Urinary Retention and the science of mitigating risk

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Middlesex Hospital Grand Rounds
February 5, 2015
Urinary Retention

- Causes
- Management
- Risk Factors
- Post op
Voiding dysfunction

- Failure to store
- Failure to empty

“...efficient and low pressure bladder filling, low pressure urine storage with perfect continence, and periodic complete voluntary urine expulsion, again at low pressure.”

Alan J. Wein, M.D., Ph.D. (Hon), FACS
Voiding dysfunction

- Failure to store
- Failure to empty
  - Because of the bladder
    - Neurogenic (DM)
    - Myogenic (obstructive)
    - Psychogenic (nurse’s bladder)
    - Idiopathic
  - Because of the outlet
    - Anatomic (eg, prostate, stricture, or external compression)
    - Functional (eg inability to relax the sphincter)
  - Combination (eg, impaired contractility 2ndary to chronic obstruction)
Bladder Innervation

**M2, M3**
- oxybutinin
- tolterodine
- fesoterodine
- solifenacin
- darifenacin
- trospium

**B3**
mirbogron

**A1**
- phenoxybenzamine
- prazosin
- terazosin
- doxazosin
- alfuzosin
- tamsulosin
- Rapaflo
Voiding dysfunction

- Failure to store
- Failure to empty
  - Because of the bladder
    - Neurogenic (DM)
    - Myogenic (obstructive)
    - Psychogenic (nurse’s bladder)
    - Idiopathic
  - Because of the outlet
    - Anatomic (eg, prostate, stricture, or external compression)
    - Functional (eg inability to relax the sphincter)
  - Combination (eg, impaired contractility secondary to chronic obstruction)
Incidence: Olmsted County

- 2,115 men, followed for 4 years
- 8,344 person–years
- 57 developed urinary retention
- 6.8/1000 person years

Incidence: Physician’s Health Study

- 6,100 male physicians, followed between 1992 and 1995
- 15,851 person–years
- 82 developed urinary retention
- 4.5/1000 person years


### Table 1. Extended followup treatment outcomes by intention to treat comparison of randomized groups

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No. Transurethral Prostatic Resection (280 pts.)</th>
<th>No. Watchful Waiting (276 pts.)</th>
<th>Relative Risk of Transurethral Prostatic Resection to Watchful Waiting (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>16</td>
<td>12</td>
<td>1.314 (0.634, 20.727)</td>
<td>0.562</td>
</tr>
<tr>
<td>Urinary retention</td>
<td>1</td>
<td>9</td>
<td>0.110 (0.014, 0.859)</td>
<td>0.111</td>
</tr>
<tr>
<td>High residual urine vol.</td>
<td>5</td>
<td>19</td>
<td>0.259 (0.098, 0.685)</td>
<td>0.003</td>
</tr>
<tr>
<td>Renal azotemia*</td>
<td>3</td>
<td>2</td>
<td>1.479 (0.249, 8.780)</td>
<td>1.000</td>
</tr>
<tr>
<td>Bladder stones</td>
<td>0</td>
<td>1</td>
<td>Insufficient data</td>
<td>0.496</td>
</tr>
<tr>
<td>Persistent incontinence</td>
<td>4</td>
<td>9</td>
<td>0.493 (0.150, 1.618)</td>
<td>0.259</td>
</tr>
<tr>
<td>High symptom score†</td>
<td>1</td>
<td>13</td>
<td>0.076 (0.010, 0.576)</td>
<td>0.0008</td>
</tr>
<tr>
<td>Loss to followup</td>
<td>16</td>
<td>18</td>
<td>0.876 (0.456, 1.683)</td>
<td>0.726</td>
</tr>
<tr>
<td>Withdrawal of consent</td>
<td>57</td>
<td>36</td>
<td>1.561 (1.064, 2.288)</td>
<td>0.023</td>
</tr>
<tr>
<td>Prostate adenocarcinoma</td>
<td>24</td>
<td>11</td>
<td>2.151 (1.074, 4.305)</td>
<td>0.035</td>
</tr>
</tbody>
</table>

* Defined as a doubling of the baseline serum creatinine or a concentration higher than 3.0 mg/dl. (265 µmol/L.).

† Defined as 21 or greater on 2 consecutive measures, or 24 on 1 measure (maximum symptom is 27).
Management

It is easy to defunctionalize a bladder with a catheter. The challenge is to keep a bladder as functional as possible for as long as possible.
How can we keep a bladder functional?

