Updates on urinary tract infection management in young children

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This brief communication aims to alert fellow paediatricians about the recent changes in management guidelines of urinary tract infection (UTI) in young children.

The traditional concept in the 1990's was that UTI often signals an underlying urologic abnormality, especially vesicoureteral reflux (VUR) or obstructive uropathy, which would cause UTI recurrence and renal scarring, leading to long term complications such as chronic kidney disease, hypertension, or complications during pregnancy. Guidelines in that era focused on universal imaging with ultrasound and voiding cystourethrogram, and antibiotic prophylaxis for VUR.[1;2]

During the last decade, it was realized that most "renal scars" were in fact congenital dysplasia associated with gross VUR as part of the CAKUT spectrum (Congenital Anomalies of the Kidneys and Urinary Tract). Also several randomized controlled trials on antibiotic prophylaxis in children with VUR have reported conflicting results on its efficacy in preventing UTI and renal damage.[3-9] Newer UTI guidelines were released by the National Institute of Clinical Excellence (NICE)[10] from the UK in 2006, American Academy of Pediatrics (AAP)[11] in 2012, and the Italian[12] and Australian[13] Groups around the same time.

For diagnosis, most groups recommend testing for UTI in all febrile young children. Most groups recommended using clean void urine samples for urinalysis and culture, though AAP accepted only samples from catheterization or suprapubic aspiration. Confirmation of diagnosis depends on presence of symptoms, evidence of inflammation (mostly as pyuria), and significant colony counts on culture. For clean void urine, most took 10^5 CFU/ml as significant growth, though lower counts indicate probably UTI if clinically compatible.

For treatment, current guidelines recommend giving antibiotics according to local sensitivity pattern of possible uropathogens. Most often second or third generation cephalosporins or amoxicillin-clavulinic acid can be given for 7-14 days. Randomized controlled trials reported no differences between oral versus full intravenous treatment or initial intravenous with switch to oral versus full intravenous treatment, if the child can tolerate oral treatments and compliance can be ensured.

Major variations in recommendations occur in the imaging strategy after a febrile UTI. The AAP recommends only USG and follow up, and doing VCUG when USG is abnormal or UTI recurs. The NICE, Italian and Australian guidelines recommend, in addition to above, doing VCUG and DMSA scan if a patient has high risk of renal damage, as indicated by risk factors. These factors include having severe illness, septicemia, renal impairment, abdominal mass or poor urine stream on presentation, UTI due to non-E.coli pathogens, and delayed resolution of fever with appropriate antibiotics. Young age below 6 months and a family history of urological abnormalities are also considered risk factors in the NICE and Italian guideline.

In terms of preventive strategy, the AAP does not recommend routine antibiotic prophylaxis, while the NICE guidelines recommend to "consider" antibiotic prophylaxis for recurrent UTI. The Italian and Australian guidelines also recommend prophylaxis in dilating VUR or recurrent UTI.

The local UTI guideline in Hospital Authority has also been revised recently.[14] It recommends no routine VCUG or antibiotic prophylaxis. Similar to the NICE, Italian and Australian Guidelines, the HA guideline recommends VCUG if USG is abnormal or UTI recurs. It also suggests to "consider" VCUG if risk factors are present (see list of risk factors in the full guideline document). In this situation, the risk of missing significant abnormalities which needs treatment versus the potential complications of VCUG such as irradiation, urethral trauma, iatrogenic infection or sedation risks would be discussed with parents, and their preference were followed. Antibiotic prophylaxis would be "considered" in patients with grade III VUR, and "recommended" if such patients have UTI recurrence (second episode). DMSA would be

ordered for VUR of grade III or above. If such a patient has severe renal scarring on DMSA, they would be offered the option of surgical intervention such as Deflux injection after the second UTI. If a patient with gross VUR has a second recurrence (third episode) despite antibiotic prophylaxis, surgical intervention should be recommended.

Interested colleagues should refer to the original articles for the detailed recommendations which were only briefly discussed above.

Reference List

(1) American Academy of Pediatrics Committee on Quality Improvement Subcommittee on Urinary Tract Infection. Practice Parameter: The Diagnosis, Treatment, and Evaluation of the Initial Urinary Tract Infection in Febrile Infants and Young Children. Pediatrics 1999; 103(4):843-852.

(2) Jodal U, Lindberg U. Guidelines for management of children with urinary tract infection and vesico-ureteric reflux. Recommendations from a Swedish state-of-the-art conference. Acta Paediatr 1999; 88(Suppl.431):87-89.

(3) Garin EH, Olavarria F, Nieto VG, Valenciano B, Campos A, Young L. Clinical significance of primary vesicoureteral reflux and urinary antibiotic prophylaxis after acute pyelonephritis: a multicenter, randomized, controlled study. Pediatrics 2006; 117(3):626-632.

(4) Roussey-Kesler G, Gadjos V, Idres N, Horen B, Ichay L, Leclair MD et al. Antibiotic prophylaxis for the prevention of recurrent urinary tract infection in children with low grade vesicoureteral reflux: results from a prospective randomized study. J Urol 2008; 179:674-679.

(5) Pennesi M, Travan L, Peratoner L, Bordugo A, Cattaneo A, Ronfani L et al. Is antibiotic prophylaxis in children with vesicoureteral reflux effective in preventing pyelonephritis and renal scars? A randomized, controlled trial. Pediatrics 2008; 121(6):e1489-e1494.

(6) Montini G, Rigon L, Zucchetta P, Fregonese F, Toffolo A, Gobber D et al. Prophylaxis after first febrile urinary tract infection in children? A multicenter, randomized, controlled, noninferiority trial. Pediatrics 2008; 122(11):1064-1071.

(7) Craig JC, Simpson JM, Williams GJ, Lowe A, Reynolds GJ, McTaggart SJ et al. Antibiotic Prophylaxis and Recurrent Urinary Tract Infection in Children. N Engl J Med 2009; 361(18):1748-1759.

(8) Brandstrom P, Jodal U, Sillen U, Hansson S. The Swedish reflux trial: review of a randomized, controlled trial in children with dilating vesicoureteral reflux. Journal of Pediatric Urology 2011; 7:594-600.

(9) The RIVUR Trial Investigators. Antimicrobial prophylaxis for children with vesicoureteral reflux. N Engl J Med 2014; 370:2367-2376.

(10) National Collaborating Centre for Women's and Children's Health. Urinary tract infection in children. Diagnosis, treatment and long-term management. 1st ed. London: RCOG Press; 2007.

(11) Subcommittee on Urinary Tract Infection and Steering Committee on Quality Improvement and Management. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. Pediatrics 2011; 128(3):595-610.

(12) Ammenti A, Cataldi L, Chimenz R, Fanos V, La Manna A, Marra G et al. Febrile urinary tract infections in young children: recommendations for the diagnosis, treatment and follow-up. Acta Paediatr 2012; 101(5):451-457.

(13) Williams GJ, Hodson EH, Isaacs D, Craig JC. Diagnosis and management of urinary tract infection in children. J Paediatr Child Health 2012; 48(4):296-301.

(14) UTI Guideline Development Panel. Clinical Guideline on The Diagnosis and Initial Management of Urinary Tract Infections in Infants and Children aged 2 to 24 months. Hospital Authority, Hong Kong.

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