What’s Up in Pediatric Urology: An Update for General Urologists

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Objectives:
• Discuss changes in understanding and treatment of reflux
• Examine steps to troubleshoot a newborn circumcision gone wrong
• Review current thinking on antibiotic prophylaxis in children
What’s Up In Pediatric Urology?
An Update for General Urologists

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Topics

- Organizational changes
- Reflux and UTI
- Hydronephrosis
- Circumcision complications
- Hernia and hydrocele
Pediatric Urology

AAP – Section on Urology:
no longer putting on fall meeting with AAP
65% maintain membership in AAP

SPU – now main meeting in pediatric urology
occurs with annual AUA meeting

Fall Pediatric Urology Congress (sponsored by SPU)
new independent pediatric urology meeting
Standard Approach to UTI Management in Childhood

- Febrile UTI equals high risk for renal scar
- Reflux common in children with febrile UTI
- All children with febrile UTI – US and VCUG
- Reflux without UTI causes no renal damage
- Low grade reflux resolves, high grade does not
- Antibiotic prophylaxis prevents new scars
- Surgery for high-grade and non-resolved reflux
New assessment of value of antibiotic prophylaxis following UTI

Antibiotic prophylaxis may NOT decrease the incidence of recurrent UTI

If this is true and VUR is just a risk factor for UTI, why should we test for VUR?
New Finding and Concept

Some children who have high grade reflux are born with segmental renal dysplasia that will may not be obvious on US but will have a DMSA scan appearance identical to infection-induced renal scars.

All scars are not secondary to UTI!
Guidelines on UTI and Reflux

• NICE Guideline on UTI in Children

• AAP Guideline on Diagnosis and Management of Febrile UTI in Children 2-24 months

• AUA Guideline on UTI and Primary Vesicoureteral Reflux in Children
AAP Guideline Committee consideration

- 6 studies of children with UTI and VUR treated with prophylaxis or no prophylaxis
- Best available data shows that prophylaxis has no benefit, except in grade 5 VUR
- Authors supplied non-published subset data to Committee (not made available to SOU)
Action Statement 3

• To establish the diagnosis of UTI, clinicians should require *both* urinalysis results that suggest infection (pyuria and/or bacteriuria) and the presence of at least 50,000 CFU per mL of a uropathogen cultured from a urine specimen obtained through catheterization or SPA

(evidence quality, C, Recommendation)
Action Statement 5

• Febrile infants with UTIs should undergo renal and bladder ultrasonography (RBUS)

(evidence quality: C; recommendation).
Action Statement 6

- **Action Statement 6a:** VCUG should not be performed routinely after the first febrile UTI; VCUG is indicated if RBUS reveals hydronephrosis, scarring, or other findings that would suggest either high-grade VUR or obstructive uropathy, as well as in other atypical or complex clinical circumstances (evidence quality B; recommendation).

- **Action Statement 6b:** Further evaluation should be conducted if there is a recurrence of febrile UTI (evidence quality: X, recommendation).
Concerns with studies used as basis for AAP Guidelines determination

- UTI often determined by bag specimens
- Circumcision status is not noted in most
- Antibiotic compliance not known (5/6)
- Renal scarring often only by US
- Left off data from Swedish RCT
- No documentation of BBD is older kids (nor in the guidelines)

Amalgamation effect – Simpson’s paradox
Is this approach a big jump with no POSITIVE data?
Concerns - continued

• Even if there is no or little benefit to many from antibiotic prophylaxis, surgical VUR resolution has been shown to decrease febrile UTI (pyelo by DMSA scan) rates.

• Analyses of US-based approaches are not encouraging.