- Address the bladder
  - Behavioral modifications (eg, timed voids, increased mobility)
  - Physical maneuvers (eg Crede, Valsalva)
  - Medications (eg, bethanechol)
  - Neuromodulation

- Address the outlet
  - Behavioral therapy (eg biofeedback)
  - Medications (eg benzodiazepines, $\alpha$-blockers, 5$\alpha$-reductase inhibitors)
  - Surgery (eg TURP)
Catheter

- CIC
- Urethral
- Suprapubic
Still a hot topic, in fact, redefined 2015.
Which of the following is a CAUTI?

A. Patient has cath in place on an inpatient unit. The cath is discontinued and 4 days later develops urinary urgency and frequency associated with bacteriuria.

B. Patient is admitted for a pneumonia and has a chronic indwelling cath. On admission, he has a temp of 38.3. Urine dipstick showed moderate blood and urine culture from the ED grew E. coli >10^5 cfu/ml.

C. Patient had a catheter removed at NBGH and was discharged a few hours later. The next day he is seen in the Middlesex Hospital ED with a fever of 38.3, lower abdominal pain, and a dipstick positive for leuk est. Culture ultimately grew E. coli 10^5 cfu/ml.

D. Patient with a spina bifida and a neurogenic bladder caths three times per day. No pain, fever, or symptoms referable to the urinary tract. Screening urinalysis was positive for leuk est and nitrites. Culture ultimately grew mixed flora, including gram – rods > 10^4 cfu/ml.
Which of the following is a CAUTI?

A. Patient has cath in place on an inpatient unit. The cath is discontinued and 4 days later develops urinary urgency and frequency associated with bacteriuria.

B. Patient is admitted for a pneumonia and has a chronic indwelling cath. On admission, he has a temp of 38.3. Urine dipstick showed moderate blood and urine culture from the ED grew E. coli >10^5 cfu/ml.

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D. Patient with a spina bifida and a neurogenic bladder caths three times per day. No pain, fever, or symptoms referable to the urinary tract. Screening urinalysis was positive for leuk est and nitrites. Culture ultimately grew mixed flora, including gram – rods > 10^4 cfu/ml.
What constitutes a CAUTI?

- Presence of a catheter
  - Indwelling catheter in place for > 2 calendar days or removed on the day of or the day before

- Presence of symptoms
  - Fever > 38°C
  - Suprapubic tenderness
  - CVA pain or tenderness
  - Dysuria
  - Urgency
  - Frequency

- Urine culture
  - Urine culture with no more than 2 species of microorganisms, at least one of which is a bacteria of >10^5 CFU/ml

http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf
OR . . . ABUTI (CAUTI)

- Presence of a catheter
  - Indwelling catheter in place for > 2 calendar days or removed on the day of or the day before

- Positive urine culture
  - Urine culture with no more than 2 species of microorganisms, at least one of which is a bacteria of $>10^5$ CFU/ml

- Positive blood culture
  - Blood culture with at least one matching bacteria to bacteria in the urine.

http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf
Reportable

- National Healthcare Safety Network
- NSQIP
Which of the following is a CAUTI?

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B. Patient is admitted for a pneumonia and has a chronic indwelling cath. On admission, he has a temp of 38.3. Urine dipstick showed moderate blood and urine culture from the ED grew E. coli >10^5 cfu/ml.

C. Patient had a catheter removed at THOCC and was discharged a few hours later. The next day he is seen in the Middlesex Hospital ED with a fever of 38.3, lower abdominal pain, and a dipstick positive for leuk est. Culture ultimately grew E. coli 10^5 cfu/ml.

D. Patient with a spina bifida and a neurogenic bladder caths three times per day. No pain, fever, or symptoms referable to the urinary tract. Screening urinalysis was positive for leuk est and nitrites. Culture ultimately grew mixed flora, including gram – rods > 10^4 cfu/ml.
Prevalence (2011)

- 183 hospitals (nationwide representative sampling)
- 11,290 patients
- 504 HAI in 452 patients (4.0% (95%CI 3.7 to 4.4)
- Estimated 721,800 HAIs nationwide

Table 4. Estimated Numbers of Major Types of Health Care–Associated Infection in the United States in 2011.

