

Is the Use of Intraoperative Neuromonitoring Justified During Lumbar Anterior Approach Surgery?

David W. Allison

Int J Spine Surg published online 13 May 2025
<https://www.ijssurgery.com/content/early/2025/05/12/8764>

This information is current as of May 17, 2025.

Email Alerts Receive free email-alerts when new articles cite this article. Sign up at:
<http://ijssurgery.com/alerts>

Is the Use of Intraoperative Neuromonitoring Justified During Lumbar Anterior Approach Surgery?

DAVID W. ALLISON, PhD, CNIM^{1,2}

¹Department of Neurology, Houston Methodist Hospital, Houston, TX, USA; ²Houston Methodist Research Institute, Houston, TX, USA

Keywords: ALIF, intraoperative neuromonitoring, SSEP, TcMEP, TaMEP, EMG

To the Editor: I write to share a few concerns regarding the article titled, “Is the Use of Intraoperative Neuromonitoring Justified During Lumbar Anterior Approach Surgery?” in the April 2024 publication of the *International Journal of Spine Surgery*.

The authors present a multisite retrospective analysis of the effectiveness of intraoperative neuromonitoring (IONM) in 359 consecutive anterior approach total disc replacement and/or anterior lumbar interbody fusion (ALIF) surgeries. Of these 359 surgeries, 3 cases with “aberrant IONM results” are presented, which the authors categorize as 1 false positive and 2 false negatives. Based upon these results and a literature review, the authors conclude that IONM does not provide any benefit for lumbar anterior approach surgery to treat symptomatic disc degeneration.

My concerns are that there is insufficient information on the IONM alerts to support their categorization, and somatosensory evoked potentials (SSEPs) cannot reliably detect a motor injury.

In the case categorized as a false positive, the authors describe the IONM alert as “changes in the IONM of the left lower extremity” but do not clarify whether the change was intermittent or sustained, how much the left SSEP changed compared to baseline, and whether it recovered. The most likely reason for attenuation of the left lower extremity SSEP during an ALIF is leg ischemia due to retraction of the iliac vessels.^{1–4} In most cases when this occurs, the SSEPs recover when the retractor is removed. We cannot judge if transitory leg ischemia was the cause of SSEP changes in this case, as no detailed information is provided.

The second and third cases are categorized as false negatives because the patients experienced foot drop postoperatively, but there were no changes in the SSEPs or electromyography. However, SSEPs

do not monitor motor function, and neither SSEPs nor EMG have been shown to detect distraction neuropraxia motor injuries during ALIFs. SSEPs can only detect injury to the sensory pathway, serve as a surrogate for motor function, and may not detect a sensory deficit in one spinal nerve due to overlapping levels of innervation.⁵ Additionally, EMG is not reliable when neuromuscular blockade is used during ALIF surgery; the methods do not clarify whether neuromuscular blockade was utilized.

Not detecting a spinal nerve motor distraction injury while utilizing IONM modalities that cannot detect a spinal nerve motor distraction injury is not a false negative. The correct modality to detect spinal nerve distraction motor injuries is motor evoked potentials (MEPs). Currently, transcranial MEPs (which require a total intravenous anesthesia anesthetic regimen and a bite block) and transabdominal MEPs are the only options.^{6,7}

REFERENCES

1. Brau SA, Spoonamore MJ, Snyder L, et al. Nerve monitoring changes related to iliac artery compression during anterior lumbar spine surgery. *Spine J*. 2003;3(5):351–355. doi:10.1016/s1529-9430(03)00067-6
2. Garg J, Woo K, Hirsch J, Bruffey JD, Dilley RB. Vascular complications of exposure for anterior lumbar interbody fusion. *J Vasc Surg*. 2010;51(4):946–950. doi:10.1016/j.jvs.2009.11.039
3. Nair MN, Ramakrishna R, Slimp J, Kinney G, Chesnut RM. Left iliac artery injury during anterior lumbar spine surgery diagnosed by intraoperative neurophysiological monitoring. *Eur Spine J*. 2010;19 Suppl 2(Suppl 2):S203–S205. doi:10.1007/s00586-010-1372-3
4. Yaylali I, Ju H, Yoo J, Ching A, Hart R. Intraoperative neurophysiological monitoring in anterior lumbar interbody fusion surgery. *J Clin Neurophysiol*. 2014;31(4):352–355. doi:10.1097/WNP.0000000000000073
5. Melachuri SR, Kaur J, Melachuri MK, Crammond DJ, Balzer JR, Thirumala PD. The diagnostic accuracy of somatosensory evoked potentials in evaluating neurological deficits during

1036 posterior spinal fusions. *Neurol Res.* 2017;39(12):1073–1079. doi:10.1080/01616412.2017.1378413

6. Wilent WB, Trott JM, Sestokas AK. Roadmap for motor evoked potential (MEP) monitoring for patients undergoing lumbar and lumbosacral spinal fusion procedures. *Neurodiagn J.* 2021;61(1):27–36. doi:10.1080/21646821.2021.1866934

7. Allison DW, Verma A, Holman PJ, et al. Transabdominal motor evoked potential neuromonitoring of lumbosacral spine surgery. *Spine J.* 2024;24(9):1660–1670. doi:10.1016/j.spinee.2024.04.029

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

Declaration of Conflicting Interests: The author reports no conflicts of interest in this work.

Corresponding Author: David W. Allison, Department of Neurology, Houston Methodist Hospital, 6565 Fannin St, Houston, TX 77030 #405, USA; ionmmonitoring@gmail.com

Copyright © 2025 ISASS. The IJSS is an open access journal following the Creative Commons Licensing Agreement CC BY-NC-ND. To learn more or order reprints, visit <http://ijssurgery.com>.