COMMON CONCERNS IN PEDIATRIC UROLOGY

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Newborn nursery asks you to evaluate a newborn male with prenatally-detected hydronephrosis. Normal amniotic fluid levels. Perfect APGAR. Room air.

Timing of postnatal renal/bladder ultrasound?
CASE 1: Postnatal RUSD at 48 hours

Unilateral hydronephrosis, no hydroureter
## Prenatal Hydronephrosis

<table>
<thead>
<tr>
<th>Grade 1</th>
<th>Unilat Grade 2</th>
<th>Bilat Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine barely splits sinus</td>
<td>Full pelvis, major calyces dilated</td>
<td>Uniformly dilated minor calyces, parenchyma spared</td>
<td>Parenchymal compromise</td>
<td></td>
</tr>
</tbody>
</table>
CASE 1

Newborn boy with unilateral SFU grade 4 hydronephrosis without hydroureter

Differential diagnosis?
# Prenatal Hydronephrosis

<table>
<thead>
<tr>
<th>Etiologies of Hydronephrosis</th>
<th>Typical Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transient dilatation</td>
<td>Unilateral mild (SFU 1-2)</td>
</tr>
<tr>
<td>UPJ obstruction</td>
<td>Unilateral severe (SFU 3-4)</td>
</tr>
<tr>
<td>Vesicoureteral reflux</td>
<td>Any ultrasound appearance!!</td>
</tr>
<tr>
<td>Megaureter **</td>
<td>Very dilated ureter</td>
</tr>
<tr>
<td>Posterior urethral valves</td>
<td>Bilateral HN in male infant</td>
</tr>
</tbody>
</table>

**Descriptor, not diagnosis. DDx:** UVJO, ectopic ureter, VUR, PBS, PUV, NGB
CASE 1

Newborn boy with unilateral SFU grade 4 hydronephrosis without hydroureter, suspected UPJ obstruction

VCUG?
WHICH NEWBORNS NEED EARLY VCUG?

- Bilateral hydronephrosis in male infant
- Ureteral dilation (dilating VUR, ectopic ureter/UVJ obstruction)
- Ureterocele/pyeloureteral duplication
- Hydronephrosis in solitary kidney (dude, obviously)
- Maybe in newborns with spinal dysraphism and hydronephrosis
LOOK AT THE BLADDER TOO!

<table>
<thead>
<tr>
<th>Intravesical ureterocele</th>
<th>Ectopic ureter</th>
</tr>
</thead>
</table>

[Images of ultrasound scans showing intravesical ureterocele and ectopic ureter]
KEY POINTS: PRENATAL HYDRONEPHROSIS

- Obtain initial postnatal ultrasound beyond 48 hours of life to allow adequate hydration
- Need for early VCUG not necessarily a function of hydronephrosis severity.....call us!
- Consider prophylaxis and early VCUG if hydroureter, duplication, ureterocele, or bilateral HN in boys
- Unilateral SFU grade 1 hydronephrosis may not require specialist referral
CASE 2

13 month old girl with fever of 103°F, no URI sx, very ill.
Catheterized urine specimen
+LE, -nitrite, -blood
Culture $10^4$ E-coli

Sufficient data to diagnose UTI?
## Guideline Summary: Management of Initial UTI in Children

<table>
<thead>
<tr>
<th></th>
<th>2011 AAP</th>
<th>ISPN</th>
<th>NICE (under 6 mo)</th>
<th>NICE (over 6 mo)</th>
<th>RCH Melbourne</th>
<th>TDA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cx</strong></td>
<td>50,000 CFU + pyuria SPA or cath specimen</td>
<td>Cath: 10,000 Mid CC: 100,000</td>
<td></td>
<td></td>
<td>SPA: Any gram – Cath: 1000 CFU</td>
<td></td>
</tr>
<tr>
<td><strong>US</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>If recurrent or atypical</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>VCUG</strong></td>
<td>Only if positive ultrasound</td>
<td>Only if pos US or risk factors</td>
<td>Only if pos US or atypical UTI</td>
<td>Only if risk factors</td>
<td>Only if positive US in boys under 6 mo</td>
<td>Only if positive acute DMSA</td>
</tr>
<tr>
<td><strong>Late DMSA</strong></td>
<td>No</td>
<td>If positive US or VUR</td>
<td>Only if atypical</td>
<td>If atypical or recurrent</td>
<td>No</td>
<td>Only if positive acute DMSA</td>
</tr>
<tr>
<td><strong>Notes</strong></td>
<td>Children less than 2</td>
<td>Atypical UTI: Septic, AKI, abx failure, abdominal, bladder mass, non-E coli</td>
<td>Risk factors: Dilation, poor urine flow, E-coli, fam hx VUR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13 month old girl with fever of 103°F, no URI sx.
Catheterized urine specimen:
+LE, -nitrite, -blood
347 WBC, 1-5 RBC, many bacteria/hpf
Culture 50K E-coli

Next steps in management?
CASE 2: RUSD  

Is this a “positive” US warranting VCUG?

Left kidney 8cm, no hydronephrosis

Right kidney 6.5cm, no hydronephrosis
13 month old girl hospitalized with febrile UTI; ultrasound demonstrates left pyeloureteral duplication.

**Timing of VCUG?**

**THIS HOSPITALIZATION?**
- more convenient
- may show bladder dynamics during inflammation
- unlikely to make child sicker
CASE 2: VCUG

Left duplication, grade 4 VUR into lower moiety
SURGICAL INTERVENTION FOR VUR

Cohen Cross-Trigonal
OK REFLUX VS BAD REFLUX

LOW GRADE
Usually benign in absence of febrile UTI
Usually short tunnel

HIGH GRADE
Usually not benign
Consider secondary reflux!
PUV, NGB (especially if bilateral)
### Congenital Renal Damage

<table>
<thead>
<tr>
<th>Grade</th>
<th>1-3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>100%</td>
<td>50%</td>
<td>15%</td>
</tr>
<tr>
<td>Slight</td>
<td>-</td>
<td>30%</td>
<td>35%</td>
</tr>
<tr>
<td>Severe</td>
<td>-</td>
<td>20%</td>
<td>50%</td>
</tr>
</tbody>
</table>

- **Bladder never empty**
- **Massive VUR**
- **Remodeling**
- **Poor bladder emptying**

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**OK REFLUX VS BAD REFLUX**
OK REFLUX VS BAD REFLUX

**Resolution by Grade**

<table>
<thead>
<tr>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 4 unilat</th>
<th>Grade 4 bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 years</td>
<td>60%</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>5 years</td>
<td>&gt;90%</td>
<td>80%</td>
<td>50%</td>
</tr>
</tbody>
</table>

- At birth, spontaneous resolution inversely proportional to initial grade.

Most cases of grade 1 and 2 VUR resolve
Unilateral grade 3 VUR resolves in 50% of cases
Very few cases of bilateral 3, grade 4 or grade 5 VUR resolve

**Resolution by Age**

<table>
<thead>
<tr>
<th>Age 1-2</th>
<th>Age 3-5</th>
<th>Age 6-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral Grade 3</td>
<td>75%</td>
<td>50%</td>
</tr>
<tr>
<td>Bilateral Grade 3</td>
<td>60%</td>
<td>25%</td>
</tr>
</tbody>
</table>

VUR is most prevalent in young children and most likely to resolve in this group.

~30% of patients resolve their VUR every year, babies resolve quicker.
When reflux resolves, it tends to do so in first few years of life.
By age 5, the greatest proportion of UVJ remodeling is complete.
PROPHYLACTIC ANTIBIOTICS

Prophylactic Antibiotics
- Neither AAP or NICE recommend routine prophylaxis in infants and children after their first UTI
- Antibiotic exposure increases likelihood that subsequent UTI will be with resistant organism (x3)
- After treatment of UTI, choose a prophylactic antibiotic different from the one used for therapy
- In general, prophylaxis is about ¼ the dose, given at bedtime to maximize bladder dwelling time
- Compliance is an issue. One study showed that 1/3 children take antibiotics regularly.
- Circumcision reduces risk of UTIs in infants and toddlers.
- Risk reduction greatest in pts with recurrent UTI and dilating VUR
- Some say circ indications include: recurrent febrile UTI, obstructive pathology, HN/HU, high grade VUR

RIVUR Trial
- Compared TMP-SMX to placebo in 600 children with grade I-IV VUR after UTI
  - Prophylaxis significantly reduced risk of recurrent UTI
  - Recurrent UTI risk reduction was greatest in children with:
    - History of febrile UTI
    - Bowel and bladder dysfunction at baseline
    - Higher grades of VUR

Uncircumcised male infant with VUR, febrile UTI:
“Should be considered malpractice if one does not address physiologic phimosis”
-- unnamed esteemed mentor
**KEY POINTS: UTI/VUR**

- Microscopic UA (pyuria) + culture (50K CFU) from cath specimen necessary to diagnose UTI in child (AAP)

- Consider VCUG after initial febrile UTI if severe infection or abnormal RUSD

- Address physiologic phimosis in male infants with febrile UTI + VUR (circumcision or topical steroid)

- Antibiotic prophylaxis is particularly important in children with VUR + bowel and bladder dysfunction
CASE 3

5 year old boy with foreskin which will not reduce

Diagnosis?

Physiologic phimosis
CARE OF UNCIRCUMCISED PENIS

Topical steroids are the first line of treatment for physiological phimosis with good success rates and low risk of complications (Level 1b/2b, Grade A).

Vigorous retraction has potential to cause micro-tears leading to scarring and iatrogenic true phimosis.

Therefore, normal foreskin care in early childhood starts once the foreskin is retractable, and this occurs at varying ages.
CASE 4

5 year old boy with foreskin which will not reduce

Diagnosis?

Pathologic phimosis
Lichen sclerosis/BXO
**PATHOLOGIC PHIMOSIS**

**Indications for urology consult:**

- Suspicion of true phimosis with evident scarring
- Lichen sclerosis of the foreskin
- Recurrent balanoposthitis or recurrent UTIs
- Delayed retraction of foreskin past 8–10 years
PENILE SKIN PROBLEMS: REFER OR REASSURE?

DORSAL HOODED FORESKIN
REFER

-Hypospadias or chordee repair
Between 6-12 months of age

VOLCANO PENIS!
REFER
PENILE SKIN PROBLEMS: REFER OR REASSURE?

PENILE SKIN BRIDGE
REFER
- Requires surgical excision

PENILE ADHESIONS
REASSURE
- Will resolve with onset of testosterone production at puberty
- Can do betamethasone valerate 0.1% BID for 2-4 weeks
CASE 5

6 month old male with left undescended testis. Normal penis. Occasional intermittent left hemiscrotal swelling.

How do you examine a possible undescended testis?
JELLY-SCOOP-POP! TECHNIQUE
JELLY-SCOOP-POP! TECHNIQUE
JELLY-SCOOP-POP! TECHNIQUE
JELLY-SCOOP-POP! TECHNIQUE
CASE 3

6 month old male with left palpable undescended testis. Occasional intermittent left hemiscrotal swelling.

Ultrasound? Nah

Timing of referral? Now
**UNDESCENDED TESTIS**

**Guideline Statements**

1. Phenotypic male newborns with bilateral, nonpalpable testes require evaluation for DSD
2. DSD more likely with UDT + increasing severity of hypospadias
3. Measure MIS in boys with bilateral nonpalpable testes (without CAH) and consider additional hormone testing to evaluate for anorchia
4. Obtain gestational history at initial evaluation
5. PCP should palpate testes for quality and position at each well-child visit.
6. Surgical referral for infants with congenital UDT and no descent by 6 months (corrected for gestational age)
7. Surgical referral for boys with newly diagnosed (acquired) UDT after 6 months (optimal to do surgery before 1)
8. No ultrasound (US) or other imaging modalities before referral (rarely aid in decision making)
9. Assess the possibility of DSD when there is increasing severity of hypospadias with cryptorchidism. Grade C
10. Monitor position of retractile testes at least annually to evaluate for secondary ascent. Grade B
11. Hormone therapy not recommended
12. If no spontaneous descent by 6 months, operate within the year
13. Scrotal or inguinal orchidopexy for prepubertal boys with palpable UDT
14. At exploration for a nonpalpable testis, identify the status of vessels to guide decision making
15. If normal contralateral testis, orchiectomy reasonable if short vessels and vas, dysmorphic/hypoplastic testis, or post pubertal age.
16. In prepupalbital boys with nonpalpable testes, do EUA to try and find it.
17. If truly nonpalpable, explore and pexy
18. Counsel boys with a history of cryptorchidism and/or monorchidism regarding potential long-term risks and provide education on infertility and cancer risk.

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**Texas Tech University Health Sciences Center**

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**Covenant Children's**
CASE 4

2 day old phenotypic boy with dorsal hooded foreskin, perineoscrotal hypospadias, bilateral nonpalpable gonads

Differential diagnosis?
AMBIGUOUS GENITALIA  46 XX

Congenital adrenal hyperplasia (21-OH deficiency)  Ovotesticular DSD
AMBIGUOUS GENITALIA  45 XO / 46 XY

Mixed gonadal dysgenesis
Partial androgen insensitivity syndrome (PAIS)

5-alpha reductase deficiency

Persistent mullerian duct syndrome
KEY POINTS: UNDESCENDED TESTES

1. Pediatric urology referral if no descent by 6 months of age
2. Ultrasound generally not helpful and not recommended for evaluation of UDT
3. Bilateral palpable inguinal testes in otherwise healthy child → likely retractile testes
4. Consider intersex condition / DSD in boy with bilateral nonpalpable UDT
QUESTIONS?