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>Infections Identified in Survey</th>
<th>Surveyed Patients with Type of Infection</th>
<th>Estimated Infections in the United States*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no.</td>
<td>% (95% CI)</td>
<td>no. (95% CI)</td>
</tr>
<tr>
<td>All health care–associated infections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>110</td>
<td>24.3 (20.6–28.5)</td>
<td>157,500 (50,800–281,400)</td>
</tr>
<tr>
<td>Surgical site infection</td>
<td>110†</td>
<td>24.3 (20.6–28.5)</td>
<td>157,500 (50,800–281,400)</td>
</tr>
<tr>
<td>Gastrointestinal infection</td>
<td>86</td>
<td>19.0 (15.6–22.8)</td>
<td>123,100 (38,400–225,100)</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>65</td>
<td>14.4 (11.4–17.9)</td>
<td>93,300 (28,100–176,700)</td>
</tr>
<tr>
<td>Primary bloodstream infection</td>
<td>50</td>
<td>11.1 (8.4–14.2)</td>
<td>71,900 (20,700–140,200)</td>
</tr>
<tr>
<td>Eye, ear, nose, throat, or mouth infection</td>
<td>28‡</td>
<td>6.2 (4.2–8.7)</td>
<td>40,200 (10,400–85,900)</td>
</tr>
<tr>
<td>Lower respiratory tract infection</td>
<td>20</td>
<td>4.4 (2.8–6.6)</td>
<td>28,500 (6900–65,200)</td>
</tr>
<tr>
<td>Skin and soft-tissue infection</td>
<td>16</td>
<td>3.5 (2.1–5.6)</td>
<td>22,700 (5200–55,300)</td>
</tr>
<tr>
<td>Cardiovascular system infection</td>
<td>6</td>
<td>1.3 (0.5–2.7)</td>
<td>8,400 (1,200–26,700)</td>
</tr>
<tr>
<td>Bone and joint infection</td>
<td>5</td>
<td>1.1 (0.4–2.4)</td>
<td>7,100 (1,000–23,700)</td>
</tr>
<tr>
<td>Central nervous system infection</td>
<td>4</td>
<td>0.9 (0.3–2.1)</td>
<td>5,800 (700–20,700)</td>
</tr>
<tr>
<td>Reproductive tract infection</td>
<td>3</td>
<td>0.7 (0.2–1.8)</td>
<td>4,500 (500–17,800)</td>
</tr>
<tr>
<td>Systemic infection</td>
<td>1</td>
<td>0.2 (0.01–1.1)</td>
<td>1,300 (0–10,900)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>721,800 (214,700–1,411,000)</td>
</tr>
<tr>
<td>Infections in non-neonatal intensive care units</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catheter-associated urinary tract infection</td>
<td>25</td>
<td>5.5 (3.7–7.9)</td>
<td>35,600 (9100–78,000)</td>
</tr>
<tr>
<td>Central-catheter–associated primary bloodstream infection</td>
<td>11</td>
<td>2.4 (1.3–4.2)</td>
<td>15,600 (3200–41,500)</td>
</tr>
<tr>
<td>Ventilator-associated pneumonia</td>
<td>35</td>
<td>7.7 (5.5–10.5)</td>
<td>49,900 (13,600–103,700)</td>
</tr>
<tr>
<td>Surgical-site infections attributed to Surgical Care Improvement Project procedures</td>
<td>46</td>
<td>10.2 (7.6–13.2)</td>
<td>66,100 (18,700–130,300)</td>
</tr>
<tr>
<td>Hospital-onset infections caused by specific pathogens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clostridium difficile infection</td>
<td>56</td>
<td>12.4 (9.6–15.7)</td>
<td>80,400 (23,700–155,000)</td>
</tr>
<tr>
<td>MRSA bacteremia</td>
<td>7</td>
<td>1.5 (0.7–3.0)</td>
<td>9,700 (1700–29,600)</td>
</tr>
</tbody>
</table>

## Prevalence (2002)

<table>
<thead>
<tr>
<th>Major site of Infection</th>
<th>Estimated Number of Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare-Associated Infection (all HAI)</td>
<td>1,737,125</td>
</tr>
<tr>
<td>Surgical Site Infection (SSI)</td>
<td>290,485</td>
</tr>
<tr>
<td>Central Line Associated Bloodstream Infections (CLABSI)*</td>
<td>92,011</td>
</tr>
<tr>
<td>Ventilator-associated Pneumonia (VAP)**</td>
<td>52,543</td>
</tr>
<tr>
<td>Catheter associated Urinary tract Infection (CAUTI)***</td>
<td>449,334</td>
</tr>
</tbody>
</table>
| Clostridium difficile-associated disease (CDI)

