Incidence of Acute Retention of Urine following a Mid-Urethral Sling Procedure and Validation of a Screening Protocol

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Background

- Reported incidence of acute Postoperative Urinary Retention (PUR) varies: 2-29%
- No standard diagnostic definition of PUR exists
- Trial of void (TOV) routinely performed, but no standard protocol
  - Spontaneous bladder filling vs. back-fill assisted
  - Use of post-void residual (PVR)
- Reported risk factors for acute PUR after Mid-Urethral Sling (MUS) are heterogeneous
- Meekins’ et al. proposed trial of void algorithm:
  - Sensitivity 98.9% and Specificity 94.9%
  - Negative Predictive Value 96.7%
  - Positive Predictive Value 97.4%

Objectives

1. Determine KHSC rate of and risk factors for PUR in women following outpatient MUS.
2. Validate Meekins’ proposed algorithm in our MUS population by comparing it against the current KHSC definition of PUR.

Study Design

- Retrospective cohort study on women at KHSC undergoing MUS surgery between 2009-2016.
- Criteria for acute PUR was defined as a failure by the KHSC TOV algorithm (Figure 1) or a patient’s return to the Emergency Department <48h of hospital discharge in PUR.
- PUR by our definition was considered the Gold Standard against which the Meekins’ algorithm was compared.

Algorithms for Urinary Retention Diagnosis

Figure 1. Algorithm used at KHSC.

Backfill bladder via Foley to 300mL, measure voided volume (VV)

VV<150mL = repeat void in 1h + obtain PVR
PVR <150mL = PASS
PVR ≥150mL = FAIL → Catheterize

≥150mL = PASS → Discharge


Backfill bladder via Foley to 300mL, measure VV

VV<100mL = FAIL → Catheterize
VV 100-199mL = Measure PVR
≥50% TBV* = FAIL
<50% TBV = PASS
VV200mL = PASS → Discharge

*TBV: Total Bladder Volume (VV + PVR)

Figure 3. Flow chart diagram of chart inclusion/exclusion process.

431 charts identified by procedure code → 316 outpatient MUS procedures → 201 charts reviewed → Incidence of acute postoperative urinary retention in KHSC is 17% (35 of 201 patients, by our protocol).

Table 1. Baseline characteristics of patients.

<table>
<thead>
<tr>
<th>N=201</th>
<th>Age (years), mean (SD)</th>
<th>54 (10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (kg/m²), median [IQR]</td>
<td>29 [26-34]</td>
<td></td>
</tr>
<tr>
<td>Caucasian Race¹, n (%)</td>
<td>113 (93)</td>
<td></td>
</tr>
<tr>
<td>Presenting Complaint(s)³, n (%)</td>
<td>Stress Incontinence 94 (54)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mixed Incontinence 67 (38)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other¹ 77 (44)</td>
<td></td>
</tr>
</tbody>
</table>

Unknown values: *n=18, BMI=79, BMI=26;
*Some patients had multiple diagnoses, so % won’t total 100.

Table 2. Identified risk factors for PUR (based the KHSC definition).

<table>
<thead>
<tr>
<th>PUR (N=35)</th>
<th>No PUR (N=166)</th>
<th>Adjusted OR*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery Type, n (%)</td>
<td>MUS-O 17 (11)</td>
<td>140 (89)</td>
</tr>
<tr>
<td></td>
<td>MUS-R 18 (41)</td>
<td>26 (59)</td>
</tr>
</tbody>
</table>

Table 3. Classification of acute PUR by our centre’s protocol compared with the proposed algorithm.

<table>
<thead>
<tr>
<th>PUR “Retention”: VV&lt;100mL or 100-199mL with PVR of ≥50%</th>
<th>Algorithm “No Retention”: VV ≥200mL or 100-199mL with PVR &lt;50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithm “Retention”:</td>
<td>Algorithm “No Retention”:</td>
</tr>
<tr>
<td>PUR No PUR</td>
<td>PUR No PUR</td>
</tr>
<tr>
<td>23 13</td>
<td>13 36</td>
</tr>
<tr>
<td>129 36</td>
<td>130 130</td>
</tr>
<tr>
<td>13 24</td>
<td>142 166</td>
</tr>
</tbody>
</table>

Table 4. Validation of Meekins’ algorithm against KHSC’s PUR definition.

<table>
<thead>
<tr>
<th>% (95% CI)</th>
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</thead>
<tbody>
<tr>
<td>Sensitivity</td>
</tr>
<tr>
<td>Specificity</td>
</tr>
<tr>
<td>Positive Predictive Value</td>
</tr>
<tr>
<td>Negative Predictive Value</td>
</tr>
</tbody>
</table>

Table 4. Validation of Meekins’ algorithm against KHSC’s PUR definition.

Conclusions

- Incidence of postoperative acute PUR after MUS in our centre is 17%, less than that reported by Meekins, which influences PPV
- Only identified risk factor for retention: retropubic MUS
- Meekins’ proposed algorithm has robust NPV:
  - Reliable if patient is not in retention by their definition → only 1/130 women was incorrectly identified

Limitations & Future Directions

- Incomplete data for some patients
- No gold standard for UR – different definitions
- Different surgical populations (MUS vs. MUS + prolapse repair)
- Future directions include algorithm validation in other populations (POP, post-partum).

Acknowledgements

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