Intrapartum & Postpartum Bladder Management

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Overview

- Intrapartum & Postpartum Bladder Management
  - Literature, available guidelines
  - Fluid status, Avoid injury, UTI
- Urinary Retention
  - Definitions, Incidence, Risk Factors
  - Prevention
  - Management

Case 1

- 32 yo G1P1 6 weeks postpartum
  “I’m wearing more diapers than my baby.”

L&D: - NSVD, epidural, 2nd stage-2h, 7#2oz male
- No voluntary control – noted when stood for first void attempt after delivery
- Foley catheter expelled through urethra with inflated balloon during second stage

Nothing to disclose
Case 2

- 38 yo G3P1 requiring clean intermittent catheterization after every void ~ 14 months post partum
- L&D: epidural, 2nd stage 3 hours, forceps, 3rd degree laceration; voided small amounts, Discharged PPD#2
- Presented to ED with abdominal discomfort, straining to void with only drops – catheterized for 3700cc

Experience with Similar Cases?

1. Foley injury
2. Over-distension/retention
3. Both types
4. Neither

Background

- Increasing number of complaints with regard to postpartum bladder issues recognized by agencies (NHS, SA Medical)
  - Prevalence
  - Patient safety, Risk Management
- Significant differences in management
- Limited recommendations by professional societies (ACOG, RCOG)

ACOG

Women should be encouraged to void as soon as possible after delivery. Often women have difficulty voiding immediately after delivery, possibly because of trauma to the bladder during labor and delivery, regional anesthesia, or vulvar–perineal pain and swelling. In addition, the diuresis that often follows delivery can distend the bladder before the patient is aware of a sensation of a full bladder. To ensure adequate emptying of the bladder, the patient should be checked frequently during the first 24 hours after delivery, with particular attention to displacement of the uterine fundus and any indication of the presence of a fluid-filled bladder above the symphysis. Although every effort should be made to help the patient void spontaneously, catheterization may be necessary. If the patient continues to find voiding difficult, use of an indwelling catheter is preferable to repeated catheterization.

**RCOG**

- Women who have had a mid-cavity delivery, an epidural top-up or spinal are at risk of urinary retention. Consider inserting an indwelling catheter (to be kept in place for 12 hours post delivery).
- For those women who do not have an indwelling catheter, a fluid balance chart should be kept for 24 hours and the timing and volume of their first void noted.
- If retention of urine is suspected, a post-void residual should be measured.


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**RCOG**

- No post-operative or post-delivery patient should be left more than 6 hours without voiding or catheterisation.


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**Survey Results**

- Only 23% of units complied with RCOG recommendation of catheterization within 6 hours if no void.
- Duration of catheterization varied markedly (6-24 hours); 47% had required no criteria to be met before removal of catheter.
- Initial voided volume only recorded in 26% (NSVD), 47% (after removal of indwelling foley).

Zaki et al 2004

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**Use of Indwelling Foley**

![Graph showing use of indwelling foley](Zaki et al 2004)
Intrapartum

- Indwelling Continuous Foley Catheter (CC) vs. Clean Intermittent Catheterization (IC)
  - Effect on labor
  - UTI
  - Urinary retention

- Management of Foley during second stage
  - remove, deflate, continue

Effect on Labor: Bladder Emptying

- "A distended bladder, with or without a cystocele, may obstruct delivery." Williams Obstetrics 1993
- Bladder emptying in women without epidurals (1st stage, active)
  - Reed et al: no effect on uterine activity or course of labor
  - Kerr-Wilson et al: increased uterine activity with no effect on course of labor

Effect on Labor: Bladder Emptying

- Continuous (CC) vs Intermittent Catheterization (IC) during Labor:
  - Duration of second stage of labor longer in CC group (105 +/- 72 vs 75 +/- 52 min (p=0.002)
  - Increased local anesthetic dose in CC group (both stages of labor)
- IC group catheterizations: 1 (60%), 2 (23%), 3 (4.5%); False positive for clinical diagnosis of retention 8.5%

  Evron et al 2008

Infectious Risk (CAUTI)

- Asymptomactic bacteriuria

- No difference in CC vs IC (≈30%)\(^1\)
- Increased in IC group vs CC group\(^2\):

  Evron et al 2008, Millet et al 2012
Iatrogenic catheter-related injury

- 10-15% of hospitalized patients undergo insertion of a urinary catheter
- Limited data regarding iatrogenic catheter-related injury
  - 0.3% hospitalized (male) patients with catheter insertion
  - 5% ICU patients, accidental removal of inflated balloon
  - No published data in obstetrics

Kashefi et al, Lorente et al

Iatrogenic catheter-related injury: Second Stage

- Bladder trauma from compression against balloon
  - Hematuria
  - Ecchymosis, edema (unclear significance)
  - Fistula
- Urethral trauma
  - Inflated catheter expelled during pushing or with descent of fetal head

2nd Stage Bladder Management: Hospital Protocols/Policies

- **UCSF**: No written policy. “We remove (Foley) prior to pushing. If the second stage is lengthy, we will straight cath as needed. This has just always been the practice here...”
- **CPMC**: Written policy. “If Foley in place, deflate balloon and remove catheter at onset of pushing; for any bladder distension in second stage, perform straight cath.”
- **Kaiser SF**: No specific policy in labor; general practice if epidural - Foley in for 1st stage and deflated for 2nd stage

Safer Catheters?

