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Imaging Febrile Urinary Tract Infections in Children: Great Clinical Gain may be obtained at a Low Cost

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Urinary Tract Infection

Urinary Tract Infections (UTI), i.e "the growth of at least $5x10^4$ colony forming units of bacteria in a clean urine specimen" [1] are a common problem in childhood. They can have variable clinical presentation, but dividing them in febrile (f-UTI) and non-febrile, is a rough but practical way.

The need for imaging in children with f-UTIs is debated, in the search for a balance between reducing hospitalization, cost and irradiation but nevertheless minimizing renal damage. Different guidelines have been recently published [1-3].

One of the most "hot topic" is the best use of radionuclide imaging. It is beyond any doubt that Ultrasound (US) is an unreliable method for identifying either acute or chronic renal damage [4,5], whilst, on the contrary, cortical renal scintigraphy (CRS) with Dimercapto-succinic Acid (DMSA) is so highly accurate [6] that it is considered actually the clinical gold standard, as confirmed by all guidelines published [1-3].

Another way to look at f-UTI then arouse, first foresaw by Hansson and coworkers [7]: To perform a CRS during the acute phase of the infection and then searching for vesicoureteral reflux (VUR) only in children with renal damage. This strategy was named "Top-Down", taking care of upper urinary tract (TOP) before the lower one (DOWN), and received the endorsement of the European Society of Paediatric Radiology [8].

The most feared drawbacks against this use of CRS are an increase in costs and radiation burden.

A paper recently published by La Scola et al [9] reviewed these aspects, and found that the top-down effectively implies a higher cost and radiation burden. This increase, on the other hand, is very limited. The cost in fact is calculated about 88-172 euros pro-patient, very small in comparison to the mean cost of one day of hospital staying or the expenses in case of relapse of f-UTI. The radiation burden is below 1 mSv [10], i.e. less than half the yearly natural background. This low cost offers us the greater gain of maximizing the detection of renal damage, a definite flaw of the published guidelines. The above mentioned review in fact, notes that the National Institute for Clinical Excellence Guidelines allow to identify only 38% of patients with acquired renal damage, the American Academy of Pediatrics none (!), the Italian Society of Paediatric Nephrology 47%. Very poor figures compared to the round 100% of the top-down….

So, the "top-down" approach in children with normal US, definitely improves the identification of children at risk for renal damage [11-13]. A normal CRS during the acute phase of UTI allows to safely dismiss the child without programming further investigation(s) as outpatient. On the contrary, in case of true acute pyelonephritis, investigation for VUR can be scheduled without waiting for a relapse. A first paper lends further support to this approach. Suson & Mathews [14], retrospectively analysing the clinical application of the AAP guidelines to a population of children with the first episode of f-UTI, found that one third of those with abnormal renal scan has a normal US and 62% had an undiagnosed grade 3 or more VUR.

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