Summary

A New Method for Pharmacokinetic Analysis of ^{99m}Tc-GSA Using Two-Compartment and Two-Parameter Model

Yoko NOMURA*, Katsuhito YAMASAKI***, Setu SAKAMOTO*, Naoko HAYASI*, Kayo HOSAKA*, Kazuhito FUKUSIMA*, Kazuro SUGIMURA*, Hiderou SAKAI** and Hidehito NAGAI**

**Department of Radiology, Kobe University School of Medicine*
***Section of Radiology, Kakogawa National Hospital*
****Japan Synchrotron Radiation Research Institute*

Technetium-99m-diethylenetriaminepentaacetic acid-galactosyl-human serum albumin (^{99m}Tc-GSA) is a liver scintigraphy agent which binds to asialoglycoprotein receptor in hepatocyte. Twenty-six patients with liver dysfunction were examined with ^{99m}Tc-GSA liver scintigraphy using two-compartment and two-parameter model (2C2P model). The ^{99m}Tc-GSA was assumed to move within two compartments (whole blood and liver). k1 and k2 were parameters which represented transfer rate constant from blood to liver, and from liver to blood, respectively. Two differential equations based on 2C2P model were integrated, so that k1, k2, k1/k2 and VLmg were estimated from the time-activity curves of the heart and liver. VLmg was computed as maximum amount of ^{99m}Tc-GSA binding to liver. The results were compared with the liver function tests and the conventional ^{99m}Tc-GSA indices: HH15, LHL15, and LU15. k1/k2 and VLmg values had positive correlation with the result of the serum liver function tests, Plt., T.Bil., ChE, GOT, LDH, ALP and γGTP. It is concluded that this new method using 2C2P model is not invasive and simplest in the ^{99m}Tc-GSA liver scintigraphies, and may be useful in evaluating liver function.

Key words: ^{99m}Tc-GSA, Two-compartment and two-parameter model, Liver scintigraphy, Evaluation of liver function, Pharmacokinetic analysis.