The US Army Walter Reed Army Institute of Research (WRAIR) seeks a partner to license and commercialize a patent-pending safety adaptor for a Foley catheter. The adaptor prevents injury to a patient in cases of accidental or deliberate removal of the catheter without deflating the anchoring balloon.

http://techlinkcenter.org/summaries/safety-adaptor-foley-catheter
Case 3

- G2P1 VBAC
- L&D: Long labor, dense epidural, foley in for 1st and 2nd stage, >3 hour second stage, NSVD
- ~1 hour after labor urine leakage noted from vagina
  - Inspection in OR revealed erosion at anterior vagina with visible foley bulb

Fig. 1. A 10 cm-long defect at the dome of the urinary bladder is evident. Allis' clamps are holding the necrotic edge of ... The arrows show the hyperemic mucosa with fibrin deposits. Dueñas-García. Postpartum Bladder Rupture. Obstet Gynecol 2008.

Normal Voiding

- **Afferent** input arises from bladder stretch receptors (through myelinated fibers in pelvic nerves)
- **Efferent** signals mediate coordinated response:
  - relaxation of the urethral/periurethral muscles and pelvic floor striated muscles
  - detrusor muscle contraction and urethral smooth muscle relaxation
How does term/postpartum bladder capacity compare to non-pregnant capacity?

1. Lower
2. Higher
3. No change

Physiologic Changes
Antepartum/Postpartum

- Increased bladder capacity in 3rd month ga, progressively increases until 8th (Progesterone) ~200+cc\up at term
- Postpartum functional bladder capacity significantly higher than non-pregnant state*: 
  - <=699cc (51.1%)
  - 700-999 (34.9%)
  - >=1000 (14%)
    - 4.9% of (total) patients required CIC

*Burkhart et al 1965

Postpartum Voiding Dysfunction
Multifactorial

- Impaired bladder emptying
  - Detrusor Hypotonia (under activity, areflexia)
    - Physiologic changes in pregnancy (progesterone)
    - Neuropathy ( pudendal and pelvic nerve injury, suppressed sensory impulses due to epidural analgesia)
    - Over distention injury (unrecognized retention)

- Bladder outlet obstruction
  - Anatomic obstruction
    - Edema, hematoma, local bladder edema
  - Functional obstruction
    - Pain ( perineal lacerations)
    - Urethral over activity (reflex increase in tone)

Postpartum Urinary Retention (PPUR)

- Incidence varies significantly due to definitions used (0.06%-37%)

- Covert*: >= 150cc post void residual volume, no symptoms of retention

- Overt: inability to void spontaneously (within 6 hours after delivery or removal of Foley)

*Yip et al
**PPUR Incidence**

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<th>Author (n)</th>
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<th>Covert – Vaginal</th>
<th>Overt – C-Section</th>
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<td>Kermans (789)</td>
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<tr>
<td>Yip (691)</td>
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<td>Teo (15,757)</td>
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<td>Carley (11,332)</td>
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**PPUR Risk Factors**

1. Nulliparity/Primigravid
2. Prolonged labor
3. Prolonged 2nd stage
4. Epidural
5. Instrumental delivery
6. Perineal injury (laceration, edema, hematoma)
7. Birth weight (>3.8kg)
8. Cesarean section

Humburg et al: (>7 days) at least 4/6 RFs present in all patients with retention, most had 5/6

**Risk Factors Multivariate Analysis**

<table>
<thead>
<tr>
<th>OVERT</th>
<th>COVERT</th>
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<td>Kermans</td>
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<td>Yip</td>
<td>Prolonged 1st &amp; 2nd stages</td>
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<tr>
<td>Teo</td>
<td>Caucasian vs Asian (0.27)</td>
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<td>Carley</td>
<td>Instrumental delivery (3-4)</td>
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<tr>
<td>Groutz (&gt;3d)</td>
<td>Length of 2nd stage</td>
</tr>
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**PPUR: Management Prevention/Early Recognition**

- Attention to bladder in labor and post partum (to avoid over distention)
  - Have patient attempt to void every 2-3 hours in labor
  - Assess voided volumes and bladder palpation on exam – low threshold for CIC
- Consider indwelling Foley catheter (~12-24 hours) after instrumental delivery and/or regional anesthesia re-dosing just before delivery
PPUR: Management
Prevention/Early Recognition

- If unable to void by 6h (postpartum or after catheter removal) – assess with PVR or CIC
- High index of suspicion:
  - Risk Factors
  - Symptoms: urgency, frequency, hesitancy, decreased sensation to void, straining, small voids, incontinence
  - Exam: uterus high/deviated, bladder palpable, small volume voids measured (<150cc)

Postpartum Voiding

- Timed voids every 3-4 hours; record volumes
- If voids less than 150cc and/or other symptoms, check PVR
- If (symptomatic) inadequate voids/retention:
  - Urine C&S
  - Indwelling catheter x 24 – 48 h (PVR >700)*
  - If 2nd attempt unsuccessful, teach self CIC vs. catheter x 1 week (pain, edema)

“Helping Measures”
- Oral analgesia
- Ice pack to perineum
- Help patients stand and walk
- Provide privacy
- Warm bath
- Immerse hands into cold water
- Avoid constipation

Stallard et al 1988

Postpartum Voiding

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**PPUR: Long-term FU**

- Data limited
- **Yip et al (4 year follow up):**
  - SUI 28.8%, FI 2.7%
  - No difference vs. patients without PPUR

**Conclusions**

- Careful monitoring of bladder function intra- and postpartum is key
- No clear evidence that CC or IC better in labor
- Remove Foley in second stage
- Low threshold to check PVR (bladder scanner or CIC)
  - 4-6h with no void, assessment of symptoms and volumes if voiding
- Residuals of >700cc – more likely to have prolonged dysfunction