

ROLE OF THE DIMERCAPTO SUCCINIC ACID (DMSA) SCAN IN THE MANAGEMENT OF URINARY TRACT INFECTIONS IN CHILDREN

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Urinary tract infection (UTI) during childhood can lead to renal scarring and subsequent deterioration of renal functions. Children ≤ 5 years are more susceptible to renal damage if UTI is not diagnosed early and treated promptly. Different imaging modalities are available to detect urinary tract abnormalities predisposing UTI. Although Ultrasound scan (USS) is the first line investigation, Technetium 99m labeled DMSA scan is the most sensitive form of imaging to assess the function of the renal parenchyma. However, widely available USS facilities and minimum exposure to radiation of the child compel clinicians to perform USSs rather than DMSA scans. When the USS is normal, a DMSA scan is usually not requested. The aim of this study is to compare the USS and DMSA scan findings of children who presented with febrile UTI in order to assess the value of DMSA scan in the management of childhood UTI.

This study was carried out at the Nuclear Medicine Unit, University of Peradeniya, using the database of 723 patients referred for DMSA scintigraphy during January 2012 - June 2013. Children aged ≤ 5 years, who had culture positive febrile UTI referred for DMSA scan were selected. DMSA scans were done at 3 months or later after the first episode of culture proven UTI. At least one USS report was available at the time of DMSA scan. Children with USS evidence of congenital renal anomalies were excluded. Chi-square test was employed to compare USS and DMSA scan findings and p value < 0.001 was considered as significant. The sensitivity and specificity of DMSA scan for the detection of renal abnormalities were calculated. Positive predictive value (PPV) and negative predictive values (NPV) of USS were also calculated considering DMSA scan as the reference imaging method.

Out of a total of 723 patients who had DMSA scans during this period, 255 children fulfilled the inclusion criteria. The total number of kidneys studied was 510. There were 150 (58.8%) males and 105 (41.2%) females, with the mean age of 32.62 months (range 2- 60 months). The mean ages of boys and girls were 32.3 ± 15.7 months and 33.09 ± 15.5 months, respectively. Abnormal USS results were found in 65 (12.74%) kidneys which included 35 (53.85%) left kidneys and 30 (46.15%) right kidneys. Abnormal DMSA results indicating cortical scarring were found in 100 kidneys (19.60%) which included 50 left kidneys and 50 right kidneys. When comparing USS and DMSA findings of each kidney; 70 kidneys (13.72%) with normal USS results gave abnormal DMSA findings showing renal cortical scarring. This study shows a significant difference between USS and DMSA scan findings of children with UTI for detecting renal cortical abnormalities (p value < 0.001). DMSA scan showed a high sensitivity (91.46%) and a low specificity (30%) for the detection of renal abnormalities. Furthermore USS showed PPV of 84.27% and NPV of 53.85%. DMSA scan is justified for children less ≤ 5 years presenting with culture positive UTI, irrespective of normal USS findings.