TO THE EDITOR:

Letter to the Editor concerning “Post-operative Distal Coronal Decompensation after Fusion to L3 for Adolescent Idiopathic Scoliosis is affected by Sagittal Pelvic Parameters” by So Kato

We carefully read the article published in Spine by Kato et al.1 The work was with great effort. However, in the study, the surgical criteria for the selection of lowest instrumented vertebra (LIV) were not discussed, which we believed was crucial to the L3-4 disc wedging angle postoperatively and at final follow-up time.

As 53 patients (68%) had structural thoracolumbar curvature, the change of L3-4 disc wedging angle was totally different between the patients with lower end vertebra (LEV) at L3 and L4. Therefore, we have some concerns about this article. Lee et al2 indicated stopping fusion at L3 may have different adjacent disc wedge angle, correction rate and change of apical vertebral translation in LEV ≤4 and LEV ≥3 patients. We think the authors could report the clear surgical criteria for the patients fusion to L3 and show the outcome of postoperative distal coronal decompensation in patients with different LEV.

In this study, the authors found interesting association between increased pelvic tilt and increased L3-4 disc wedging. However, the case example in this study had a severe proximal junctional kyphosis and the Cobb angle of lumbar curve was much >43°. The relationship between the change of pelvic tilt (PT), proximal junctional kyphosis, and the selection of LIV may influence the final result. Thus, we thought the change of proximal junctional kyphosis after surgery should be taken into calculated in this study instead of only discussing the lumbar-pelvic parameters.

At last, LIV translation, Cobb angle, pelvic incidence, and PT were used in the multivariate logistic regression analysis, which revealed that larger PT was a significant risk factor for decompensation. However, Shu et al3’s study also showed the immediate postoperative LIV tilt and LIVDA may also influence the final adding-on. Why not take the LIV tilt and the immediate postoperative parameters in the multivariate logistic regression analysis and get a more predictable result? We wish the authors to show more data about these questions.

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TO THE EDITOR:

Letter to the Editor regarding “Risk of Postoperative Complications and Revision Surgery Following Robot-assisted Posterior Lumbar Spinal Fusion”

We read with great interest the study by Yang et al, which compared outcomes and complications between robotic-assisted and conventional lumbar fusions. Although we commend the authors for tackling a complex topic using a large administrative database, it was surprising that the observed rate of complications is higher for robotic spinal fusions as outcomes for robotic-assisted procedures are usually similar, if not better, when compared to conventional open surgeries.1,2 The study’s methodology introduces questions about the presented data and conclusion.

The authors have identified robotic fusions using billing codes for fluoroscopic (CPT-0054T), CT/MRI (CPT-0055T), image-less (CPT-20985), and stereotactic (CPT-61783) computer-assisted navigation. This presents an issue as robotic-assisted surgery is considered to be incidental to the primary procedure and is not uniquely identified with a unique CPT code. Therefore, a significant portion of the procedures captured in this analysis might not be robotic procedures, but instead are various forms of navigation-assisted fusions.

The authors also discuss stratifying their analysis based on the number of levels, but there is no separate analysis or multivariate analysis that shows a stratification and/or adjustment for the length of fusion. Therefore, the significantly higher rate of complications observed for robotic fusions could arise from procedures done for long-segment fusions, and/or spinal deformity that would preclude an easy placement of free-hand pedicle screw placement.

The manuscript submitted does not contain information about medical device(s)/drug(s).
No funds were received in support of this work.
No relevant financial activities outside the submitted work.
DOI: 10.1097/BRS.000000000003915

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TO THE EDITOR:

Letter to the Editor regarding: “Risk of Postoperative Complications and Revision Surgery Following Robot-assisted Posterior Lumbar Spinal Fusion” by Yang et al.

We appreciate the thoughtful comments regarding our manuscript. It is true that a number of previous studies comparing freehanded to robot-assisted posterior lumbar spine fusion (LSF) report lower rates of pedicle screw repositioning with robot assistance; however, this evidence is inconsistent, and furthermore, several studies have reported increased operative time with robot-assisted LSF compared to freehand screw placement which increases health care costs and infection rates.

Overall, this nationwide database study joins a body of recent evidence suggesting that robot-assisted LSF surgery at the current time provides little advantage over conventional freehanded LSF in terms of overall patient safety. In a recent, well performed study Passias et al examined patients undergoing open, minimally invasive (MIS), and robotic LSF. Although their study was from a single center, developing propensity-matched cohorts by numbers of levels fused and utilizing the PearlDiver data only for their cost-analysis. They reported that open patients had significantly shorter operative times, and rates of both postoperative complications and length of stay were significantly higher in robotic patients versus open patients. This contemporary investigation by Passias et al strongly supports our data.

In regard to the coding, it is our experience in practice that the CPT codes we have used to specify robot-assisted surgery are often cited as the modifier codes for robot-assistance. It is correct that CPT codes may not be sufficient to identify robot-assisted cases, and that is a limitation of this investigation which Passias et al do not share when they utilized single-center data to assess robotic surgery patients. To help alleviate these concerns, we have returned to our data to more closely examine the breakdown of CPT codes for our matched cohort of 2528 robot-assisted LSF surgeries. CPT-61783 (Stereotactic Computer Assisted Posterior Spinal), the most specific to robot-assisted technology, represents 2492 (98.6%) of the procedures.

Regarding the stratified analysis based on number of levels, we reported in our discussion that results were conserved and thus did not describe these specific results. In summary, single-level robotic LSF involved higher risk of revision (9.2% vs. 5.8%, adjusted odds ratio [aOR] = 1.64, 95% confidence interval [CI] 1.19–1.27, \( P = 0.0026 \)) and higher risk of 30-day complications, which approached significance (9.2% vs. 7.7%, aOR = 1.26, 95% CI 0.93–1.70, \( P = 0.1420 \)), compared to conventional LSF. Multi-level robotic LSF involved higher risk of revision, which approached significance (9.5% vs. 7.3%, aOR = 1.34, 95% CI 0.98–1.85, \( P = 0.0736 \)), and higher risk of 30-day complications (19.6% vs. 15.2%, aOR = 1.34, 95% CI 1.06–1.70, \( P = 0.0163 \)).

Ultimately, further research is needed to investigate long-term postoperative outcomes following robot-assisted LSF, and to further assess these technologies as the surgeon learning curve progresses and these technologies improve.

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