Peri-Operative Urodynamic Assessment has Poor Predictive Value for Developing Post-Operative Urinary Retention

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Pre-operative Urodynamic Assessment has Poor Predictive Value for Developing Post-Operative Urinary Retention

Baylor Wickes, Matthew S. Austin MD*, Robert Pivec MD*
Introduction and Objective
Post-operative urinary retention (POUR):

What We Know:
High (35%) prevalence following total joint arthroplasty
Known iatrogenic variables
• Intraoperative catheter
• Excessive fluid resuscitation
• Neuraxial analgesics
Unknown: Risk Factors related to Intrinsic Renal Pathology

How We Know:

Why We Care:
Minimizing post-operative complications
Reducing post-operative length of stay
Stratifying appropriate candidates for OP TJA
Research Question & Hypothesis

• **Question:** How do preoperative post-void residual (PVR) volumes correlate with the development with POUR?

• **Hypothesis:** Patients with risk factors for post-operative urinary retention related to intrinsic renal pathologies can be risk stratified based on preoperative PVR volumes.
Methods

• **Study design:** Single institute retrospective medical chart review of primary total hip and knee arthroplasties

• **Population/study sample:** All patients undergoing primary total hip and knee arthroplasty over age 18 years who have documented post void residual volumes in the perioperative period.

• **Data source and collection**
  - Retrospective review
  - Rothman preoperative and perioperative medical charts

• **Outcome:**
  - Pre-operative and post-operative PVR data
  - Urinary Retention rate
  - Catheterization rate
  - Creatinine and Glomerular Filtration Rate (GFR)
  - Length of stay
  - Delay in discharge secondary to POUR
Methods

• Analysis:
  • Continuous variables: Student’s simple t-test
  • Categorical variables: Fisher’s exact test
  • Continuous variables related to +/- POUR: logistic regression model
  • Sensitivity, Specificity, PPV, NPV
  • Efficacy of risk stratification via pre-op PVR: ROC curve

• Findings:

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<th></th>
<th>(+) POUR</th>
<th>(-) POUR</th>
<th>p value*</th>
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<td>AUA Total</td>
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Table 2. American Urologic Association Symptom Score (AUASS) Mean Score Results
*corrected p value for significance is p < 0.006

Fig 2. Receiver-operator characteristic curve for pre-operative PVR >10 as predictor of developing POUR. Area under curve (AUC) is 0.69 (95% CI: 0.604 – 0.784).
Conclusion: Pre-operative Urodynamic Assessment has Poor Predictive Value for Developing Post-Operative Urinary Retention

Urodynamic measurements and patient urinary retention scores, as part of an institutional pre-operative screening protocol, have limited value in determining which patients are at increased risk of POUR. PVR-based risk stratification would result in 8 out of 10 patients being incorrectly placed on high protocol.

Overall rate of POUR: 5.1%
- 252 male patients with mean age 64.9 years and BMI 30.8 kg/m²
- Elevated PVR alone p < 0.001
- Elevated PVR plus urologic disease p = 0.001

Mean pre-operative PVR not significant
- Categorical variable analysis: elevated pre-op PVR proportional to POUR
- Continuous variable analysis
  - Near similar pre-op mean PVR between patients with POUR and protocol-driven catheterization
  - Logistic regression analysis: p = 0.24 → not significant

Predictive Values do not accurately predict POUR
- High sensitivity (91.6%) and NPV (>99%)
- Low specificity (72.1%) and very low PPV (18.2%)
- Risk stratification based on PVR would result in 8/10 patients incorrectly denoted high-risk

Utilization of PVR
- Moderate sensitivity (91.6%)
- Low specificity (72.1%)


Resources:
- Google Scholar [https://scholar.google.com/](https://scholar.google.com/)
- Owl Purdue [https://owl.english.purdue.edu/owl/section/2/10/](https://owl.english.purdue.edu/owl/section/2/10/)