

Continuous spinal anesthesia as the primary anesthetic for orthopedic surgery: a retrospective study

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Background:

- Continuous spinal anesthesia (CSA) can provide a consistent surgical block with reduced hemodynamic effects when compared to single-injection spinal anesthesia.^{1,2}
- CSA provides rapid onset anesthesia and can be redosed to extend duration.
- For orthopedic surgery, CSA is often used for medically complex patients with significant cardiac and pulmonary comorbidities.

Objectives:

- Primary aim:** describe the patient population that receives CSA for major orthopedic surgery, specifically the patient and procedural factors that contribute to the anesthesiologist's decision to choose CSA.
- Secondary aim:** describe CSA related complications.

Methods:

- Study received IRB exemption per Mass General Brigham IRB policy.
- Patients identified per administrative database CPT codes and procedure notes.
- 14 patients identified who underwent CSA for orthopedic surgery from 2016 - 2024 at Brigham and Women's Hospital.
- Data collected from anesthetic records, inpatient records, cardiac and pulmonary studies.
- Preoperative risk factors, intraoperative hemodynamics, and post-operative discharge and survival outcomes up to 1 year were analyzed.
- CSA procedure:** deliberate puncture of dura mater with a 17G epidural needle confirmed by cerebrospinal fluid flow, followed by insertion of 20G epidural catheter. Adequate anesthesia levels were obtained by incremental dosing with preservative-free bupivacaine or lidocaine.

Results:

Patient Characteristics:

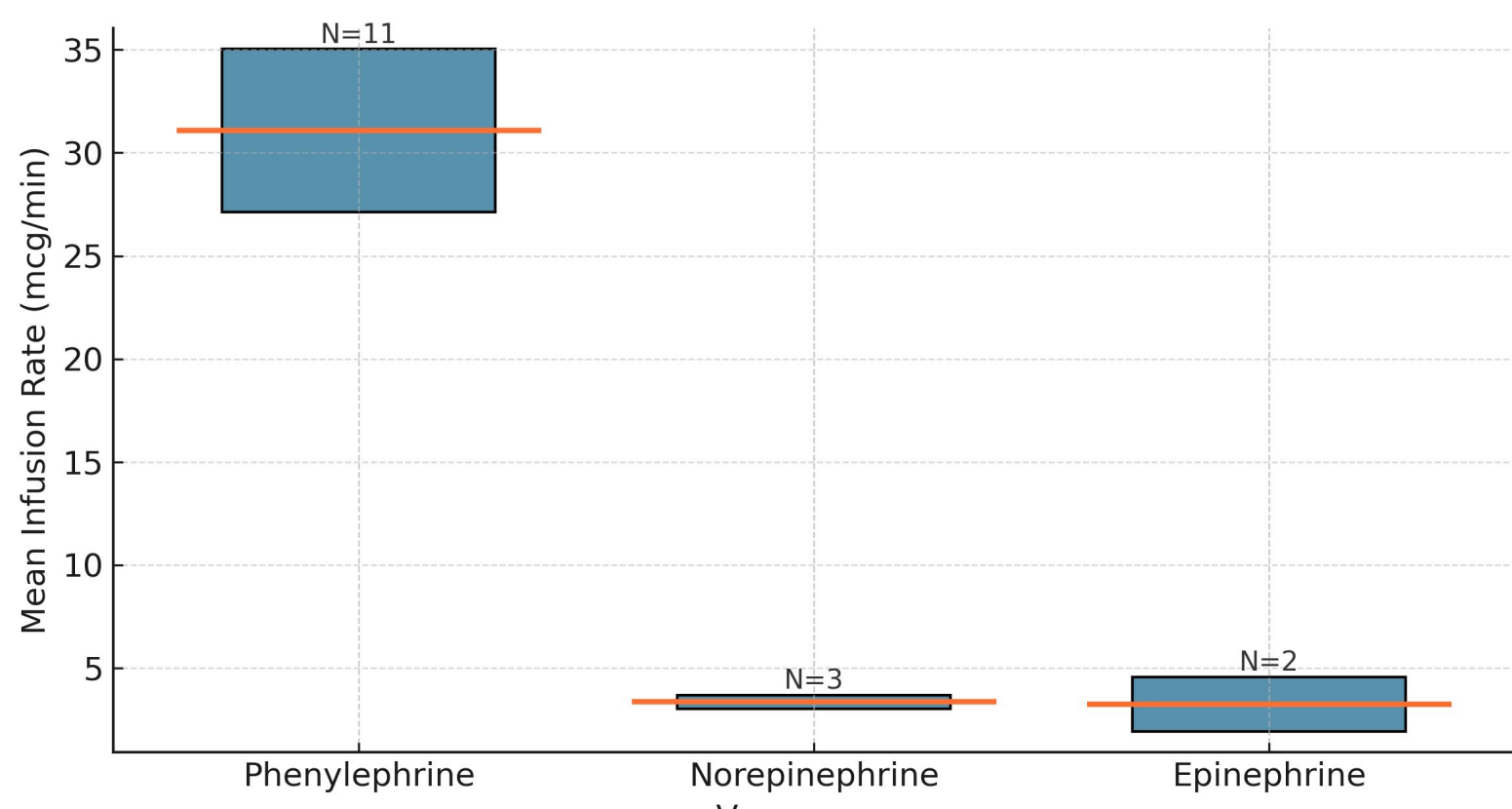
Age (mean ± SEM)	86 ± 3.2
ASA score (# of patients)	3 (6), 4 (8)
Valvular disease (# of patients)	6
Home oxygen therapy (# of patients)	2
Frailty score (mean ± SEM)	0.39 ± 0.03
DNR/DNI status (# of patients)	8

Perioperative Data:

Duration of surgery (mean minutes ± SEM)	120.9 ± 12.6
Invasive blood pressure monitoring (# of patients)	9
ICU admissions	1
Postoperative vasopressor infusion (# of patients)	0
Use of propofol sedation (# of patients)	10

- Surgical procedures included: hip fracture repair (10), total knee arthroplasty (3), total hip arthroplasty (1).
- 0 patients required conversion to general anesthesia.
- The 30-day mortality rate was 7% (1 patient).
- No complications directly attributable to CSA or intrathecal catheter insertion/removal were revealed.
- All spinal catheters were removed at the end of surgery in the operating room or PACU.

Intraoperative Vasopressor Requirements:



Brief description: mean infusion rates of intraoperative vasopressors. Bar height reflects the standard error of the mean (SEM) around the mean infusion rate (mcg/min) for each vasopressor. Orange horizontal lines denote the true mean, and (N) = number of patients who were administered each pressor.

Discussion:

- CSA is used infrequently at our institution in frail and medically complex patients for a select variety of surgical procedures.
- Vasopressor requirements were overall low considering the frailty and cardiopulmonary comorbidities of the patients.
- No adverse cardiac or cerebrovascular events were identified in the intraoperative or immediate post-operative period.
- Most patients had DNI advanced directives, and CSA facilitated avoidance of airway manipulation, consistent with patients' wishes.
- Avoiding intubation was particularly valuable in patients with severe respiratory disease, given the risk of possible failed extubation in this population.
- In our small sample size, it appears that CSA provides a reliable, safe anesthetic for high-risk patients undergoing major lower extremity orthopedic surgery.
- More investigation and larger trials are needed to determine which patients would benefit most from CSA.

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