

Summary

^{99m}Tc-GSA Dynamic SPECT for Regional Hepatic Functional Reserve Estimation: Assessment of Clinical Value for Hepatic Resection

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We assessed the clinical value of three-dimensional functional mapping method employing GSA dynamic SPECT for the estimation of residual hepatic functional reserve before hepatic resection.

Seventy-two consecutive patients of liver tumor were recruited in this study. Thirty-seven underwent segmentectomy or lobectomy and 35 did subsegmentectomy. GSA studies were carried out in all 72 patients before operation. Postoperative studies were performed in 70 patients about 1 month after operation, and 2 patients died of postoperative hepatic failure early after operation. In the preoperative study, liver functional images were divided into 4 segments according to liver anatomy and segmental GSA clearance was analyzed. The sum of GSA clearance of the segments immune from resection were calculated as predicted residual GSA clearance.

Two patients who showed poor predicted residual hepatic GSA clearance died of postoperative hepatic failure within two months after operation (extended right lobectomy).

There were good correlations between pre- and postoperative total liver clearance in patients underwent subsegmentectomy ($r = 0.900$, $p < 0.0001$, $n =$

35), and between predicted residual clearance and postoperative total clearance in patients underwent segmentectomy or lobectomy ($r = 0.799$, $p < 0.0001$, $n = 35$).

After hepatic resection, there seemed to be discrepancies between hepatic volume expansion and functional restoration in some patients. Mean GSA clearance (clearance per unit volume) apparently decreased after operation in patients whose residual volume ratio (preoperative predicted residual liver volume/preoperative total liver volume) were less than 50% ($p < 0.01$, $n = 12$).

These results suggested that three-dimensional functional mapping method employing GSA dynamic SPECT can provide quantitative information of postoperative hepatic function and reserve before hepatic resection.

Changes of mean GSA clearance after hepatic resection suggested that hepatic function per unit volume changes in the process of hepatic regeneration.

Key words: ^{99m}Tc-DTPA-galactosyl human serum albumin (GSA) dynamic SPECT, Hepatic resection.