Validation of curve-fitting method for blood retention of $^{99m}$Tc-GSA: Comparison with blood sampling method

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We investigated a curve-fitting method for the rate of blood retention of $^{99m}$Tc-galactosyl serum albumin (GSA) as a substitute for the blood sampling method. Seven healthy volunteers and 27 patients with liver disease underwent $^{99m}$Tc-GSA scanning. After normalization of the y-intercept as 100 percent, a biexponential regression curve for the precordial time-activity curve provided the percent injected dose (%ID) of $^{99m}$Tc-GSA in the blood without blood sampling. The discrepancy between %ID obtained by the curve-fitting method and that by the multiple blood samples was minimal in normal volunteers 3.1 ± 2.1% (mean ± standard deviation, n = 77 sampling). Slightly greater discrepancy was observed in patients with liver disease (7.5 ± 6.1%, n = 135 sampling). The %ID at 15 min after injection obtained from the fitted curve was significantly greater in patients with liver cirrhosis than in the controls (53.2 ± 11.6%, n = 13; vs. 31.9 ± 2.8%, n = 7, p < 0.0001). There was a highly linear correlation between the %IDs of $^{99m}$Tc-GSA and the plasma retention rate for indocyanine green (r = −0.869, p < 0.0001, n = 27). These results indicate that the curve-fitting method provides an accurate %ID of $^{99m}$Tc-GSA and could be a substitute for the blood sampling method.

Key words: $^{99m}$Tc-galactosyl serum albumin, asialoglycoprotein, blood retention rate, curve fit