissection leads to fast healing. In addition, because the dura is resected, no FM restenosis is observed.

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Perioperative complications in patients older than 80 years of age

TO THE EDITOR: I read with interest the article by Watanabe et al.¹ (Watanabe T, Kanayama M, Takahata M, et al. Perioperative complications of spine surgery in patients 80 years of age or older: a multicenter prospective cohort study. *J Neurosurg Spine*. 2020;32[4]:622–630). The authors should be commended for attempting to reasonably answer the question of complication risks for our older patient population requiring spine surgery. My concern, however, is that the study as presented downplays the overall risk of surgery by including balloon kyphoplasty (BKP). The authors had 3 categories of complications: surgical site, major systemic, and minor systemic. Within the surgical category they also included instrumentation-specific and kyphoplasty-specific complications. My issue here is that including BKP with open surgery artificially decreases the overall complication rate by increasing the overall cohort of patients who are not going to have surgical site complications. Patients who undergo BKP are not going to have dural tears or surgical wound disruption because the percutaneous nature of the procedure does not really allow for it. In contrast, a surgical patient could have an instrumentation-specific and also a general surgical site complication. However, with the possible exception of hematoma and deep wound infection, none of the surgical complications the authors attempted to measure are really conceivable with BKP, so there were zero. The BKP minor systemic complications they described were

also confusing: did they really have a case of anemia that required a transfusion? My overall point here is that they are lumping two different kinds of procedures together. I think the study would be better if the complications were described in the surgical groups alone.

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Disclosures

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Response

We appreciate the comments on our current article provided by Dr. Bhangoo. His major concern was underestimation of the risk in elderly patients with spine surgeries if BKP was included.

To defend against his criticism, we compared the complication rates whether or not BKP was included. As written in our article, overall complications developed in 54 of 270 patients (20.0%), surgical site complications in 22 of 270 (8.1%), and minor systemic complications in 40 of 270 (14.8%) when BKP was included. If BKP was excluded, overall complications developed in 51 of 238 (21.4%), surgical site complications in 21 of 238 (8.8%), and minor systemic complications in 38 of 238 (15.9%). As shown above, the complication rates were not substantially different whether or not BKP was included, and we reached the same conclusions in our article.

One of our goals was to clarify the safety of each surgical procedure in elderly patients. The complication rate of BKP in the elderly must be reported as written in this article; perioperative complications occurred in 3 of 32 BKPs (9.4%), which consisted of 1 surgical site complication (adjacent vertebral fracture) and 2 minor systemic complications (anemia and delirium). We believe this information will be beneficial to surgeons managing spine disorders in the elderly.

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