Summary

Evaluation of ^{99m}Tc-MAG$_3$ (Mercaptoacetyltriglycine) Renography for Pediatric Patients

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It is difficult to evaluate renal function with ^{99m}Tc-MAG$_3$ renography in both adult and pediatric patients. We examined 109 pediatric patients with various renal diseases using ^{99m}Tc-MAG$_3$ renography. Tenal diseases were classified as follows: 9 vesicoureteral reflux, 4 ureteropelvic junctional stenosis, 3 double pelvis, 23 hydronephrosis, 4 glomerulonephritis, 4 nephrotic syndrome, 24 hemolytic uremic syndrome, 10 others; and 24 patients without abnormal findings on other examinations. After hydration and sedation, 100–200 MBq of ^{99m}Te-MAG$_3$ was injected intravenously. All patients were placed in the supine position, and dynamic data acquisition at 12 sec/frame$\times$100 frames was performed from the back. The renograms were prepared with the ROIs (regions of interest) set to include the entire kidney. Tmax and T1/2 of renograms were measured for 26 kidneys with no abnormal findings. The correlations between Tmax or T1/2 and age (days after birth) were determined by a linear or logarithmic function. The logarithmic function ($Y=7.49-0.56\ \log_e X$, $r^2=0.134$) yielded a higher correlation than did the linear function ($Y=5.16-0.00194X$, $r^2=0.089$) between Tmax and age. For T1/2 and age (days after birth), the linear function ($Y=8.07-0.00451X$, $r^2=0.222$) yielded a higher correlation than the logarithmic function ($Y=11.9-0.986\ \log_e X$, $r^2=0.192$). Our findings suggest that prolonged Tmax is normalized more rapidly than T1/2 after birth in infants. A delayed excretion phase is not suggestive of renal dysfunction, but is characteristic of renograms in pediatric patients. Abnormality was detected in all patients with hydronephrosis using ^{99m}Tc-MAG$_3$ renography. On the other hand, a quantitative study was required because renography detected no abnormality for some of patients with disorders of renal parenchyma.

Key words: ^{99m}Tc-MAG$_3$, Renogram, Pediatrics, Tmax, T1/2.