

Thesis Title	Estimation of Glomerular Filtration Rate Using Gamma Camera Method
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Date of Graduation	30 April B.E. 2540 (1997)

ABSTRACT

The evaluation of glomerular filtration rate (GFR) using single injection with multiple blood samples method (plasma clearance) was a standard and reliable but complicated method and not suitable for routine clinical use. Alternatively, GFR can be determined by gamma camera method with several advantages. GFR by gamma camera is simple, no blood samples or urine samples are needed, separate renal function can be determined, etc.

The GFR by gamma camera uptake index method was compared with the GFR by single injection with multiple blood samples method as a gold standard in 7 normal volunteers and 40 subjects with glomerulonephritis disease. The influencing factors of gamma camera method were studied i.e. the size of region of interest (ROI) over heart, the extra-renal background subtraction, the effect of time delay adjustment between peak time of heart and kidney, the inter and intra operator's bias. Results were also compared with those of Gates' method.

The best results can be achieved by using 10% threshold of boundary to maximum count of ROI over heart with extra-renal background subtraction with correlation coefficient (r) and standard error of estimation ($s_{x,y}$) of 0.9136 and 13.0819 ml/min respectively. Time delay adjustment has no effect on GFR calculation (the p value of a paired t -test was 0.53). The intra operator's bias was low. ($\%CV < 5\%$) but the inter operator's bias was high with $\%CV > 5\%$. Correlation coefficient and standard error of estimation of uptake index were better than Gates' method ($r = 0.7191$, $s_{x,y} = 23.8755$).

In conclusion, the estimation of GFR using gamma camera method was reliable, accurate and suitable for clinical practice.