

## Summary

### **<sup>99m</sup>Tc-GSA Dynamic SPECT for Regional Hepatic Functional Reserve Estimation: Assessment of Quantification**

Eui-Hyo HWANG

*Department of Nuclear Medicine, Kanazawa University School of Medicine*

For the estimation of regional hepatic functional reserve, we produced a three-dimensional hepatic functional mapping method employing <sup>99m</sup>Tc-GSA dynamic SPECT. In this analyzing protocol, we applied Patlak plot for the estimation of the liver uptake parameter of GSA, which is named hepatic GSA clearance, because it is relatively simple and suitable for matrix by matrix analysis.

In this study, we assessed the physiological implication of estimated parameters and the clinical value of this analyzing method for hepatic functional reserve estimation. After venous injection of 185 MBq of GSA (3 mg), fifteen sequential sets of SPECT data were acquired for 15 minutes. First 5 sets (minutes) SPECT images were analyzed by Patlak plot and hepatic GSA clearance (ml/min) was obtained in each matrix. The sum of hepatic GSA clearance in each matrix (total hepatic GSA clearance) was calculated as an index of whole liver functional reserve. Total hepatic GSA clearance was compared with receptor index or effective blood flow (EHBF) of whole liver which were analyzed by Direct Integral Linear Least Square Regression (DILS) method for the assessment

of the physiological implications of hepatic GSA clearance. The clinical value of total hepatic GSA clearance was assessed in comparisons with the conventional hepatic function test.

A very good correlations were observed between total hepatic GSA clearance and receptor index ( $r = 0.935$ ,  $p < 0.0001$ ,  $n = 49$ ), whereas the correlations between total hepatic GSA clearance and EHBF were not significant.

Significant correlations were also observed between total hepatic GSA clearance and the conventional hepatic function tests, such as choline esterase ( $r = 0.517$ ,  $p = 0.0001$ ,  $n = 47$ ), albumin ( $r = 0.612$ ,  $p < 0.0001$ ,  $n = 49$ ), hepaplastin test ( $r = 0.539$ ,  $p < 0.0001$ ,  $n = 47$ ), ICG R15 ( $r = -0.616$ ,  $p < 0.0001$ ,  $n = 37$ ).

These results suggested that hepatic GSA clearance strongly reflects hepatic receptor function and this parameter seemed to be useful for the hepatic functional reserve estimation.

**Key words:** <sup>99m</sup>Tc-GSA dynamic SPECT, Patlak plot, Regional hepatic functional reserve.