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28th Annual Research Day

May 2nd, 12:00 AM

A Scoping Review: Ketamine for the Prevention of Perioperative Shivering in Patients Undergoing Spinal Anesthesia

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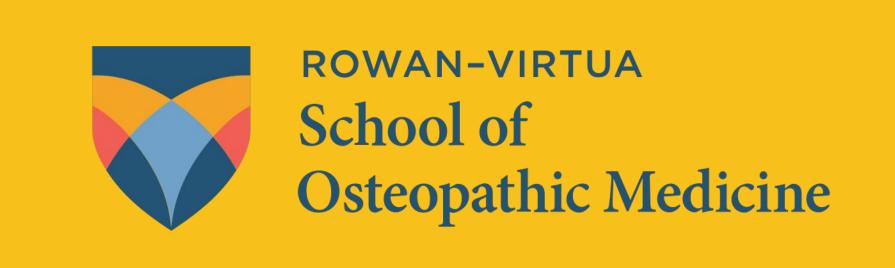
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Goich, Kenneth; Pastore, Dakota B.; Koutsenko, Bianna; Infosino, Benjamin; Sgrignoli, Mitchell; and Schachter, Todd, "A Scoping Review: Ketamine for the Prevention of Perioperative Shivering in Patients Undergoing Spinal Anesthesia" (2024). Rowan-Virtua Research Day. 91.

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A Scoping Review: Ketamine for the Prevention of Perioperative Shivering in Patients Undergoing Spinal Anesthesia

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Background

- Shivering is a frequently encountered perioperative complication in patients undergoing spinal anesthesia.
- Numerous different pharmacological agents have been employed to mitigate this issue.
- When selecting a pharmacologic agent to prevent shivering the effects of the drugs on hemodynamics should also be considered.
- Data has yet to demonstrate a superior agent to control perioperative shivering
- Ketamine has received increasing attention as possible pharmacological means to prevent perioperative shivering.

Objective

- This scoping review aims to evaluate the efficacy of ketamine in mitigating the incidence of shivering in patients undergoing spinal anesthesia.
- The effects of ketamine on hemodynamics were also examined as a secondary objective.

Methods

- Information Sources: The medical databases used for ascertaining data included PubMed, JAMA, and Cochrane.
- Search Terms: Using search terms "ketamine" AND "shivering" AND "spinal", "ketamine shivering spinal", "ketamine" AND "hypothermia" AND "spinal", and "ketamine shivering", a total of 104 articles were collected, 52 from PubMed, 4 from JAMA, and 48 from Cochrane. 13 articles were used in this review after filtering for duplicates and inclusion criteria.
- Data Extraction: Studies published during the years 2018 to 2023 were used for data gathering. From the collected literature, results, conclusions, and methodology were extracted.

Results

- In ketamine versus control, three out of five studies found ketamine to be more effective (p<0.05, p<0.001, p<0.001) in the prevention of shivering than saline control (Table 1). 1,2,3
- When compared with tramadol, two studies found ketamine to be more effective (p<0.001, p<0.001), 4,5 one found no difference (p=0.261),⁶ and one found tramadol to be more effective (p<0.001).7
- Two studies found dexmedetomidine more effective (p<0.022, p<0.027)^{8,9} than ketamine and tramadol.
- When comparing ketamine, ondansetron, and pethidine, all three were effective (p<0.001) versus saline, with no significant difference between the three. 10
- Meperidine demonstrated more efficacy (p<0.05) in reducing the intensity of shivering than ketamine. 11
- Ketamine's effects on hemodynamics were shown to be equivocal or more favorable across several studies. 1,6,10,12,13

Ketamine Versus Saline									
First Author	Administration	N, Saline	N, Ketamine	Dose Ketamine	Shivering Saline	Shivering Ketamine	P Value		
Sarshivi	IV	45	45	0.3 mg/kg bolus	24 (53.3%)	15 (33.3%)	0.08		
Xue*	Epidural	30	30	0.5 mg/kg bolus	10 (33.3%)	2 (6.67%)	< 0.05		
Aboelsed	IV	63	63	0.3 mg/kg bolus 0.1 mg/kg*hr infusion	22 (38.1%)	5 (7.94%)	< 0.01		
Adhikari	IV	40	40	0.25 mg/kg bolus	8 (20%)	5 (12 %)	0.36		
Thangavelu**	IV	31	29	0.2 mg/kg bolus 0.1 mg/kg*hr infusion	18 (58.06%)	4 (13.79%)	< 0.01		

^{*}At 30-minute mark

Table 1. Ketamine compared to saline in reduction of postoperative shivering.

Discussion

- Ketamine consistently demonstrates efficacy in the prevention of perioperative shivering, but has not proven itself a superior agent.
- When choosing an agent patient population, comorbidities, and procedure being performed should be considered to mitigate risks.
- One advantage of ketamine is that it shows no detrimental effects to the fetus when used in spinal anesthesia for cesarean section.⁵
- Other studies suggested that ketamine in combination with tramadol may be superior, ¹⁴or that it may be effective in treating shivering opposed to prevention. 15

Conclusion

- Ketamine is one of several drugs that may be beneficial in the prevention of perioperative shivering.
- While there is mixed evidence on whether it is better than other treatments, ketamine may have advantages from a hemodynamics standpoint.
- Doctors should be cautious when prescribing it to patients who might be prone to delirium due to its association with hallucinations.
- Overall, ketamine is a safe and effective drug for the prevention of perioperative shivering.

References



References

^{**}Ketamine group continued to have statistically significant (P<0.01) shivering prevention postoperatively