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INPLASY

Local Ropivacaine Delivery via Urethral Catheter for Reducing Postoperative Catheter-Related Bladder Discomfort A Systematic Review and Meta-Analysis

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Wen, DX ; Zhang, JW ; Guo, MG ; Li, X ; Lu, KS.

Corresponding author:
Keshi Lu

keshilu@szu.edu.cn

Author Affiliation:
Department of Urology, Shenzhen University General Hospital, Shenzhen University Clinical Medical Academy, Shenzhen 518055, China.

ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Data extraction.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 April 2026 and was last updated on 30 April 2026.

INTRODUCTION

Review question / Objective This systematic review and meta-analysis aims to evaluate the efficacy and safety of continuous intravesical instillation of ropivacaine administered via an indwelling urinary catheter for reducing catheter-related bladder discomfort (CRBD) in patients undergoing surgical procedures requiring urinary catheterization.

Condition being studied Catheter-related bladder discomfort (CRBD) is a common and distressing complication occurring in 47%–90% of patients with indwelling urinary catheters placed intraoperatively or postoperatively. It is characterized by a burning sensation and pain in the suprapubic and penile regions, accompanied by urinary urgency and frequency. The underlying pathophysiology closely resembles that of overactive bladder (OAB), involving involuntary bladder contractions driven by muscarinic receptor activation, primarily through M2 and M3 receptor subtypes. Beyond patient discomfort, CRBD is clinically significant as it has been associated with increased postoperative pain intensity, emergence agitation, higher rates of postoperative complications, reduced patient satisfaction, and prolonged hospital stay. Given its high incidence and wide-ranging adverse impact on postoperative recovery and healthcare resources, effective prevention and management of CRBD represents an important unmet clinical need in perioperative care.

METHODS

Participant or population Adult patients (aged ≥18 years) undergoing any surgical procedure that requires intraoperative or postoperative urinary catheterization.

Intervention Continuous intravesical instillation of ropivacaine administered via an indwelling urinary catheter in the postoperative period.

Comparator Continuous intravesical instillation of normal saline administered via an indwelling urinary catheter.

Study designs to be included Randomized controlled trials (RCTs) with available full-text publications.

Eligibility criteria Studies were excluded if they met any of the following criteria: conference abstracts or conference proceedings; review articles, editorials, or letters to the editor; studies for which full-text data were unavailable or could not be retrieved; and duplicate publications reporting overlapping patient populations or identical datasets.

Information sources PubMed/MEDLINE, Embase, and the Cochrane Central Register of Controlled Trials (CENTRAL).

Main outcome(s) Extracted data included study characteristics (first author, publication year, and country), details of intervention and control measures, participant demographic and baseline characteristics, catheter characteristics, type of surgery, incidence and severity of CRBD, patient catheter preference assessed using a 5-point Likert scale, and adverse event rates in each group.

Quality assessment / Risk of bias analysis The risk of bias of each included RCT was independently assessed by two reviewers using the revised Cochrane risk-of-bias tool for randomized trials (RoB 2), with discrepancies resolved through discussion and any remaining disagreements adjudicated by a third reviewer.

Strategy of data synthesis All statistical analyses were performed using RevMan 5.4.1 (Cochrane Collaboration, London, UK). Continuous outcomes were pooled as mean differences (MD) with 95% confidence intervals (CIs), and dichotomous outcomes were expressed as risk ratios (RR) with 95% CIs. Heterogeneity across studies was evaluated using the Chi-squared test and quantified using the I^2 statistic. A random-effects model was applied when substantial heterogeneity was detected ($I^2 \geq 50\%$); otherwise, a fixed-effects model was used. When significant heterogeneity was identified in primary outcomes, subgroup analyses and sensitivity analyses were conducted to explore potential sources, with subgroup analyses performed only when a minimum of two trials were available per subgroup. Statistical significance was set at $P < 0.05$.

Subgroup analysis Subgroup analyses will be performed according to the ropivacaine infusion rate, categorized as 1 mL/h and 2 mL/h.

Sensitivity analysis Subgroup analyses will be performed according to the ropivacaine infusion rate, categorized as 1 mL/h and 2 mL/h.

Country(ies) involved China.

Keywords Ropivacaine ; CRBD ; Meta-Analysis.

Contributions of each author

Author 1 - Dexing Wen.
Email: wendexing1@163.com
Author 2 - Jiawei Zhang.
Email: zhangjw@szu.edu.cn
Author 3 - Minggan Guo.
Email: gmg2024@163.com
Author 4 - Xiao Li.
Email: lxsugh@sina.com
Author 5 - Keshi Lu.
Email: keshilu@szu.edu.cn