The Value of MAG3 Clearance in Monitoring Renal Function: A Prospective Comparative Study Between Camera-Based Tc-99m MAG3 Clearance and Creatinine Clearance

Raghuveer Halkar, MD*, Andrew Taylor, MD*, Amita Manatunga, PhD$, Muta M. Issa, MD, MBA#, Samuel E Myrick, MD#, Sandra Grant, CNMT* and Neeta V. Shenvi, MS$

Departments of Radiology*, Urology# and Biostatistics$, Emory University School of Medicine, Atlanta, GA and the Veterans Administration Medical Center, Atlanta, GA

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ABSTRACT

Objectives: To determine the value and limitations of Tc-99m MAG3 clearance measurements obtained using a gamma camera (camera-based MAG3 clearance), a prospective study was conducted to evaluate the reproducibility of the camera-based MAG3 clearance compared to that of the conventional creatinine clearance.

Materials and Methods: Twenty-four male patients with stable renal function entered the study; the mean age was 66.5 ± 7.9 years and the mean serum creatinine was 1.38 ± 0.57 mg/dL. MAG3 renal scans and 24-hour creatinine clearance measurements were performed 11 ± 8 days apart. A camera-based MAG3 clearance was obtained at the time of each MAG3 scan; no blood samples were required. Bland-Altman plots were constructed to assist in data analysis.

Results: The Pearson correlation for the first and second camera-based MAG3 clearances (means of 151 vs 158 mL/min/1.73m², respectively) was 0.965 compared to 0.729 for the two creatinine clearance measurements (means of 62 vs 72 mL/min/1.73m², respectively). Even with the omission of two outliers, the creatinine clearance would have to change by 58.2% compared to the baseline measurement before the clinician could be confident the change exceeded the error of measurement; in contrast, the change required for the camera-based MAG3 clearance was 30.8%.

Conclusion: This study demonstrates that MAG3 clearance obtained using a camera-based technique shows greater precision than the conventional creatinine clearance and is superior to the creatinine clearance for monitoring changes in renal function.