

URINARY TRACT INFECTION IN CHILDREN

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INTRODUCTION

The management of Urinary Tract Infection (UTI) in children is currently undergoing change in the light of accumulating evidence that the widespread use of antibiotic prophylaxis and extensive radiological investigation of all children is probably unnecessary. However, the four basics of management remain unchanged:

- 1 It is an important diagnosis to make.
- 2 The urine sample obtained must be reliable and free from contamination (see accompanying article by Jo Connolly).
- 3 Immediate adequate antibiotic treatment is essential.
- 4 Detailed imaging is required in some children.

Unfortunately, experts in the field have not yet reached a consensus on the best approach. The following article attempts to give an overview of the current state of play and also highlights areas where uncertainty exists. A flow chart for a suggested management strategy is included.

WHY IS UTI IMPORTANT?

- Long term risk of renal damage especially in the presence of severe reflux which may lead to hypertension, pregnancy-induced hypertension, chronic renal failure
- Reflux nephropathy is the commonest cause of hypertension in children
- Reflux nephropathy is responsible for over 20% of renal failure in children

PRESENTATION

The younger the child the more diverse and non-specific the symptoms:

Neonate/infant: fever, poor feeding, vomiting, prolonged jaundice, failure to thrive, generalised sepsis

Child: fever, frequency, urgency, hesitancy, haematuria, enuresis, dysuria, abdominal pain, loin pain, febrile convulsion, hypertension

MAKING THE DIAGNOSIS

- Consider UTI in any febrile child particularly if there is no obvious focus of infection
- Accurate diagnosis is essential. A reliable urine specimen must be obtained prior to commencing antibiotics. This is not always an easy task! Jo Connolly's article provides excellent practical advice on how to succeed!

The cost of spurious diagnosis is considerable in terms of unnecessary, unpleasant and expensive investigations for the child, antibiotic usage, time and anxiety for the parents and out-patient and radiology resources

- Urine dipsticks are invaluable to guide the need for treatment

If leucocyte esterase and/ or nitrite dipstick is positive provisionally diagnose UTI and commence treatment whilst awaiting laboratory confirmation and sensitivities

- Culture the urine whatever the stick test result if UTI is clinically likely

LABORATORY RESULTS

- A significant result is a pure growth of more than 100,000 organisms per ml
- A mixed growth often indicates contamination and is an indication for a repeat sample
- Significant growth with minimal symptoms and no urinary white cells may indicate balanitis
- < 10 white cells per cubic mm is regarded as normal. Pyuria is common in febrile infants whatever the infective focus

TREATMENT

- Analgesics/antipyretics
- Adequate fluids
- Antibiotics

Co-amoxiclav is our current first line treatment of choice. Trimethoprim, nitrofurantoin and cefalexin are also suitable. Amoxil and ampicillin are not recommended because of high levels of resistance.

- Treat for five days
- Cranberry juice – little evidence of effectiveness in children
- Treat constipation if present as this predisposes to UTI
- General advice to parents – hygiene, cotton underwear, avoid bubble bath, bathe in fresh water after using swimming pool

PROPHYLAXIS

- Current guidelines recommend prophylaxis for all under five year olds whilst awaiting secondary care assessment/ further investigation. This should be started as soon as the treatment course is completed and parents advised to continue with it until the results of any further investigations are available
- Commonly used drugs are trimethoprim, nitrofurantoin, cefalexin
- Evidence so far indicates that prophylactic antibiotics decrease re-infection rates but may not reduce the

incidence of renal scarring, which is the very reason for giving them in the first place.

Not surprisingly, some parents are now reluctant to keep their child on long term antibiotics, as they see potential side effects, but no proven benefit.

