

Urinary Tract Imaging in Children Post UTI

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Urinary Tract Infections (UTI) are common in children and radiologic imaging of the urinary tract is important to exclude structural abnormalities¹. Numerous international guidelines exist although follow-up imaging recommendations vary. These include repeat renal ultrasound (RUSS), Micturating cystourethrogram (MCUG) and/or Dimercaptosuccinic acid scintigraphy (DMSA)²⁻⁴. The aim of this study was to review the radiologic imaging of children presenting with UTI and examine whether our data supports follow-up imaging as recommended in the guidelines.

A retrospective chart review of all children admitted with UTI over a two-year period was conducted. UTI was defined as a child with typical symptoms and a pure growth of an organism with a colony count $>10^5$ on mid-stream urine culture.⁴ Atypical and recurrent UTI were defined as per NICE guidelines.²

A total of 241 cases were reviewed, mean (SD) age 25.19 (34.78) months. In these 241 patients, 217 (90 %) had UTI due to *Escherichia coli* and 47 (19.5%) had recurrent UTI. Acute RUSS was reported normal in 173/241 (71.8%), pyelonephritis was identified in 21 (8.7%) and other abnormalities in 39 (16.2%). Of 241 patients, 170 underwent follow-up RUSS, which was reported normal in 136 (80%) and abnormal in 34 (20%). DMSA was performed in 63 patients, of whom 46 (73%) and 17 (27%) experienced normal and abnormal DMSA, respectively. Moreover, 27 had MCUG, which was normal in 9 (33%) and abnormal in 18 patients (67%).

A significant association was observed between recurrent UTI and abnormal DMSA or MCUG in all age groups (p-value 0.01 and 0.03, respectively). Moreover, atypical UTI has an impact on the abnormal DMSA or MCUG in patients aged $<$ two years (p-value 0.02 or 0.04, respectively), however the number of patients aged more than two years with atypical UTI was too small to draw a conclusion. A link was observed between the results of acute RUSS and DMSA or MCUG results. A total of 55 patients had both an acute RUSS and follow-up DMSA, these were reported as abnormal in 27/55 (49.1%) and 12/55 (21.8%), respectively. Of 12 patients with abnormal DMSA findings, 8 (66.7%) also had an abnormal acute RUSS, with a statistically significant association between abnormal acute RUSS and abnormal DMSA (p-value 0.006).

A total of 27 patients had both an acute RUSS and follow-up MCUG, these were reported abnormal in 21/27 (77.8%) and 18/27 (66.7%), respectively. Of these 18 patients with abnormal MCUG findings, 17 had an abnormal acute RUSS, with a statistically significant association between abnormal acute RUSS and abnormal MCUG (p-value 0.011). Notably, the patients' age, gender or length of stay has no impact on radiological imaging abnormalities (p value >0.05).

In children with UTI, follow-up imaging is important to identify those with renal scarring and/or VUR, particularly in children with recurrent or atypical UTIs and in those with abnormal RUSS. These results highlight the importance of following current guidelines regarding renal tract imaging following UTI in children.

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