Examining the Effect of Intraoperative Dexmedetomidine on Postoperative Pain and Opioid Use

By

Derrick McCoy, RN, BSN, CCRN

Deliverable

Summary of Findings

The results of this project express how dexmedetomidine (precedex), is currently being used in practice amongst active anesthesia providers. This project revealed a wide variety of usage patterns dispersed within the group of 57 CRNAs and 1 MDA. Although literature supports dexmedetomidine's opioid sparing properties that improves post operative pain, and patient outcome, rationale for its usage wasn't standardized amongst the providers. Despite the variations, almost all respondents agreed that it reduces post-op pain and opioid use. This data supports what many RCTs and systematic reviews have already shown, which is that clinical outcomes improve when Dexmedetomidine (precedex) is administered intraoperatively.

Surprisingly, the survey results failed to reveal statistically significant results between "years of practice" and "frequency of use". I was expecting to find that the younger the year of practice, the higher the use of dexmedetomidine. Whereas the higher the number of years practiced, I would have expected a lower use and familiarity with the medication. The results revealed that the hypothesis was false and dexmedetomidine use was widespread amongst "years of experience" with all groups reporting use. This finding suggests that a provider's comfort level with dexmedetomidine is not only based on years of experience, rather exposure to, their

training, and facility/policy culture. Literature describes various barriers-to-adoption into practice related to the absence of standardized protocols, varied training experiences, and facility expectations. This project showed that providers, especially those in my survey, recognized that although dexmedetomidine is beneficial, its lack of integration in routine practice remains.

Project Strengths and Limitations

A strength of this project includes live results from actively practicing anesthesia providers from various states and clinical experiences. Survey responses were reflective of daily practices, which makes the data credible. A by-product of this project and another strength is that is aims to reduce opioid use in the operating room and enhance recovery after surgery (ERAS), making this project clinically relevant. The survey was anonymous and no identifiers were recorded. For most descriptive and inferential analysis, a sample size of 50 or greater provides enough statistical power for comparisons of groups and increases the strength of these results.

There are limitations to this project, it did not directly evaluate patient outcomes including post-op pain scores, opioid and OTC medication use and hemodynamic effects. Effective post-op pain monitoring and hemodynamic assessments directly monitor dexmedetomidine's effectiveness as a intraoperative anesthesia adjunct. The survey was only live for 3 weeks. Due to time constraints and due dates, although more than 50 surveys were completed, more time could have allowed for increased data collection and analysis. These limitations don't weaken the significance of the findings but generate opportunities for future research and development of guidelines.

Future Implications and Recommendations

Providers recognize the benefits of dexmedetomidine, but the inconsistent dosage patterns, training/education, absence of approved protocols are reasons that limit its use. Although this project did not result in the development of a dosing guideline due to time and scope limitations, the survey data and literature strongly support continued efforts in that direction. This project did provide a summarization of the use of dexmedetomidine, that could influence further development of a dosage protocol. The survey results that will be shared with anesthesia providers which will include mean dose (mcg), surgery type, and perceived effectiveness.

Future implications for research should focus on a protocol that should include dosage recommendations, clinical indications, contraindications, and hemodynamic parameters. Literature identified hypotension and bradycardia as contraindications, indicating that future protocol development must include clearly stated hemodynamic parameters and patient criteria to ensure it is safely used across various surgical populations. Other opportunities for education include focused training during orientation, SRNA education modules, and continuing education for practicing anesthesia providers.

A standardized dosing protocol would make it possible to evaluate whether post-operative pain scores, PACU opioid requirements, time of PACU to discharge, and occurrences of hemodynamic instability are clinically significant or not. This work will contribute to opioid epidemic reduction, ERAS protocols and multimodal anesthetic and analgesic practice across various surgical settings.

Conclusion

The survey findings reinforce the belief that dexmedetomidine is a valuable anesthetic adjunct but is influenced by lack of standardization which limits its routine use. By identifying barriers to implementation, this work can lead to future development that aligns into Evidence Based Practice.

Results

- Total of 58 Anesthesia Providers, CRNA (n=57), MDA (n=1) participated in this survey
- Dexmedetomidine is popular amongst anesthesia providers, but it lacks a dosing protocol and formal ERAS parameters. Its popular amongst: General, oncology, orthopedic and plastic surgeries.
- 98.3% reported routine or occasional use of dexmedetomidine intraoperatively
- Mode for average intermittent bolus dose: **4 mcg (**34%), **10 mcg (**24%), **8 mcg (**27.6%)
- Mean cumulative dose by case: **30 mcg**
- Mean cumulative dose for providers who **believed dexmedetomidine reduced** postoperative opioid needs: **32.18 mcg**
- Mean cumulative dose for providers **who did not believe** dexmedetomidine affected opioid needs: **16.38 mcg (**was significant p=.001)

- There was no significance between years of practice and frequency of dexmedetomidine use (p=.943)