

A single-center retrospective analysis of inadequate neuraxial anesthesia for postpartum tubal ligation

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- Postpartum tubal ligation (PPTL) anesthesia: epidural reactivation or de novo spinal anesthesia
- High failure rates with both methods
- Optimal dose of intrathecal bupivacaine for PPTL unclear
- Recently using higher intrathecal bupivacaine doses and attempting epidural reactivation within 4 h of delivery

Aim: Inadequate blocks for PPTL with spinal anesthesia according to bupivacaine dose and with epidural reactivation

Hypothesis: Lower incidence of inadequate blocks with higher intrathecal bupivacaine dose

Methods

Population

- PPTLs with epidural reactivation or de novo spinal anesthesia between 2003-2025
 - Spinal anesthesia bupivacaine dose groups: low (7.5-9.75 mg), middle (10.5-12 mg), high (>13.5 mg)

Outcomes

- **Inadequate block:** need for IV analgesic/sedative supplementation (morphine, hydromorphone, propofol, ketamine, fentanyl>100µg , dexmedetomidine>20µg, midazolam>2mg) or failed block (repeat neuraxial block or conversion to general anesthesia)

Statistical Analysis

- Kruskal-Wallis test and Fisher's exact test
- Multivariable logistic regression for factors associated with inadequate blocks

Results

Table 1. Incidence of inadequate block for spinal and epidural anesthesia.

	Bupivacaine 7.5-9.75 mg (n=14)	Bupivacaine 10.5-12 mg (n=336)	Bupivacaine >13.5 mg (n=244)	All Spinal (n=594)	Epidural Catheter Reactivation (n=46)
Inadequate Block	3 (21.4%)	95 (28.3%)	34 (13.9%)	132 (22.2%)	6 (13.0%)
IV Analgesic Supplementation	2 (14.3%)	55 (16.4%)	25 (10.2%)	82 (13.8%)	6 (13.0%)
IV Fentanyl Used (>100 µg)	2 (14.3%)	53 (15.8%)	23 (9.4%)	78 (13.1%)	0 (0.0%)
Total IV Fentanyl Dose (µg)	25 [20, 75]	50 [25, 100]	65 [25, 85]	50 [25, 90]	0 (0.0%)
Ketamine Used	0 (0.0%)	18 (5.4%)	6 (2.5%)	24 (4.0%)	2 (4.3%)
Total Ketamine Dose (mg)	N/A	25 [10, 40]	45 [40, 50]	30 [15, 40]	22.5 [20, 25]
Midazolam Used (>2mg)	1 (7.1%)	51 (15.1%)	10 (4.1%)	62 (10.4%)	0 (0.0%)
Propofol	2 (14.3%)	16 (5.7%)	10 (4.1%)	31 (5.2%)	4 (8.7%)
Repeated Block	2 (14.3%)	15 (4.5%)	10 (4.1%)	27 (4.5%)	0 (0.0%)
Conversion to GA	0 (0.0%)	4 (1.2%)	0 (0.0%)	4 (0.7%)	0 (0.0%)

Data are median [IQR] or number (%)

Table 2. Factors Associated with Inadequate Spinal Anesthesia

	Odds Ratio (95% CI)	p-value
Age (per year)	1.03 (0.99, 1.08)	0.134
Bupivacaine Dose Group		
Low	0.78 (0.21, 2.90)	0.712
Mid	1.0 (ref)	N/A
High	0.48 (0.26, 0.86)	0.015
Spinal Fentanyl Dose (per mcg)	1.03 (1.00, 1.05)	0.043
Years since start of study (per year)	0.95 (0.90, 1.00)	0.029
ASA Score		
2	1.0 (ref)	N/A
3	1.61 (0.92, 2.81)	0.095
Time from Delivery to BTL (per hour)	1.00 (1.00, 1.00)	0.838
Surgery Duration (per minute)	1.03 (1.01, 1.04)	<0.001

Conclusion

- Higher bupivacaine doses (>13.5 mg) associated with significantly lower odds of inadequate blocks than middle doses (10.5-12 mg)
- Failure rate of epidural reactivation (13.0%) comparable to high dose spinal group (13.9%)
 - Larger sample size needed to confirm these findings
- Higher rates of inadequate blocks in spinal anesthesia associated with:
 - Fewer years since start of study
 - Increased surgical duration
 - Higher IT fentanyl doses