• **BIG worry** – inappropriate message to pediatricians and primary care docs – “you don’t need to worry much about UTI” – the broad brush effect. Will they feel that getting a VCUG in a specific patient (despite patient-specific worries) is now “sub-standard”?
Potential Findings on RBUS

• Obstruction (1-5%)
• Ureteral Dilatation
• Bladder Wall Changes or other pathology
• Renal parenchymal abnormalities
  (combined: 10-15%)

(best ordered with pre and post-void images)
Sensitivity of RBUS for Renal Scar/Abnormality Detection

- DMSA radionuclide scan – 100%
- IVP – 55%
- RBUS – 25%

* RBUS is abnormal in 25% of kids with grade 4 and 62% of grade 5 VUR
AUA Guidelines for the Management and Screening of Primary VUR in Children

Guidelines committee performed a meta-analysis to determine the outcomes related to 5 topics:
1. Management of infants with VUR
2. Management of the child >1 yr with VUR
3. Management of children with VUR and BBD
4. Screening of siblings and offspring of pts with VUR
5. Screening of infants with PNH
Is antibiotic prophylaxis useful?
Effect of CAP on UTI

The chart above shows the effect of CAP on UTI rates across different studies. The x-axis represents the study names, and the y-axis represents the CAP rate. The points are distinguished by color: CAP rate is represented by blue squares, and no CAP rate is represented by yellow circles.
**Swedish Reflux Trial 2009**

- **Prophylaxis**
  - n=69

- **Endoscopic Rx**
  - n=66
  - VCUG x 1-2

- **Surveillance**
  - n=68

- **2 years Follow-up**
  - VCUG DMSA Bladder function

- UTI=194
- PNH=9
- 203 girls
- 75 boys
- All with VUR

*The University of Utah Pediatric Urology*

*Intermountain Primary Children's Medical Center*
Swedish Reflux Study
Baseline DMSA Abnormalities

![Chart showing baseline DMSA abnormalities for Grade III and Grade IV reflux. The chart includes four classes: Class 0, Class 1, Class 2, and Class 3. Class 3 is represented in red, Class 2 in orange, Class 1 in light blue, and Class 0 in dark blue.](chart.png)
Girls

Logrank p < 0.0001

Time to first febrile recurrence (months)

1: Endoscopic  2: Prophylaxis  3: Surveillance
Boys

Logrank p = 0.2479

Time to first febrile recurrence (months)

1: Endoscopic  2: Prophylaxis  3: Surveillance
What patient factors predict high risk for future febrile UTI and scar?

- Age < 1 year
- White race
- High-grade VUR (grades 4 and 5)
- Presence of a renal scar/defect
- Bowel and bladder dysfunction
Does VUR increase the risk of renal injury?
What is the prevalence of renal scar based on number of UTIs?

<table>
<thead>
<tr>
<th>UTIs:</th>
<th>% scars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>2</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>18%</td>
</tr>
<tr>
<td>4</td>
<td>33%</td>
</tr>
<tr>
<td>5</td>
<td>62%</td>
</tr>
</tbody>
</table>
Are there infants after fUTI who might be helped if VUR is recognized?

• Increase Parental focus
• Improve Pediatrician/office focus
• Antibiotic prophylaxis in select sub-group?
• Surgical intervention potentially for those with high recurrent UTI/scar risk and low potentially for VUR resolution
New Working Tenets of UTI and Reflux

- Reflux is just one risk factor for UTI
- Reflux does increase the risk of UTI being febrile and of scar formation after UTI
- Many patients have congenital renal lesions that are most common in high grade VUR
- Resolution of reflux does decrease pyelo rates
- Many children with reflux are not predisposed to further UTI or scar

These patients will do well without prophylaxis
What are the risks of “Wait for 2” Approach?

• Overall population – 5% increase scar rate, probably higher in select high risk cohort

• Some may wait for more than 2 non-compliant – choice, distance, etc.
  complacent
  dim bulbs

Unproven in POSITIVE trials
What are risks of old “VCUG with 1” Approach

• Morbidity of study – pain, UTI, cost, radiation

• Over – treatment
  antibiotic prophylaxis
  surgical
Truth?

Likely lies somewhere in between

We need a finer-toothed comb to know
Immaturity

Pre-existing damage

Bladder Dynamics

UTI

Renal Injury

Long-term Health Impact
Critical Parameters in Reflux form the **BASIS** for Management

B ladder
A ge
S ex
I nfections
S carring
## Risk of UTI

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>BBD</td>
<td>Mild</td>
<td>Moderate</td>
</tr>
<tr>
<td>Age</td>
<td>School Age</td>
<td>Toddler</td>
</tr>
<tr>
<td>Grade</td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Infections</td>
<td>None</td>
<td>Few</td>
</tr>
<tr>
<td>Scarring</td>
<td>None</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Risk assessment in reflux

• Clinical decisions should be based on a risk assessment to tailor evaluation and treatment to the individual child’s risk of acute illness (*pyelonephritis*) and scarring.