* Total BSI adjusted to estimate CLABSI \((248,678 \times 0.37^{15}) = 92,011\)

** Total Pneumonia infections adjusted to estimate VAP \((250,205 \times 0.21^{15}) = 52,543\)

*** Total UTIs adjusted to estimate CAUTI \((561,167 \times 0.80^{16}) = 449,334\)
CDC Guideline for Prevention of Catheter–Associated Urinary Tract Infections
CDC Guideline for Prevention of Catheter–Associated Urinary Tract Infections

- **Appropriate urinary catheter use** (I.A.3. Use urinary catheters in operative patients only as necessary, rather than routinely.)
- **Proper techniques for urinary catheter insertion** (II.A. Perform hand hygiene immediately before and after insertion or any manipulation of the catheter device or site.)
- **Proper techniques for urinary catheter maintenance** (III.B. Maintain unobstructed urine flow.)
- **Quality improvement programs** (IV.A.1. A system of alerts or reminders to identify all patients with urinary catheters and assess the need for continued catheterization.)
- **Administrative infrastructure** (V.D.1. Consider implementing a system for documenting the following in the patient record: indications for catheter insertion, date and time of catheter insertion, individual who inserted catheter, and date and time of catheter removal.)
- **Surveillance** (VI.C. Routine screening of catheterized patients for asymptomatic bacteriuria (ASB) is not recommended.)

Neither incidence nor management of retention (aside from catheter use) is a matter of quality improvement programs, administrative infrastructure, or surveillance.
Surgical Care Improvement Project

- Seven commonly performed surgical procedures
  - CABG
  - Other cardiac surgery
  - Major vascular surgery
  - Hip arthroplasty
  - Knee arthroplasty
  - Hysterectomy
  - Colon surgery
Surgical Care Improvement Project

- **Quality and Safety Metrics**
  - SCIP Inf–1: Prophylactic Antibiotic Received Within One Hour Prior to Surgical Incision
  - SCIP Inf–2: Prophylactic Antibiotic Selection for Surgical Patients
  - SCIP Inf–3: Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time
  - SCIP Inf–4: Cardiac Surgery Patients With Controlled Postoperative Blood Glucose
  - SCIP Inf–6: Surgery Patients with Appropriate Hair Removal*
  - SCIP Inf–9: Urinary catheter removed on Postoperative Day 1 (POD 1) or Postoperative Day 2 (POD 2) with Day of Surgery Being Day Zero
  - SCIP Inf–10: Surgery Patients with Perioperative Temperature Management**
  - SCIP Card–2: Surgery Patients on Beta-Blocker Therapy Prior to Arrival Who Received a Beta Blocker During the Perioperative Period
  - SCIP VTE–2: Surgery Patients Who Received Appropriate Venous Thromboembolism Prophylaxis Within 24 Hours Prior to Surgery to 24 Hours After Surgery

- **Process metrics**
  - Urinary retention does not fall into that category!
NSQIP

OUTCOMES

- Pneumonia
- Cardiac complications
- Surgical site infections
- UTIs
- VTEs
- Renal failure
- Return to OR
- Death

Urinary retention is still not a quality metric!
Post op urinary retention
National incidence and outcomes of postoperative urinary retention in the Surgical Care Improvement Project

- National Inpatient Sample (nationally representative data set composed of inpatient hospital discharge records from a 20% stratified sampling of all nonfederal U.S. hospitals)
- 2,077,045 patients nationally underwent SCIP procedure
- 43,030 (2.1%) POUR

POUR risk factors

- Abnormalities of or past surgery of the urinary tract
- History of back or spinal cord problems
- History of prior urinary tract infections
- Age
- History of cancer
- Herpes genitalis
- Hematuria
- Bladder stones
- Male gender
- Medication
- Pre op post void residual
- Post op bladder volume
- History of renal disease or elevated creatinine
- Diabetes
- Cognitive impairment
- Neurological diseases (MS and Parkinsons)
- Psychiatric diseases
- AUA symptom score or presence of voiding symptoms
- History of BPH
- Amount of fluid given during the procedure
- Lack of pre op voiding
- Length of procedure
- General, epidural, or spinal anesthesia
- PCA use
- Use of an indwelling catheter for 24 to 48 hours after surgery
- Surgery of the lower limbs
- Emergency surgery
POUR: Problems with studies out there

