Disappearance Rates of ICG, $^{131}$I-BSP, $^{131}$I-Rose Bengal and $^{198}$Au-Colloid in the Cases with Various Liver Diseases

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Hepatic clearance of dye was investigated in various liver diseases. Indocyanine green (ICG), $^{131}$I-sulfobromophthalein ($^{131}$I-BSP), $^{131}$I-rose bengal ($^{131}$I-RB) and $^{198}$Au-colloid were injected simultaneously and their disappearance rates ($K_{\text{ICG}}$, $K_{\text{I-BSP}}$, $K_{\text{RB}}$ and $K_{\text{Au}}$) were determined. $^{198}$Au-colloid was uptaken and stored by the hepatic reticuloendothelial system and other dyes were cleared from the blood by the hepatic cells and excreted into the alimentary tract. Non-radioactive sulfobromophthalein (BSP) was also used and its disappearance rate ($K_{\text{BSP}}$) was measured in a small number of patients. The subjects were as follows; 16 cases with acute hepatitis, 30 cases with chronic hepatitis, 13 cases with liver cirrhosis, 11 cases with congenital jaundice, 4 cases with so-called ICG abnormality, 12 other cases and a normal control group of 16. $K_{\text{ICG}}$, $K_{\text{I-BSP}}$, and $K_{\text{RB}}$ decreased relative to the progress of the hepatic disease; however, the value of $K_{\text{Au}}$ was significantly low only in cases with liver cirrhosis.

The correlation coefficients between $K_{\text{I-BSP}}$ and $K_{\text{ICG}}$ ($r=+0.84$, $p<0.005$), $K_{\text{RB}}$ and $K_{\text{ICG}}$ ($r=+0.80$, $p<0.005$), $K_{\text{BSP}}$ and $K_{\text{ICG}}$ ($r=+0.76$, $p<0.005$) were higher than that of $K_{\text{Au}}$ and $K_{\text{ICG}}$ ($r=+0.47$, $p<0.005$).

This fact showed that ICG, $^{131}$I-BSP and $^{131}$I-RB were uptaken and metabolized similarly in the hepatic cells, while $K_{\text{Au}}$ showed a different hepatic function.

Among the cases of congenital jaundice and so-called ICG abnormality, a dissociation between $K_{\text{I-BSP}}$, $K_{\text{RB}}$ and $K_{\text{ICG}}$ was found. Cases with Rotor's hyperbilirubinemia showed a very low value of $K_{\text{ICG}}$, $K_{\text{I-BSP}}$ and $K_{\text{RB}}$, but in the cases with ICG abnormality, $K_{\text{I-BSP}}$ and $K_{\text{RB}}$ were within the normal range. The cases with Gilbert's disease showed a normal disappearance rate with all the dyes used, and the cases with Dubin-Johnson syndrome showed a low $K_{\text{BSP}}$ value only.

The Determination of Liver Volume and Surface area from Liver Scintigraphy.

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We have developed a new computer program which assesses liver volume and surface area from liver scintigrams obtained by using scintillation camera. The nuclide used for the scintigraphy was $^{198}$Au colloid. The radioisotopic images were recorded on magnetic tape in a digital image of $64 \times 64$ matrices using an on-line minicomputer system. The contour of the liver was determined by the setting of the cut off count level, that is, 25% of the maximum count. The maximum count in the anterior view is considered to reflect the maximum thickness, which can be determined from right lateral view. Since the relation of count and thickness can be obtained in the maximum thickness, another count in the anterior view also can be transformed to the thickness. Thus the liver volume was calculated by multiplying the sum of the thickness by matrix point area (0.16 cm$^2$). The surface area was calculated by summing up the matrix point area within the liver contour. Good correlation was obtained between calculated liver volume and surface area in the same patient ($r=0.891$, $P<0.01$). Repeat examination was performed in 8 patients within 2 month and the differences between double determination were less than 11%. Whether or not these calculated

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