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A Brief Review of the New AAP (American Academy of Pediatrics) Guideline on Febrile Urinary Tract Infection in 2- to 24-month infants.

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In recent years, based on controversial issues regarding the diagnosis, treatment and follow up in patients with febrile urinary tract infection (UTI), various investigations have been performed and conventional methods have been modified. Hence, American Academy of Pediatrics (AAP 1999 and 2011) and National Institute for Health and Clinical Excellence (NICE 2007) designed guidelines to justify a method for diagnosis, treatment and follow- up of UTI.
The current revised version (AAP 2011) has important changes in approaching febrile UTI in 2- to 24-month infants such as the necessity of performing urinalysis and urine culture, revised sampling methods, modified treatment methods (parenteral or oral therapy), radiological follow-up, and finally antibiotic administration.
The aim of this study was to summarize the recent AAP guideline (2011) and present a simpler algorithm.

Keywords: Urinary Tract Infections; Infants; Child; Vesico-Ureteral Reflux

Running Title: New UTI Guideline

Introduction

Symptoms and signs of UTI during infancy are unspecified and only the urine specimen could be reliable for the diagnosis if performed by invasive methods such as suprapubic aspiration (SPA) and catheterization. However, these methods could cause delayed treatment and consequently renal damage; therefore, this new guideline was published after American Academy of Pediatrics and National Institute for Health and Clinical Excellence guidelines ((AAP 1999 and NICE 2007) and has been recommended to be used for 2- to 24-month febrile infants with no apparent source of infection. It consists of 7 action statements which are summarized below.

Action Statement 1

If a clinician decides that there is an urgent need for antibiotic therapy in a febrile infant with no apparent source of infection (FWS), they should first obtain a urine specimen for culture through SPA or catheterization, because obtaining the

urine specimen by clean catch and urine bags has a high rate of false positive results which may wrongly result in an urgent need for treatment and invasive imaging.

Action Statement 2

If a clinician decides that there is no urgent need for antibiotic therapy in a FWS infant (2-24 months of age), the likelihood of UTI should be assessed.

Although the likelihood of UTI in FWS infants has been reported approximately 5%, it is possible to identify groups with higher or lower than the average likelihood. Furthermore, the likelihood of UTI in all uncircumcised febrile boys is high. The following Figure demonstrates the assessment of likelihood regarding gender. (Figure 1)

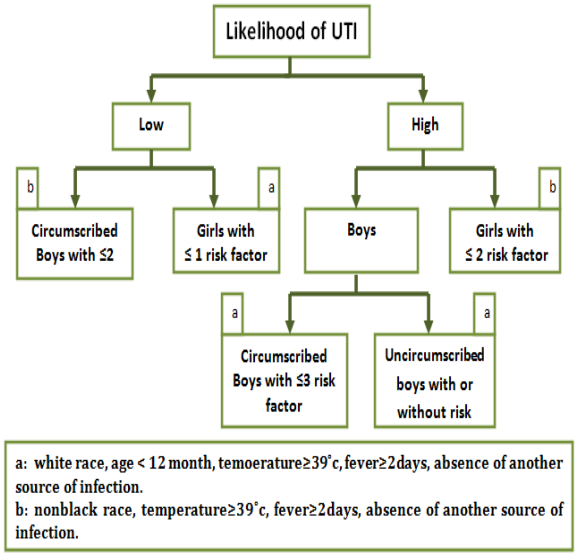

Figure 1. Likelihood of UTI

Action Statement 2a

If the assessment shown above reveals the low likelihood of UTI, monitoring and follow- up without urinalysis are recommended.

Action Statement 2b

Two approaches exist if the clinician suspects a high likelihood.

1. Obtaining a urine specimen through SPA or catheterization for urine culture (U/C) and urinalysis (U/A).

2. Obtaining a urine specimen by a convenient method and evaluating its results including a positive nitrite test or leukocyte esterase or positive microscopy for leukocytes or bacteria. Also, SPA or catheterization should be performed.

As UTI can occur in a child with a low likelihood, it is strongly recommended that the clinical course should be considered in FWS children in whom antibiotic therapy is not initiated.

Action Statement 3

The final diagnosis of UTI should be made by U/A and more than 50,000 colony forming units (CFU) per ml uropathogenic bacterial growth in SPA and catheterization culture.

Nitrite test

This test is a standard component of a urinary test strip, but it is not a sensitive marker because children empty their bladder frequently. Although positive test results are highly specific, negative results have no significant value in ruling out UTI.

Leukocyte esterase test

It is a urine test for the presence of white blood cells and other abnormalities associated with infection. Since false positive results are common, positive test results generally recommend caution. However, the combination of this test with the urinary nitrite test provides an excellent screen for the presence of UTI.

In addition, urine specimens with positive leukocyte esterase and nitrite tests should be cultured for pathogenic bacteria.

Microscopic analysis of bacteriuria

The existence of bacteria in a fresh gram stained specimen of uncentrifuged urine is consistent with 10^5 CFUs per ml in U/C. Combining these methods could reveal great sensitivity, specificity, and positive predictive value in comparison with routine U/A.

Automated urinalysis

As automated urinalysis methods correlate well with manual methods, they are being used in the diagnosis of UTI. They can identify red blood cells, WBCs, and squamous epithelial cells and could be an appropriate alternate for U/A in future.

