Medical Management of childhood UTI and VUR

Dr Patrina HY Caldwell
Paediatric Continence Education, CFA
15th November 2013
Terminology

- According to the current ICCS terminology guidelines
  - Bladder and bowel dysfunction = combined bladder and bowel disturbance that encompasses lower urinary tract and bowel function.
  - Dysfunctional voiding = habitually contracts the urethral sphincter during voiding
  - UTI = urinary tract infection
  - VUR = vesicoureteric reflux
UTIs Background

• UTIs are common in children
  • 1/10 girls and 1/30 boys will have a UTI by 16
  • More common in boys in first year
  • More common in girls after the first year

• Commonly caused by E coli (80%)
  • Other organisms – urinary tract anomalies, younger age, previous antibiotics
Risk for UTI

- Females (2-4X) Shaikh 2008
- Ethnicity (white 2-4x) Shaikh 2008
- Genetic factors
- Anatomical obstruction (70% present with UTI in first 2 months of life) Ring 1988
- Functional obstruction (bladder and bowel dysfunction, neurogenic bladder)
Risk for Recurrent UTIs

- 10-30% will develop a further UTI
- Risk factors:
  - <6/12 at first UTI
  - Bladder and bowel dysfunction
  - Renal damage at first UTI (DMSA defect)
  - VUR
  - Previous UTIs
  - Female
  - Bacterial virulence and host susceptibility

Panaretto 1999
Typical UTIs

• Pyelonephritis/upper tract infection:
  – Bacteriuria + fever >38°C
  – Bacteriuria + any fever + loin pain
  – 14% acute pyelonephritis had urinary tract abnormalities vs 3% with lower tract or asymptomatic bacteriuria (Pylkkanen 1981)

• Cystitis/ lower tract infection
  – Bacteriuria + urgency, frequency, incontinence, dysuria

• Asymptomatic bacteriuria
  – Bacteriuria + no symptoms
Atypical UTIs

- Seriously ill
- Poor urine flow
- Abdominal or bladder mass
- Raised creatinine
- Septicaemia
- Poor treatment response within 48/24
- Non- E Coli infection

Nice Guidelines on UTI in children
Recommended Tests

- Urine microscopy and culture
- Urinalysis
- (CRP, procalcitonin)
- Ultrasound infants < 6 months and those with atypical or recurrent UTIs
- DMSA – atypical or recurrent UTI
- (Do not need MCUG)

Nice Guidelines on UTI in children
Urine collection

- Clean catch urine
- Urine collection pads
- Suprapubic aspirate
- Catheter urine
- (Bag urine – 50% contaminated Al-Orifi 2000)
Urinalysis

- Leukocyte esterase and nitrites helpful
- Combination more helpful
- Less reliable in children < 2 years

Figure 4.3  Leucocyte esterase (LE) or nitrite dipstick, microscopy and dipslide culture plotted in ROC space
Acute management

• Antibiotics
  – Parenteral AB for those <3 months
  – Pyelonephritis – oral AB for 7-10 days (or IV followed by oral AB)
  – Cystitis – oral AB for 3 days
• Do NOT treat asymptomatic bacteriuria
• If on prophylactic AB, use different AB

Nice Guidelines on UTI in children

The University of Sydney
Long term management

• Recurrent pyelonephritis associated with renal scarring (5%)

• Aim of long term management – reduce risk for further UTI and renal damage
  – Address inappropriate voiding patterns, dysfunctional voiding
  – bowel management
  – Encourage adequate fluid intake
  – Access clean toilet, don’t delay voiding
  – (Antibiotic prophylaxis not routinely recommended)

• For recurrent UTI antibiotic prophylaxis may reduce risk
  – (need to treat 14 children to prevent 1 UTI)

• Circumcision also reduce risk
  – (need 111 circumcisions to prevent 1 UTI)
VUR: abnormal movement of urine from the bladder into the ureters or kidneys
Background

• VUR may be:
  – primary (congenital)
  – secondary (caused by UTI, obstruction, bladder and bowel dysfunction)

• Can be familial
  – in 43% of infants of mothers with VUR
  – 1/3 children with VUR have sibling with VUR  

• Found in 17-37% of prenatal U/S
• 11% boys and 8% girls have dilating VUR
• About ½ had bilateral VUR

North 2000
Grades of VUR

- 5 grades of VUR (III to V = dilating)
- Spontaneous resolution or improvement in 31-84%, particularly for unilateral or low grade VUR
Treatment for VUR

• Usually not necessary
• Surgery vs Surgery + long term antibiotics vs Long term antibiotics alone vs Endoscope (deflux) (Hodson et al Cochrane 2007)
  → Risk of UTI no different between medical and surgical group
  → Combined Rx resulted in 50% reduction in febrile UTI, but no reduction in risk of renal damage
  → 2 studies no difference between AB and no Rx
Relationship between VUR and UTI

• VUR most common abnormality in children with UTI (in 30% under 2 years)

• Associated with recurrent UTI (41% recurrent UTI vs 27% first time UTI)

• Risk highest with bilateral VUR and high grades VUR

• Children with VUR and UTI more likely to have febrile UTI

• Parenchymal damage more common bilateral, dilating VUR
Dysfunctional voiding, UTI and VUR

- Does dysfunction voiding cause secondary VUR which may result in UTI?
- Of girls with dysfunctional voiding 67% developed UTI and 20% had VUR
- In those with dysfunctional voiding and VUR, ½ had constipation, ½ had bladder instability or infrequent voiding
- Dysfunctional voiding associated with increased time to resolution or non-resolution of VUR

Koff 1998, Snodgrass 1991
Conclusion

• Bladder and bowel dysfunction can cause secondary VUR which increase the risk of UTI in children
• Recurrent pyelonephritis predispose children to permanent renal scarring, hypertension, impaired renal function and end stage renal disease
• This risk can be reduced by:
  • Appropriate diagnosis and management of UTIs
  • Treat dysfunctional voiding by addressing constipation, voiding posture and encourage regular timed voiding
References