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Clinical Studies : Images in Nephrology

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What did we find from imaging studies in childhood UTI and which studies are mandatory?

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Background: Changes to the guidelines for childhood urinary tract infection (UTI) management were introduced recently from two developed countries. These changes are related to the indications for performing imaging studies and result in a significant difference to patient management. Conditions in developing countries are not the same as in developed countries, however, and it is not clear whether or not it would be appropriate to apply these changes to institutions in developing countries. the objectives of this study is to evaluate the imaging results of childhood UTI in a developing country setting, and examine if it would be appropriate to apply the recent guideline changes regarding imaging studies as routine practice in Thailand.

Methods: Medical records of children aged 0-15 years who had UTI and were admitted at the Department of Pediatrics, Prince of Songkla University from January 2004 - December 2013 were reviewed. Renal ultrasound (RUS), cystogram and ^{99m}Tc dimercaptosuccinic acid (DMSA) renal scan results to determine congenital anomalies of the kidney and urinary tract (CAKUT) and renal damage were evaluated. Mild CAKUT was defined as primary VUR grades I-III or isolated hydronephrosis and all other abnormalities were defined as severe CAKUT.

Results: 142 boys and 129 girls had at least one imaging study after UTI. Their median (IQR) age was 1.0 (0.5 - 2.7) year; 0.7 and 1.4 years for boys and girls, respectively (p=0.006). 262 children had an RUS performed, of which 99 (37.8%) were abnormal.

Cystograms were performed in 221 children, of which 83 (37.6%) CAKUTs were detected; 69 primary VURs, 3 posterior urethral valves, 5 neurogenic bladders with VUR and 4 duplex kidneys and 2 urinary tract fistulas.

108 children had a DMSA performed, of which 53 (49.1%) were abnormal, including 30 scarred kidneys, 14 dysplastic kidneys, 4 with dysplasia and scarring in the contralateral kidney, 2 enlarged kidneys, 2 with generalized decreased uptake in one kidney and 1 with a non-functional kidney.

Overall, CAKUTs were detected in 148 (54.6%) children of which 43 were severe and 105 were mild. RUS together with cystogram provided higher sensitivity (100% vs 88.9%) and specificity (53.8% vs 42.4%) to detect severe CAKUT than RUS together with DMSA.

Conclusion: A CAKUT was detected in more than half of the children with first UTI, with one third having severe CAKUT. There is no single optimal imaging study guideline after first UTI, as patient settings and resources vary widely.

Keywords: children, hydronephrosis, renal damage, urinary tract infection