Validation of IAEA Software Package for the Analysis of Scintigraphic Renal Dynamic Studies: Parameters of Renal Transit in Children With Renal Pelvic Dilatation

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References:


Abstract:

PURPOSE:
The objectives of the study were to use the International Atomic Energy Agency (IAEA) software package for the analysis of scintigraphic renal dynamic studies to obtain values of curve parameters and excretory parameters in children with hydronephrosis and to validate the reliability of these numerical outputs by comparing with values established by consensus reports.

PATIENTS AND METHODS:
Fifty children with hydronephrosis (median age, 16 months; 30 boys, 20 girls; 99 kidneys) underwent Tc-MAG3 diuresis renography. Studies were analyzed by 2 observers, and according to the assessment of images, renograms, and differential function, kidneys were classified as normal (42, kidneys contralateral to hydronephrotic kidney), hypotonic unobstructed (49), and obstructed (8). The IAEA software was applied to each renogram. The parameters analyzed were as follows: normalized residual activity at 20 minutes (NORA 20) and on postmicturition (PM) acquisition, output efficiency at 20 minute (OE 20), PM to maximum renal count ratio (PM/max), and mean transit time (MTT).

RESULTS:
Mean values for normal, hypotonic unobstructed, and obstructed kidneys were as follows: NORA 20: 0.25, 0.57, and 2.16; OE 20 (%): 94.5, 87, and 57; normalized residual activity on PM acquisition: 0.02, 0.03, and 0.27; PM/max: 0.01, 0.02, and 0.13; and MTT (minutes): 1.9, 3.5, and 8.9, respectively. Difference between obstruction/dilatation and normal/dilatation was significant (P &lt; 0.0001), as well as the correlation between NORA 20/OE 20 (R = -0.982). Cutoff values to predict obstruction were as follows: NORA 20, 1.6; OE 20, 73%; NORA PM, 0.11; PM/max, 0.06; and MTT, 8.23 minutes.

CONCLUSIONS:
The IAEA software package gives reliable values of numerical parameters of renal excretion. The use of the software improves diagnostic accuracy of diuresis renography in children.

Keywords: