Vesicoureteral Reflux: Update & Traditional Approach

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VUR: Diagnosis

Prenatal Presentation
- prenatal ultrasound
Postnatal Presentation
- febrile and non-febrile UTI
- family history and screening

VUR: Prenatal Presentation

Hydronephrosis on prenatal sonogram
- renal pelvic diameter (RPD) > 7 mm in 3rd trimester
- VUR prevalence: approx. 16%
- VUR can be present if post-natal USG is normal
- Male predominance—especially higher grade

VUR: Prenatal Hydronephrosis Selective evaluation?

Unilateral—USG after birth > 1 week post delivery
Bilateral—VCUG & USG shortly after birth
Options for VCUG testing with unilateral dilatation:
- all infants
- only if postnatal USG shows RPD > 10 mm and/or ureteral dilatation
- discuss risks and benefits if RPD < 10 mm
- if there is a family history of VUR
VUR: Postnatal Presentation

First UTI:
- Obtain renal USG in all after first UTI
- Renal USG is normal in 90% of children with VUR

- VCUG: controversial
  - VCUG in all—what I recommend
  - Only if USG abnormal
  - If fever > 39 C (102.2 F)
  - Parental preference
  - ? Family compliance issues
  - Any history of kidney disease

Any additional UTI’s: All need a VCUG

VUR: Sibling Screening

Controversial

Up to 30% of asymptomatic siblings will have VUR

Selective Screening
- Younger siblings (< age 5 years)
- Siblings with a history of UTI or BBD
- Poorly compliant families
- Siblings of probands with high grade VUR
- Parental concern

VCUG: Imaging Techniques

Standard contrast VCUG
- International grading system: I-V
  - most common in my practice

Radionuclide VCUG (rnVCUG)
- Less radiation
- Cannot grade reflux, may miss grade I
- More useful in following patients after initial contrast VCUG

VCUG: Imaging Techniques

- Contrast enhanced Voiding Uro-Sonography (ceVCUG)
- Ultrasonically visible contrast agent introduced through catheter
- Kidneys imaged on ultrasound looking for agent in collecting system
- May be more sensitive than other methods
- No radiation, but still requires catheterization
International classification of vesicoureteral reflux (VUR)


Voiding cystourethrogram (VCUG) demonstrating unilateral Grade II vesicoureteral reflux.

Voiding cystourethrogram (VCUG) demonstrating bilateral Grade V vesicoureteral reflux.

Micturition urogram demonstrating moderate to severe vesicoureteral reflux.
Contrast Enhanced Voiding Uro-sonography (ceVUS)

VCUG: UDR System

Distal ureteral diameter ratio (UDR)
- less subjective than the International Scale
- Ratio: greatest width in true pelvis/distance from the bottom of L1 to the top of L3
- greater inter-observer consistency
- lower UDR's correlate with
  1. more spontaneous resolution
  2. fewer breakthrough UTI's
  3. less need for surgery

VUR: Renal Scarring

Best detected with a DMSA renal scan
Cannot be seen with USG, unless severe
Most often due to recurrent UTI
May be present at birth with high grade VUR: congenital hypo-dysplasia
More common with higher grades, but can be seen with Grade I
Responsible for hypertension, renal insufficiency
- I obtain DMSA scan initially in all children after VUR diagnosis on cystogram

VUR: Management

Goals:
- prevent recurrent UTI
- prevent renal damage
- identify older toilet trained children with bladder and bowel dysfunction (BBD)
- minimize morbidity of treatment and follow up regimen
VUR: Management

Options: All require treatment of BBD
- watchful waiting (surveillance)
- continuous antibiotic prophylaxis
- options above require repetitive VCUG’s until VUR resolution in my practice
- Surgery
  Deflux injection
  Open reimplantation
  ? circumcision

VUR: Management

Grades I & II

Spontaneous resolution rate from 80 to 90%
Identify and treat BBD in toilet trained child
Surveillance without prophylaxis:
- older child who can convey symptoms
- no renal scarring on DMSA scan
- compliant family
- parental preference in older children
- must seek medical attention immediately
- educate family about renal scarring
- ? need for repetitive VCUG’s?
- ? stop seeing after a certain age?

VUR: Management

Grades I & II

Benefits of prophylaxis
- Decrease recurrent UTI’s by 50% (RIVUR Trial)
- Diminish new renal scarring (older studies)
- avoid need for surgery
- avoid reliance on parental surveillance and compliance
- helpful while treating BBD
- may avoid circumcision in those families who are opposed

VUR Management

Grades I & II

Antibiotic prophylaxis
- non-toilet trained infants
- older patients with unresolved BBD
- poorly compliant families
- scarring on initial DMSA renal scans
- uncircumcised males
- parental preference
VUR: Management
Grade I & II

Prophylaxis regimen
most common: TMP/SMZ, nitrofurantoin
once daily nighttime dose
see every 4 to 6 months for urine culture
with office visit
repeat VCUG every 18 months

VUR: Management
Grade III - V

All: antibiotic prophylaxis
Detection and treatment of BBD in older toilet trained child
Spontaneous resolution rates:
Grade III: 50%
Grade IV (older child): 20%
Grade V (older child): near 0%
Newborns with grades IV, V may resolve in up to 50% by 2 years of age

VUR: Management
Surgical Indications

Breakthrough UTI’s
New renal scarring after a breakthrough UTI
Poor parental compliance
Failure to resolve with growth—age, gender
Women in pregnancy have higher rates of UTI if they have VUR
Grades IV & V in children older than 2 years
Parental preference