ORIGINAL ARTICLE

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Influence of hydration status in normal subjects: fractional analysis of parameters of Tc-99m DTPA and Tc-99m MAG_3 renography

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Rationale and Objectives: The purpose of this study was to evaluate the influence of hydration status upon renogram patterns and renal physiological parameters and clarify the differences between DTPA and MAG_3 studies in normal volunteers. ***Material and Methods:*** The study populations were 22 kidneys of 11 volunteers with no history of hypertension or renal disease with normal serum creatinine levels. They were 6 men and 5 women aged from 24 to 48 yrs (mean age: 33.4 yrs). Renal scintigraphies with both 185 MBq (5 mCi) of Tc-99m DTPA and Tc-99m MAG_3 were performed after dehydration (urine specific gravity > 1.025) and adequate hydration (urine specific gravity < 1.010) in each subject at least with a 5–7-day interval. Renograms were generated from the whole kidney and cortical ROIs. We analyzed the clearance, renogram pattern, mean transit time, time to maximum activity, time from maximum activity to half activity, and residual cortical activity. Paired t-test and Wilcoxon signed rank test were used as statistical analysis methods. Statistical analysis was considered significant at $p < 0.05$. ***Results:*** In the dehydrated state, with Tc-99m DTPA and whole kidney ROI, parameters such as time to maximum activity, time from maximum activity to half activity, residual cortical activity, and mean transit time were delayed as compared to parameters in the adequately hydrated state, but the clearance was not changed. With the cortical ROI, the changes of parameters due to dehydration were partially offset. There were insignificant differences between most parameters of Tc-99m DTPA and Tc-99m MAG_3 with the whole kidney and cortical ROIs. ***Conclusions:*** Dehydration may bring about a false positive curve pattern on renograms which can be prevented or minimized by using the cortical ROI. There were insignificant differences between most parameters of Tc-99m DTPA and Tc-99m MAG_3.

Key words: renal scintigraphy, hydration, dehydration, DTPA, MAG_3