- Evaluate a single risk factor
- Inconsistent about the relative risk associated with each risk factor.
- Disagree over which factors pose a significant risk to begin with.
- Definition of urinary retention is very variable
- Different protocols to manage the bladder in the peri op setting
- Low power (most of the studies include < 200 patients)
- Heterogenous sampling
POUR in Joint Patients

- Incidence 10.7 to 84%
Healthgrades: risk assessment

- Urinary retention
- Renal
- Cardiac
- Pulmonary
- Delirium
- Paralytic ileus
POUR risk factors

- Abnormalities of or past surgery of the urinary tract
- History of back or spinal cord problems
- History of prior urinary tract infections
- Age
- History of cancer
- Herpes genitalis
- Hematuria
- Bladder stones
- Male gender
- Medication
- Pre op post void residual
- Post op bladder volume
- History of renal disease or elevated creatinine
- Diabetes

- Cognitive impairment
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- PCA use
- Use of an indwelling catheter for 24 to 48 hours after surgery
- Surgery of the lower limbs
- Emergency surgery
That’s just about everyone getting a joint replacement!
How do we stratify the risk factors to identify patients at higher risk for post op retention after joint replacement?

Tracy Andrulat, R.N.
Orthopedic Nurse Navigator
Risk

- Prognostication
- Pascal, Fermat, the theory of probability (1654), and the mathematical quantification of risk
- Gambling, the weather, insurance, and the stock market
- What about medicine?
# Goldman Multifactorial Cardiac Risk Index

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative third heart sound or jugular venous distention indicating active heart failure</td>
<td>11</td>
</tr>
<tr>
<td>Myocardial infarction in the past 6 months</td>
<td>10</td>
</tr>
<tr>
<td>≥5 Premature ventricular complexes/min before surgery</td>
<td>7</td>
</tr>
<tr>
<td>Rhythm other than sinus</td>
<td>7</td>
</tr>
<tr>
<td>Age ≥70 years</td>
<td>5</td>
</tr>
<tr>
<td>Emergency surgery</td>
<td>4</td>
</tr>
<tr>
<td>Significant aortic stenosis</td>
<td>3</td>
</tr>
<tr>
<td>Intraperitoneal, intrathoracic, or aortic surgery</td>
<td>3</td>
</tr>
<tr>
<td>Markers of poor general medical condition (e.g., renal dysfunction, liver disease, lung disease, electrolyte imbalance)</td>
<td>3</td>
</tr>
</tbody>
</table>

## Goldman Multifactorial Cardiac Risk Index

<table>
<thead>
<tr>
<th>Points</th>
<th>Class</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–5</td>
<td>I</td>
<td>1%</td>
</tr>
<tr>
<td>6–12</td>
<td>II</td>
<td>7%</td>
</tr>
<tr>
<td>13–25</td>
<td>III</td>
<td>14%</td>
</tr>
<tr>
<td>26–53</td>
<td>IV</td>
<td>78%</td>
</tr>
</tbody>
</table>
Cardiac Risk Indices

  - Modified risk index
  - Modified risk index, specific to vascular surgery
  - Revised cardiac risk index, 6 independent variables
  - Updated Lee’s revision of Goldman
What about urinary retention?
Odds ratios:

- **Female** (OR 0.24, 95% CI 0.22 to 0.25)
- **Age** (each year of age was associated with increased OR (1.04, 95% CI 1.03 to 1.04))
- **Type of surgery** (compared to CABG, knee OR 1.38, 95% CI 1.27 to 1.5 and hip OR 1.43, 95% CI 1.31 to 1.56)
- **Renal failure** (OR 1.10, 95% CI 1.01 to 1.20)
- **DM** (OR 1.48, 95% CI 1.3 to 1.69)
- **Psychiatric illness** (OR 1.27, 95% CI 1.16 to 1.40)
- **Psychosis** (OR 1.34, 95% CI 1.13 to 1.60)
Odds ratios for complications of POUR:

- **UTIs** (OR 2.3, 95% CI 2.2 to 2.5)
- **Non-infectious complications** (each year of age was associated with increased OR (5.2, 95% CI 3.8 to 7.0))
- **Less likely to be discharged home without additional care** (OR 0.76, 95% CI 0.71 to 0.80)