Culture

The number of CFUs in U/C can indicate positive or negative results. Hence, more than 10^5 CFUs in the urine culture could be diagnostic of UTI.

Management

Action statement 4

Action Statement 4 a

In patients with an urgent need for drug administration, the clinician should justify two considerations:

1. The route of administration: initiating treatment with oral or parenteral route does not differ.

2. Topical drug sensitivity: Treatment should be initiated based on topical antibiotic sensitivity and be justified according to the antibiogram.

Action Statement 4b

The aim of treatment in acute UTI is to treat acute infection and prevent complications and renal scar. Children can often be treated by oral drug therapy, but if the patients develop toxicity or cannot tolerate oral therapy, parenteral therapy should be initiated.

If parenteral therapy is initiated, it could be altered to oral therapy during 24-48 hours.

The most important factor in drug selection is local antibiotic sensitivity. This guideline recommends drugs for oral treatment which include Cephalosporins, Amoxicillin clavulanate, Trimethoprim- Sulfamethoxazole.

Furthermore, due to the lack of appropriate serum levels, administering nitrofurantoine is not recommended.

Moreover, 7-14 days are sufficient for administering drugs, which is recommended not to be less than 7 days.

Action statement 5

FWS children need renal-bladder ultrasound (RBUS) to assess the parenchymal renal size (for monitoring) and urologic disorder (for obstruction, Hydronephrosis, scar, bladder anomaly and hydroureter).

In unusual clinical cases, the assessment of renal and pre-renal abscess should be performed during 2 days of treatment. However, if the clinical course is normal, it is not required to be performed for 48 hours.

Action statement 6

Action statement 6 a

Clinicians should not perform VCUG after the first febrile UTI. However, it is recommended if RBUS demonstrates hydronephrosis, scarring, atypical or complex clinical circumstances and obstructive uropathy.

Action statement 6 b

In recurrent cases of febrile UTI, Further evaluation such as performing VCUG is recommended. Although, VCUG is an invasive and costly procedure with radiation, its advantages are more than its disadvantages in high grade reflux.

Action statement 7

Good communication between the parents and the caregivers is essential. As parents are those who detect and identify children with an urgent need for treatment, clinicians should ensure that parents could recognize symptoms appropriately within 48 hours and should provide appropriate advice to promote their information to detect recurrent UTI rapidly (Figure 2,3).

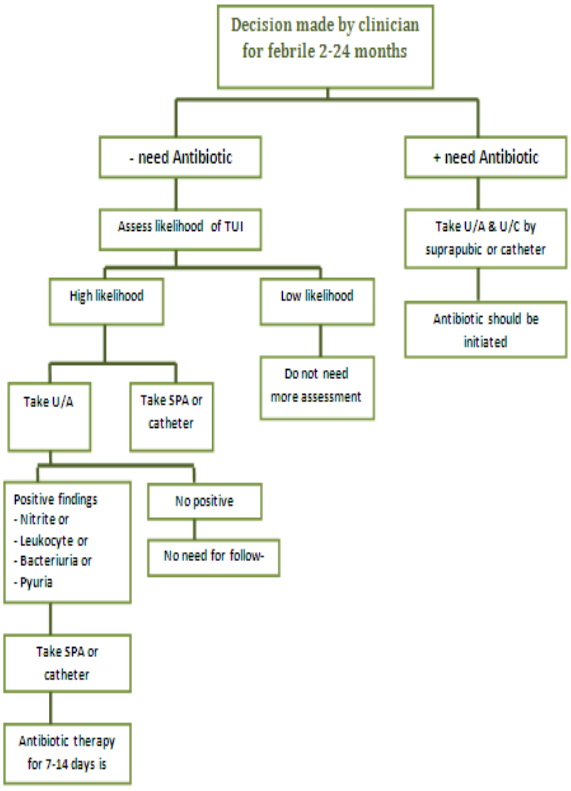

Figure 2. Decision made by clinician for febrile 2-24 month

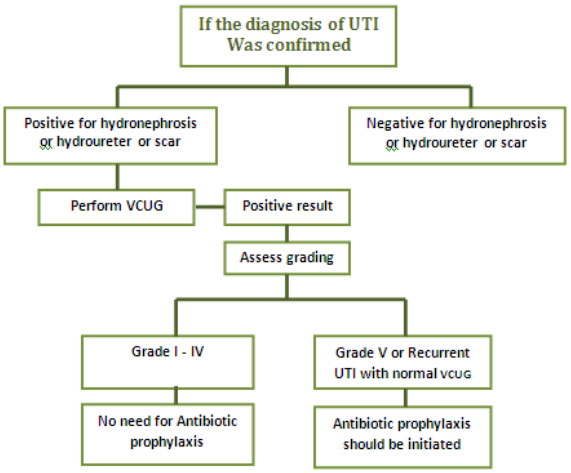

Figure 3. Confirmed UTI

Conclusions

This revised guideline has been developed for proper detection, appropriate diagnosis, and prompt treatment of UTI in febrile infants with no apparent source of infection. It seems that clinicians could use this guideline and adjust the 7 action statements mentioned earlier to promote the patients' health. Regarding the recommendations, although they suggest no more imaging in children with the first febrile UTI and consider VCUG as an invasive method, clinicians should consider urgent VCUG in recurrent UTI, perform further investigations in recurrent infections, and prescribe antibiotic for 7-14 days after diagnosis.

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