



Investigating Urinary Complications in Infant Surgical Patients with Indwelling Epidural Catheters: A Retrospective Cohort Study

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INTRODUCTION

- Continuous epidural catheter (CEA) is commonly used for postoperative pain in NICU infants but may increase Postoperative urinary retention (POUR) risk, while Foley catheters help prevent POUR but raise Urinary tract infection (UTI) risk.
- This study examines 1) The incidence of POUR and UTIs, 2) The role of opioid use and comorbidities as risk factors, 3) The necessity of Foley catheter placement with epidural catheters.

METHODS

- Study Overview:** Retrospective study at UPMC Children's Hospital of Pittsburgh (CHP), including NICU infants who received epidural catheters for postoperative pain management between July 2018 and September 2024.
- Study Group Classification:** Group A (Foley removed before epidural), Group B (Foley removed after epidural), Group C (no Foley catheter placement).
- Data Collection:** Demographics, Anesthesia & Surgery Details, POUR: Defined as inability to void within 8 hours post-surgery, requiring catheterization or Foley re-insertion. UTI: Classified per CDC NHSN criteria, requiring symptoms, a positive urine culture, and antibiotic treatment.
- Statistical Analysis:** Descriptive statistics were used, with Kruskal-Wallis tests for continuous variables and Chi-squared/Fisher's exact tests for categorical comparisons.

RESULTS

1. Demographics

- Study Population:** 103 infant surgical patients (44 females, 59 males) in NICU with indwelling epidural catheters, all removed on postoperative day 3, with tips located above the T12 spinal level.
- Patient Characteristics:** Median gestational age 40.43 weeks (IQR: 38.5 - 42.57), median weight 3.01 kg (IQR: 2.55 - 3.52). The study groups had comparable baseline characteristics, with no significant differences in key demographic or clinical parameters.
- Preexisting Urologic Conditions:** Found in 15% of Group A (5/33) and 14% of Group B (5/36), including acute kidney injury and congenital urogenital conditions, with a significant difference among groups ($p = 0.040$).

RESULTS (CONT.)

Variable Value	Total N = 103 n (%)	Group A N = 33 n (%)	Group B N = 36 n (%)	Group C N = 34 n (%)	P-Value
Exploratory Laparotomy Bowel Resection	35 (34%)	13 (39%)	15 (42%)	7 (21%)	0.066
Exploratory Laparotomy Bowel Resection and Circumcision	8 (7.8%)	2 (6%)	1 (3%)	5 (15%)	
Thoracic Procedure	13 (12.6%)	7 (21%)	5 (14%)	1 (3%)	
Thoracic Procedure and Circumcision	1 (1%)	1 (3%)	0 (0%)	0 (0%)	
Stoma Closure	29 (28.2%)	5 (15%)	10 (28%)	14 (41%)	
Stoma Closure and Circumcision	10 (9.7%)	2 (6%)	4 (11%)	4 (12%)	
Other	6 (5.8%)	3 (9%)	1 (3%)	2 (6%)	
Other and Circumcision	1 (1%)	0 (0%)	0 (0%)	1 (3%)	

Table 1. Surgical Procedures

2. Urinary Complications (Figure 1)

- POUR:** 3/103 patients (2.9%) – 2 in Group A ($p = 0.101$), 1 in Group B with Foley re-insertion for re-operation ($p = 1.000$).
- UTIs:** 2/103 patients (1.9%), both in Group B ($p = 0.327$), requiring antibiotic treatment, though no complications such as pyelonephritis or urosepsis were observed.

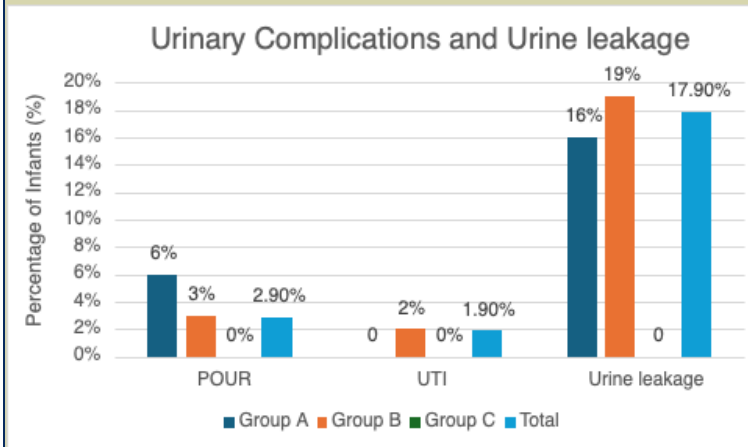


Figure 1. Urinary Complications and Urine leakage

3. Opioid Administration (Figure 2)

- Total Opioid Administration:** Significant difference among groups ($p = 0.029$), with Group B having the highest median MME (1.7 mg/kg, IQR: 0.6-3.8), compared to Group A (0.7 mg/kg, IQR: 0.3-1.8) and Group C (0.6 mg/kg, IQR: 0.3-1.1). No significant differences when analyzed separately ($p = 0.072$ for intraoperative, $p = 0.088$ for postoperative), but total opioid administration showed a statistically significant variation.

RESULTS (CONT.)

- Postoperative Opioid Infusion Use:** Significant difference among groups ($p = 0.042$), with 53% in Group B, 36% in Group A, and 24% in Group C receiving infusions.

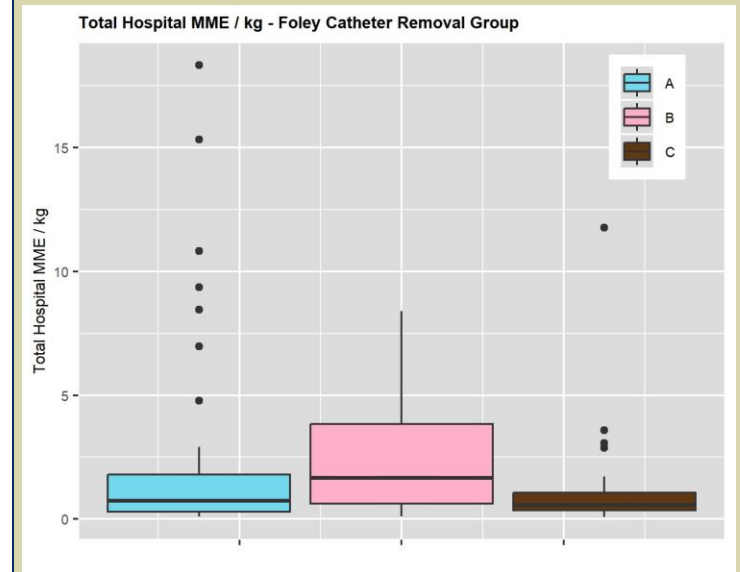


Figure 2. Total Opioid Administration

CONCLUSION

- Early Foley Catheter Removal:** Consider removal if the infant urinates around the catheter, has no associated urinary problems, and requires minimal opioid use.
- Avoiding Foley Catheter Placement:** Can be considered if the epidural catheter tip is at the thoracic level, opioid use is low, and the infant is undergoing circumcision.
- Reevaluating Foley Catheter Practices:** Some infants may void despite epidural continuous analgesia when opioid consumption is reduced. Revising Foley catheter use may be beneficial in selected cases.

REFERENCE

- Lior Y., et al., Postoperative Urinary Catheterization in Children Treated with or without Epidural Analgesia After Orthopedic Surgery: A Retrospective Review of Practice. *Children (Basel)*.
- Baldini G., et al., Postoperative urinary retention: anesthetic and perioperative considerations. *Anesthesiology*.