Letters to the Editor

Assessing the Efficacy of Dexmedetomidine in Postoperative Pain Management: A Trial Sequence Analysis Approach

To the Editor:

We read with great interest the article by Yu et al (1) titled "Application of dexmedetomidine as an opioid substitute in opioid-free anesthesia: A systematic review and meta-analysis," published in *Pain Physician*. We commend the authors for their valuable contribution to the field of anesthetic practice, particularly in light of the current opioid crisis. Their systematic review and meta-analysis provides important insights into the potential benefits and risks of dexmedetomidine as a substitute for opioids.

While the finding that the opioid-free group had significantly reduced pain scores at 2 hours postoperatively is promising, the high heterogeneity (I^2 = 78%) suggests that the evidence may not be robust enough for widespread application. This may concern the readers, as it raises questions about the applicability of the findings across different patient populations and surgical procedures. To address this concern, we performed a trial sequence analysis (TSA) using the raw data provided in the meta-analysis. TSA is a powerful tool that combines an information size calculation for meta-analysis with the monitoring boundaries of a single trial (2,3). We used the TSA software version 0.9 (Copenhagen Trial Unit, Centre for Clinical Intervention Research), which is specifically designed for such analyses. The results of the TSA of the data revealed that the cumulative Z-curve crossed the trial sequential monitoring boundary, indicating that the finding of reduced pain scores is both statistically significant and unlikely to be a result of random error (Fig. 1). This suggests that dexmedetomidine is an effective opioid substitute in the context of opioid-free anesthesia, and warrants further investigation through additional high-quality randomized controlled trials with standardized dosing and protocols.

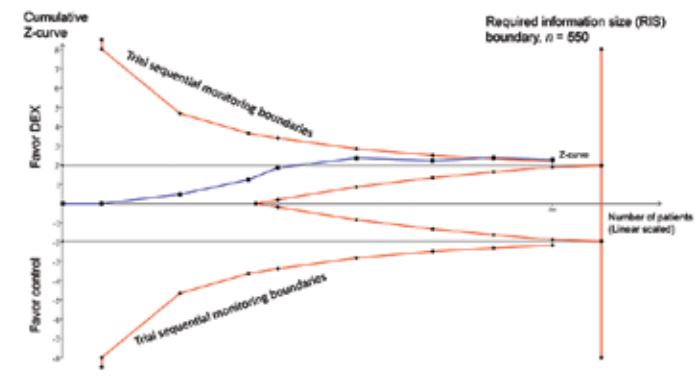

Fig. 1. *This graph depicts a trial sequence analysis (TSA) of the cumulative evidence evaluating the effectiveness of dexmedetomidine (DEX) in reducing postoperative pain at postoperative 2 hours. The X-axis displays the cumulative number of patients on a linear scale, while the Y-axis represents the cumulative Z-score, a measure of statistical significance. The blue line illustrates the Z-curve, which aggregates the Z-scores across trials as more data is accumulated. The red lines represent the trial sequential monitoring boundaries, which help determine the reliability of the evidence and whether additional trials are needed. The intersection of the Z-curve with the upper monitoring boundary indicates that the evidence is sufficient to confirm a significant reduction in postoperative pain by DEX, and further trials may not be necessary.*

Overall, the manuscript is of great importance, as it provides a critical evaluation of a potential strategy to reduce opioid use in anesthesia, which is crucial for improving patient care and outcomes. The results of the TSA support the conclusion that dexmedetomidine is a promising alternative to opioids, and further research is needed to fully establish its efficacy. The authors are to be commended for their contribution to the ongoing effort to improve patient care and outcomes.

I-Wen Chen, MD
Department of Anesthesiology, Chi Mei Medical Center, Liouying, Tainan City, Taiwan

Wei-Ting Wang, MD
Department of Anesthesiology, E-Da Hospital, Kaohsiung City, Taiwan

Kuo-Chuan Hung, MD
Department of Anesthesiology, Chi Mei Medical Center, Tainan City, Taiwan
E-mail: ed102605@gmail.com

References

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