• Incorporate parental risk perception into decision and revisit periodically over time.  
  *Ogan, J Urol, 2001*
RIVUR
Randomized Intervention for Children with Vesicoureteral Reflux

• NIH/NIDDK sponsored clinical trial on the efficacy of CAP in children with VUR
• Randomize 600 children (40 centers)
  ages of 2 - 72 months
  Grade I-IV after 1st UTI
  TMP-SMX vs. placebo
• DMSA scan within 10 weeks of UTI
• Repeat DMSA at 12 and 24 months
• 2 year study with incidence and character of UTI as primary endpoint and renal scarring, treatment failure, and antimicrobial resistance as secondary endpoints
Future Directions for UTI and VUR

• Rapid UTI detection
• Non-invasive imaging for VUR
• Genetic profile for UTI/scarring risk
• Urinary proteome evaluation for important parameters – UTI risk, renal inflammation or scar
• Incorporate RIVUR trial data
• Need a prospective – “Wait for 2” trial
Surgical correction

- Open reimplant
- Laparoscopic and robotic reimplant
- Deflux

For unilateral reflux – outpatient, extravesical open reimplant
(cheaper, equal satisfaction, same results)
Antenatal hydronephrosis

- **Antibiotic prophylaxis:** 20mg/kg Amox once daily (continue for VUR, UVJO)

- **Ultrasound:** renal and bladder
  - bilateral hydro in male – immediate
  - unilateral hydro – delay to DOL >3
Antenatal hydronephrosis

• Evaluate initial ultrasound and THEN decide on other studies

• Get VCUG if hydro GR 2 or greater or any ureteral dilatation seen

• Get renal scan with lasix if hydro GR 3 or greater and not accounted for by reflux
Antenatal hydronephrosis

- Function rarely decreases in short-term.

- Strongest predictor of need for surgery is initial severity of hydronephrosis...AP pelvic diam.

- If hydronephrosis is going to improve, 90% will do so by 18 months of age. Follow with more ultrasound than renal scan.

- If not improved by then, of all GR 3 and 4 hydronephrosis patients...40% will need surgery eventually due to UTI, pain, worsening function.
Pyeloplasty

- Open procedure preferred until school aged
  - done via dorsal lumbotomy approach

- Lap or robotic after school aged

(this is clearly a personal approach)
Circumcision

Local anesthesia:
50:50 ¼% bupivicaine
½% lidocaine

• Dorsal penile nerve block
  – Block the dorsal nerves as they pass under the symphysis to provide glans block
Circumcision

Local anesthesia:

– Perform a ring block at the base of the penis to give full skin block. (extra ventrally)

– Must do both for FULL block
Circumcision - Plastibell

- After the local anesthesia
- And after the mark at the coronal margin you are ready to begin
Circumcision - Plastibell

Tie the string tightly

Consider using O-Silk for tighter knot
Penile Bandage
“Foam Friend”

Excellent for kids and adults:

Inner – Telfa

Outer – ½” Reston Foam

Clear tape or Conform to secure in place
Bleeding Circumcision

• 10 minutes modest compression

• If punctate bleeding, suture edge, use 1% lido with epi. (under plastibell – pack with fibrillar surgicell)

• If general ooze, use Foam Friend with tightness adjusted to need

• If still a problem, consider tighter bandage with Surgicell first, then Xeroform, then Conform or Coban (hard to remove later – “cast”)
Circ – Skin Separation
(Mild – let it epithelialize)
Circ – Skin Separation
(More severe – repair with rotation flaps or graft
Hernia / Hydrocele

Consider **diagnostic insufflation** to assess contralateral side for crepitus and bulge ---- done with 8 Fr feeding tube inserted via open sac (not scope)

Hydrocele – contralateral risk = 7%
Hernia – contralateral risk = 12-15%
(estimated sensitivity is 65%)
Pediatric Urology faculty at Primary Children’s Hospital

Pat Cartwright
Brent Snow
Chad Wallis
Catherine deVries (IVUmed)
Si Oottamasathien (NIH funded)

Fellowship approved – interviewing now for 2015
Thank you