Regarding "Incidence and Associated Factors for Kyphosis Progression in Short-Segment Fixation Thoracolumbar Spine Fractures" by Kongtush Choovongkomol et al

Mohamed M. Aly

Int J Spine Surg 2023, 17 (4) 623-624
doi: https://doi.org/10.14444/8485
http://ijssurgery.com/content/17/4/623

The International Journal of Spine Surgery
2397 Waterbury Circle, Suite 1,
Aurora, IL 60504, Phone: +1-630-375-1432

International Journal of Spine Surgery, Vol. 17, No. 4, 2023, pp. 623–624
https://doi.org/10.14444/8485

Letter to the Editor Regarding "Incidence and Associated Factors for Kyphosis Progression in Short-Segment Fixation Thoracolumbar Spine Fractures" by Kongtush Choovongkomol et al

MOHAMED M. ALY, MD, MSc, PhD[1,2]

[1]*Department of Neurosurgery, Prince Mohammed Bin Abdulaziz Hospital, Riyadh, Saudi Arabia;* [2]*Department of Neurosurgery, Mansoura University, Mansoura, Egypt*

Keywords: posterior ligamentous complex, thoracolumbar fractures, magnetic resonance imaging, AOSpine classification, posttraumatic kyphotic deformity

We read with great interest the article by Kongtush Choovongkomol et al titled "Incidence and Associated Factors for Kyphosis Progression in Short-Segment Fixation Thoracolumbar Spine Fractures." The authors examined the incidence and risk factors for kyphosis progression in 91 patients with thoracolumbar fractures who had short-segment fixation and were followed for at least 12 months.[1] The study reported a 35.2% incidence of kyphosis progression. Injury to the posterior ligamentous complex (PLC; OR 3.14, $P = 0.040$) and usage of intermediate screw insertion (OR 0.11, $P = 0.043$, preventative factor) were the only two independent predictors of kyphosis progression. Age, body mass index, and fracture type had little effect on kyphosis progression. While we appreciate the authors' efforts in conducting this study, we have a few comments to contribute to the conversation.

The authors first recognized kyphosis progression based on radiographic evidence of a greater than 5° increase in Cobb angle over the follow-up period but with no clinical correlation. Whether or not the kyphosis progression reported in the study was symptomatic is critical to the study's findings. There is no agreed-upon definition for kyphosis progression; nevertheless, it has been suggested that the criteria include radiological evidence and clinical symptoms such as back pain.[2]

The definition of PLC injuries by the authors was based on computed tomography (CT) findings of facet joint diastasis, sagittal translation, or interspinous widening (ISW) >2 mm or magnetic resonance imaging (MRI) findings of black stripe discontinuity or high signal intensity on sagittal T1- and T2-weighted. Regarding MRI, earlier research demonstrated that high signal intensity yielded moderately low specificity for diagnosing PLC damage intraoperatively.[3] The high signal intensity criterion has been criticized as it overestimates PLC injuries.[4] Instead, several authors recommended using black stripe discontinuity as a criterion for PLC injury in MRI, and this was further supported by biomechanical evidence that supraspinous and ligamentum flavum is the main contributor to PLC competence.[5] The authors did not consider horizontal laminar or spinous process fractures, which are highly predictive of PLC injuries when defining PLC injuries in CT.[6,7] Rajasekaran et al have shown that ISW greater than 2 mm yielded a low specificity (57%) in detecting PLC damage.[8] Instead, we recommend using ISW >4 mm, which was reported to independently predict PLC injury in MRI.[6] We have recently proposed a CT criterion for PLC injury based on the number of positive CT findings independently associated with PLC injury in MRI. Two or more CT findings had a 91% positive predictive value for PLC injury and should be considered a criterion for PLC damage.[6] This criterion may improve the accuracy of detecting PLC injuries based on CT.

The study's relatively redundant definition of PLC injury has probably overestimated the rate of PLC injuries and their contribution to kyphosis. This is reflected by the high prevalence (51.7%) of PLC injuries in this study. We recently demonstrated that the incidence of PLC injuries in A3/A4 fractures after MRI is around 12%, which is far lower than the incidence reported in this study.[4]

REFERENCES

1. Choovongkomol K, Piyapromdee U, Tanaviriyachai T, Jongkittanakul S, Sudprasert W. Incidence and associated factors for

kyphosis progression in short-segment fixation thoracolumbar spine fractures. *Int J Spine Surg*. 2022;16(5):815–820. doi:10.14444/8343

2. De Gendt EEA, Vercoulen TFG, Joaquim AF, et al. The current status of spinal posttraumatic deformity: a systematic review. *Global Spine J*. 2021;11(8):1266–1280. doi:10.1177/2192568220969153

3. Pizones J, Sánchez-Mariscal F, Zúñiga L, Álvarez P, Izquierdo E. Prospective analysis of magnetic resonance imaging accuracy in diagnosing traumatic injuries of the posterior ligamentous complex of the thoracolumbar spine. *Spine (Phila Pa 1976)*. 2013;38(9):745–751. doi:10.1097/BRS.0b013e31827934e4

4. Aly MM, Al-Shoaibi AM, Abduraba Ali S, Al Fattani A, Eldawoody H. How often would MRI change the thoracolumbar fracture classification or decision-making compared to CT alone. *Global Spine J*. 2022:21925682221089580. doi:10.1177/21925682221089579

5. Wu C-C, Jin H-M, Yan Y-Z, et al. Biomechanical role of the thoracolumbar ligaments of the posterior ligamentous complex: a finite element study. *World Neurosurg*. 2018;112:e125–e133. doi:10.1016/j.wneu.2017.12.171

6. Aly MM, Al-Shoaibi AM, Alzahrani AJ, Al Fattani A. Analysis of the combined computed tomography findings improves the accuracy of computed tomography for detecting posterior ligamentous complex injury of the thoracolumbar spine as defined by magnetic resonance imaging. *World Neurosurg*. 2021;151:e760–e770. doi:10.1016/j.wneu.2021.04.106

7. Aly MM, Al-Shoaibi AM, Aljuzair AH, Issa TZ, Vaccaro AR. A proposal for a standardized imaging algorithm to improve the accuracy and reliability for the diagnosis of thoracolumbar posterior ligamentous complex injury in computed tomography and magnetic resonance imaging. *Global Spine J*. 2023;13(3):873–896. doi:10.1177/21925682221129220

8. Rajasekaran S, Maheswaran A, Aiyer SN, Kanna R, Dumpa SR, Shetty AP. Prediction of posterior ligamentous complex injury in thoracolumbar fractures using non-MRI imaging techniques. *Int Orthop*. 2016;40(6):1075–1081. doi:10.1007/s00264-016-3151-1

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

Declaration of Conflicting Interests: The authors report no conflicts of interest in this work.

Disclosures: Dr Aly reports receiving a grant from AOSpine Knowledge Forum.

Corresponding Author: Mohamed M. Aly, Department of Neurosurgery, Prince Mohamed Ben Abdulaziz Hospital, PO Box 54146, Riyadh 11514, Saudi Arabia; drmoali26@gmail.com; ali@pmah.med.sa

Published 21 July 2023