An alternative approach, therefore, would be for the child not to be on prophylaxis, but parents to be very vigilant for symptoms suggestive of UTI, and then treat promptly, after urinalysis has been performed. For this, parents would require a supply of urine dipsticks and a sterile collecting container for a clean catch specimen, together with a supply of a suitable antibiotic for home use should the dipstick result suggest UTI. This may be more suitable for older children who are able to articulate their symptoms. Anecdotally this appears to be a popular approach with some parents. However, further research is needed to clarify this question

- Prophylaxis can be discontinued if there is no vesico ureteric reflux (VUR) or renal scarring

BREAKTHROUGH INFECTIONS ON PROPHYLAXIS

- Treat as for acute infection using different antibiotic from prophylactic agent
- Change prophylaxis if organism resistant
- Consider non-compliance if sensitive

FOLLOW-UP

- Review at 48 hrs if not improving
- Laboratory sensitivities should be available at 48 hrs to confirm whether the child is on appropriate treatment
- Some recommend re-culture on completion of treatment course to ensure eradication of infection
- Advise parents to seek advice promptly if symptoms recur. Each episode requires urine culture to confirm infection as true recurrent infections may need further investigation

REFERRAL FOR ADMISSION

- Neonates/young infants are more likely to be systemically unwell and to require intravenous antibiotics
- Toxic/unable to tolerate fluids

REFERRAL TO OUT-PATIENTS

- Under fives
- Over fives if systemically unwell with loin pain
- Known abnormality of renal tract
- Children with first degree relatives with VUR
- Recurrent UTI in selected older children (see flow chart)

REFERRAL NOT REQUIRED IF:

- Over five years with uncomplicated UTI. If renal USS and blood pressure are normal no further investigation or follow-up is required

WHAT ELSE COULD IT BE?

- Vulvovaginitis
- Threadworms
- Balanitis
- Sexual abuse
- IDDM
- Neurological problem

FURTHER INVESTIGATIONS

- The need for imaging investigations in all children with UTI is currently being questioned and guidelines may change as a result
- Renal USS: all children up to age 12 years with UTI. Looks for obstruction, anatomical defects, incomplete voiding, stones, dilatation, renal size
- DMSA (isotope scan): selected under fives with first UTI, abnormal USS, selected children with recurrent UTIs. Looks at differential renal function and renal scarring. Not done until three months after acute episode to allow resolution of transient defects
- MCUG: Infants under one year, selected older children, infants with family history of VUR in first degree relative (risk of VUR increased 20-40 times)
- MAG 3: looks for obstruction

ANTIBIOTICS

TREATMENT	PROPHYLAXIS
Augmentin-Duo 0.15 ml/kg bd 2/12-2 yrs 2.5 ml bd 2-6 yrs 5 ml bd 7-12 yrs	Trimethoprim sf suspension 2 mg/kg at night
Cefalexin 12.5 mg/kg bd	Nitrofurantoin sf suspension 1 mg/kg at night
Trimethoprim sf suspension 4 mg/kg bd	Cefalexin 12.5 mg/kg at night.
Nitrofurantoin sf suspension 750 mcg/kg qds > 3 months – 12 years of age. Avoid in renal impairment.	Remember to increase dose in line with weight gain. Parents find it helpful to have a written schedule for this.

REFERENCES

- 1 Beattie TJ. Imaging guidelines for urinary tract infection in childhood; time for change? Arch Dis Child 2004;89:398-399
- 2 Prais D. Bacterial susceptibility to oral antibiotics in community acquired urinary tract infection. Arch Dis Child 2003;88(3):215.
- 3 Royal College of Physicians. Report of working group of research unit. Guidelines for the management of acute urinary tract infection in childhood. J Roy Coll Phys London 1991; 25:36-42
- 4 PRODIGY Guidance – Urinary tract infection – children
- 5 Williams GJ. Long-term antibiotics for preventing recurrent urinary tract infection in children. Cochrane Database Syst Rev 2001(4) cd 001534
- 6 Verrier Jones K. Diagnosis and management of urinary tract infections in children under two years. Assessment of practice against published guidelines. Research Division RCPCH.

A suggested management strategy for uncomplicated UTI in children who do not require acute admission