**Increased length of stay** (0.39 to 1.1 days, depending on type of surgery)

Prediction Post–Operative Urinary Retention (POUR) in Total Joint Patients

- Prospective observational study to identify risk factors for POUR

  ◦ Primary Objectives
    - Overall incidence of post–operative urinary retention in a population of patients undergoing hip and knee surgery
    - Odds ratio of urinary retention for established independent risk factors, including length of catheterization

  ◦ Secondary Objectives
    - Establishment of a risk assessment tool for pre–operative stratification of patients according to their post–op risk of urinary retention
Risk assessment

<table>
<thead>
<tr>
<th>Urinary Retention Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age greater or equal to 70</td>
</tr>
<tr>
<td>Benign prostatic hyperplasia</td>
</tr>
<tr>
<td>CKD or serum Cr 1.2 mg/dl or more</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
</tr>
<tr>
<td>Bladder, prostate, urethra abnormality or previous surgery</td>
</tr>
<tr>
<td>Medication usage (anti-cholinergic, antihistamine, anti-inflammatory, alpha blockers, 5-alpha reductase, neuroleptic)</td>
</tr>
<tr>
<td>Spinal cord injury, stenosis, tumor or prior back surgery</td>
</tr>
<tr>
<td>UTI, hematuria, bladder stone or retention</td>
</tr>
<tr>
<td>Neurologic disturbance (i.e. MS, Parkinson’s)</td>
</tr>
<tr>
<td>Cognitive impairment (Alzheimer’s, dementia)</td>
</tr>
<tr>
<td>GU Cancer</td>
</tr>
<tr>
<td>Male Gender</td>
</tr>
<tr>
<td>AUA symptom Score:</td>
</tr>
<tr>
<td>Post void residual (PVR):</td>
</tr>
<tr>
<td>Patient given information sheet</td>
</tr>
</tbody>
</table>

If positive BPH plus 3 risk factors equals HIGH URINARY RETENTION RISK
Over the past month,

<table>
<thead>
<tr>
<th>Question</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>how often have you felt you have not emptied your bladder completely after urinating?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>how often have you had to urinate again less than 2 hours later?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>how often have you stopped and started again several times when you urinated?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>how difficult have you found it to postpone urination?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>how often have you had a weak urinary stream?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>how often have you had to push or strain to begin urination?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>how many times did you typically get up to urinate from the time you went to bed until the time you got up in the morning?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

American Urological Association Symptom Score

In the general population, the AUASS is highly predictive of urinary retention in men.

Inconsistency about the risk of symptoms in studies of POUR.


POUR definition

- Symptoms (e.g., abdominal discomfort and inability to void)
- Physical findings (e.g., palpable bladder)
- Ultrasound PVR
- Requirement for catheterization

Symptoms prompting ultrasound and catheterization for a PVR > 300 ml
Catheter is placed in the OR
Removed on the morning of POD#2
Patient is evaluated for symptoms of retention
Bladder scan is used as needed
Patients are catheterized for PVR > 300 ml as needed
Documented in a new specialty flow sheet
Post op bladder management

- Randomized prospective clinical trial
- Group 1: Catheter removal on POD#1
  - 41 patients
  - 27% required at least 1 cath
  - 18% required long term catheterization
- Group 2: “as needed” catheterization
  - 55 patients
  - 52% required at least 1 cath
  - 21% required long term catheterization

Randomized prospective clinical trial

Group 1: “as needed” catheterization
- 165 patients
- 106 (64%) required at least 1 catheterization
- 2.4 catheterizations (mean) per patient

Group 2: “as needed” catheterization, followed by placement of an indwelling catheter
- 295 patients
- 181 (61%) required catheterization
- 124 (69% of those who required 1 cath and 42% of total) required indwelling

Group 3: indwelling catheter for 48 hours or less
- 140 patients
- 10 (7%) required catheterization after the catheter was removed
Results

- January 1, 2013 to June 30, 2014
- 381 patients
- 14 (3.7%) POUR (12 catheterized by strict definition, 2 catheterized by symptoms alone)
- Average 1.4 catheterizations
- 1 indwelling catheter
- 1 CAUTI
- Odds ratios
Future directions

- Post op catheter protocol revision (catheter removed POD#1)
- Risk assessment calculator
Urinary retention is multifactorial
It is underappreciated as a problem, particularly in the post op setting
There are a number of identifiable risk factors
Which are thus far poorly weighted
Middlesex Hospital has taken several strong steps to prevent urinary retention in both the pre op and post op settings
Bibliography

Bibliography