Linear Scanning with Oblique-slit Collimator in Diagnosis of Infantile Jaundice

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Linear scanning with oblique-slit collimator is very useful for differential diagnosis of jaundice in infant. Four biliary duct atresia, 1 intrahepatic biliary duct hypolasia, choledocal cyst, 8 hepatitis and 1 control patients were studied in 20 trials. The slit type collimator (slit width: 1 cm) was attached to the 3″ crystal of the scintiscanner paralleled to the lower border of liver of the patient. Sequential linear scanning were carried out along the body axis at 0, 1, 3, 6, 24 and 48 hours after intravenous injection of 5 μCi of ^{131}I-Rose Bengal or ^{131}I-BSP. This procedure was useful to separate the small peak of intestinal activity from the large peak of liver. Complete urine-free feces were collected into a glass container and urine specimens were collected with the Foley catheter every 8 hours throughout this procedure. Excretion ratio into feces of this series were similar to the results of Dr. H. L. Sharp. Urinary excretion ratio were usually less than 1–2% of injected dosis for 8 hours and 10% for 48 hours. In the normal case, a large peak of liver appeared in linear scanning soon after injection. During the following few hours two peaks of liver and intestinal activities were observed, and then the liver peak gradually disappeared. Usually hepatitis also showed two peaks pattern. On the contrary only one peak of the liver was observed in atresia and hypoplasia of bile duct. A case of very severe hepatitis also showed no peak of intestine, but his fecal excretion was not so little. A case of suspected choledocal cyst showed two peaks which were demonstrated for few days with very little fecal excretion. Measurement of fecal excretion can be avoided except when the separation of these peaks is doubtful. This method is very simple and requires very small dosis of RI and no anesthetic procedure.

^{131}I-BSP Studies on Acute Hepatitis

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In order to evaluate the value of ^{131}I-BSP retention test in acute hepatitis following study was paformed.

Patients were 25 cases with acute hepatitis from Kofu Manicipal Hospital. Four Hundred μCi of ^{131}I-BSP was injected followed by sequential scanning at 10 min, 1 hr, 2 hrs, 4 hrs & 8–24 hrs. Blood clearance of ^{131}I-BSP and 30 min % retention were examined in these cases. Fifty four examinations were performed at acute stage of hepatitis and at recumbent stage. These values were compared with laborator ytests (GPT, GOT, jaundice index, bilirubin level and others).

^{131}I-BSP uptake by the liver and excretion into bile duct showed marked delay at acute stage of hepatitis with jaundice, however, improvent was found at recovery from the disease.

Hepatitis without jaundice showed no delay of ^{131}I-BSP uptake and excretion even at acute stage.

^{131}I-BSP retention ratio (30 min) from the hepatitis cases with jaundice showed significant correlation with GPT value ($\gamma=0.83$), whereas no correlation was found in cases without jaundice.

Along the course of recovery both ^{131}I-BSP retention rate, GPT and jaundice index showed parallel improvent.

In one case who showed marked increase in GPT (1300) with less remarkable ^{131}I-BSP retention (12.3%) revealed rapid improvement of the disease.

In conclusion, ^{131}I-BSP clearance showed close relationship with the bilirubin level of hepatitis. This fact could be evaluated only by the introduction of ^{131}I-BSP instead of BSP colorimetry. It is suggested that ^{131}I-BSP test might be useful for the determination of prognosis of the disease.

A Clinical Experience with ^{131}I-BSP (2)
—^{131}I-BSP Test Loaded with Non-radioactive BSP—

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An external counting over the liver and the head was carried out using ^{131}I-BSP, and clearance (K) in the blood and Hepatic Uptake Index (H.U.I.) were studied, then their clinical significances were discussed in the 1st report.

However, ^{131}I-BSP contained in tracer amounts is extremely small in comparison with routine BSP (5.0 mg/kg), and probably due to this reason K volue shows very high as compared with BSP-clearance. (Ratio of the both: 1.91 ± 0.71).

In case of obvious liver disease is out of question, but each obtained value was within normal range in the mild liver disease. Hence, it is considered that ^{131}I-BSP test with ^{131}I-BSP alone is not adequate for diagnosis of patient with mild liver disease.

In this report, a dose of 5.0 mg/kg of BSP was injected previously as a hepatic loading substance, and then 40 μCi of ^{131}I-BSP was administered intravenously. And these obtained value were compared with the value of ^{131}I-BSP without use of such BSP loading.

Using four scintillation counters set on the liver, the head, the gallbladder, and the umbilicus, the recording is continued simultaneously.

K value is obtained from the radiogram of the head and blood sampling data by means of the extrapolation method.

Blood retention ratio of ^{131}I-BSP was determined according to the method of Yamada et al.

After counting ^{131}I-BSP Hepatogram H(t) and back ground curve B(t) respectively from what we call RISA-^{131}I-BSP-Hepatogram contrived in our laboratory, then H.U.I. is calculated in accordance with the following formula.

$$\text{H.U.I.} = \frac{[\text{Hepatogram H(t)} - \text{Back Ground B(t)}]}{[\text{Back Ground B(o)}]}$$

As the result, it is known that the obtained value in case of the administration of ^{131}I-BSP only is effective for diagnosis of patients with obvious liver disease, but not so ade-