

Assessment of the optimal time interval and background region of interest in the measurement of differential renal function in Tc-99m-EC renography

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Background: Differential renal function (DRF) measurements are routinely corrected for background, which mainly affects the reproducibility and accuracy of the measurement. The present study was conducted to identify the most appropriate background ROI and optimal time interval in the calculation of DRF for EC renography. **Materials and Methods:** Nineteen patients were studied. For determination of DRF in EC renography, the selected time intervals were 0.5–1.5; 0.5–2; 1–2; 1.5–2.5; 2–3 min, and the background ROI types were inferolateral crescent, lateral crescent, and perirenal shaped. The reference DRF was obtained through DMSA study. For low functioning kidney of each patient, relative uptake differences between the DMSA and EC scans were calculated. Then, the mean differences and the standard deviations were found. **Results:** The highest correlation was between the DRF values obtained using inferolateral background ROI in 0.5–2 minutes of EC scintigraphy and the DRF values obtained through posterior DMSA images ($r = 0.9889$). However, there were no statistically significant differences between the mean DRF values obtained for each time interval with each ROI type ($p > 0.05$). For all the time intervals and background ROIs, the mean of the differences was $<0.9\%$. In conclusion, in obtaining comparable DRF values from EC and DMSA studies, none of the background types proved superior. Also our research for optimal time interval showed that EC scintigraphy underestimates the DRF when compared to DRF obtained from DMSA study. The DRF has a tendency to decrease as the later time intervals are used. The time intervals less than 2.5 minutes show lower underestimation of DRF values.

Key words: differential renal function, renal scintigraphy, Tc-99m-EC