Implementation of a Spinal-Induced Hypotension Management Bundle For Cesarean Sections

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Introduction

- Spinal anesthesia–induced hypotension (SIH) affects up to 70% of cesarean deliveries and is linked to maternal nausea/vomiting and reduced uteroplacental perfusion.
- A retrospective chart review of parturients receiving spinal anesthesia for elective cesarean sections at the facility revealed that 46% of patients experienced hypotension, highlighting a critical gap in care. Spinal-induced hypotension (SIH) during cesarean sections is a preventable risk that threatens maternal and neonatal outcomes.

Project Purpose

- Reduce the occurrence and severity of SIH among parturients receiving spinal anesthesia for elective cesarean delivery by implementing a three-component, evidence-based bundle.

Objectives

- Decrease SIH incidence within 10 min post-spinal.
- Reduce rescue vasopressor and additional antiemetic use.
- Achieve ≥90% fidelity to all bundle elements.
- Evaluate feasibility and sustainability for broader adoption.

Learning Outcomes

- Describe current best practices to prevent SIH.
- Apply a standardized bundle to improve maternal hemodynamics.
- Interpret key process/outcome metrics to guide practice change.

PICO Question

In term parturients undergoing elective cesarean under spinal anesthesia (P), does a bundle consisting of ondansetron 8 mg IV, 1 L crystalloid co-loading under pressure, and a prophylactic phenylephrine infusion at 0.5 mcg/kg/min (I), compared with usual care (C), reduce the incidence/severity of SIH (O) over a 3-month period (T)?

Results

Figure 1.Number of Patients Experiencing Hypotension

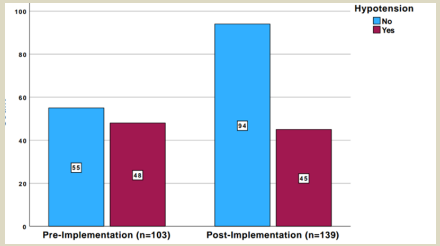


Figure 2. Number of Patients Requiring Rescue Vasopressors

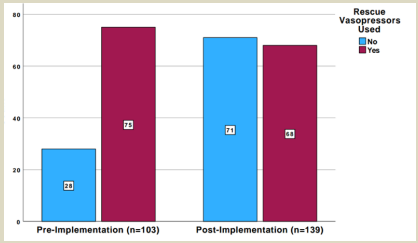


Figure 3. Prophylactic Phenylephrine Drips Utilized

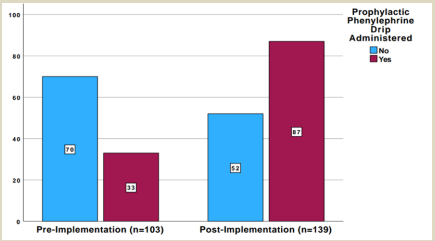
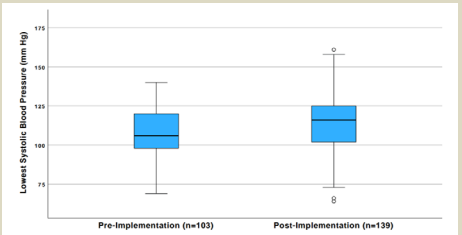


Figure 4. Lowest Systolic Blood Pressure



Incidence of Hypotension

- Pre-implementation: 46% (n = 48)
- Post-implementation: 32% (n = 45)
- p = 0.024

Rescue Vasopressor Use

- Pre-implementation: 72% (n = 75)
- Post-implementation: 49% (n = 68)
- p < 0.001

Prophylactic Phenylephrine Infusion

- Pre-implementation: 32% (n = 33)
- Post-implementation: 62% (n = 87)
- p < 0.001

The lowest mean systolic blood pressure

- Improved from 107.2 ± 16.3 mm Hg to 113.7 ± 17.9 mm Hg
- p = 0.01

Methods

- *Design*: Prospective, quasi-experimental pre-post QI project within a Plan-Do-Study-Act cycle.
- *Population*: Adult women (18–45 years) with uncomplicated singleton pregnancy undergoing elective cesarean section with a spinal anesthetic
- *Setting*: Level II academic medical center with a dedicated obstetrical unit
- *Measures/Outcomes*: Primary- Occurrence of SIH (drop 20% from baseline) utilizing a non-invasive BP cuff. Secondary- Presence of nausea/vomiting, use of rescue vasopressors.
- *Intervention*: SIHMB implementation for three months
- *Analysis*: χ^2, t-/Mann–Whitney; α=0.05; SPSS v29.

Discussion

- SIH bundle shows improved hemodynamic stability with early and structured interventions.
- Less rescue vasopressor requirements translates to a more hands-free anesthetic.
- Increased use of a prophylactic phenylephrine drip reflects a shift toward anticipatory rather than reactive anesthetic care.
- Utilization of all components of the SIH management bundle was achieved by 53% of anesthesia providers.
- Additional antiemetic use did not decrease following SIH bundle. Data skewed by practice variability among providers.
- Limitations include voluntary provider participation and workflow variation, staffing changes, and potential co-interventions (e.g., persistent crystalloid preloading) affecting fidelity.

Implications for Advanced Practice Nursing

- Implementing a simple, stocked bundle can standardize SIH prevention, improve maternal comfort, and protect fetal acid–base status.
- Protocolization supports training, reduces variability, and enables ongoing audit-and-feedback.

Sustainability

- This bundle is easily reproducible worldwide, using standard IV fluids and widely available 'top-drawer' anesthetic medications like ondansetron and phenylephrine.

Implementation of a 'Spinal-Induced Hypotension Management Bundle' can significantly decrease incidence and severity of hypotension 10 minutes after spinal placement and overall rescue vasopressor use.

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Scan for References