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Clinical evaluation of Tc-99m-PMT hepato-biliary SPECT imaging using deconvolution analysis. H.Sakuma, N.Katou, K.Nakamura, J.Gon, T.Nakagawa, N.Yamaguchi and T.Kitano. Mie University School of Medicine, Mie.

Hepatic transfer function (TF) which is derived from deconvolution analysis of Tc-99m-PMT SPECT images provides a three dimensional information about regional effective blood flow (EHBF) and extractory function. We have tested this method in 24 subjects with diffuse hepatic diseases such as liver cirrhosis. After the injection of Tc-99m-PMT, intermittent 1 minute SPECT data with 60 projections every 2 minutes were obtained for 60 minutes with a rotating dual head gamma camera. TF over ROI and each pixel of transaxial sequential SPECT images was calculated from the regional dynamic curves as output and a time activity curve over the heart region as an input function. Four parameters of minimum, mean, maximum transit time and initial height were computed from each TF, and functional images for these parameters were constructed. Three dimensional distribution of EHBF can be visualized on initial height image and transit time on three transit time functional images. In the subjects of liver cirrhosis, segmental distribution of changes in EHBF and transit time, either matched or mismatched was clearly shown. We believe this method will provide us highly valuable information on pathophysiology and the grade of various liver diseases.

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CLINICAL EVALUATION OF Tc-99m-PMT FUNCTIONAL IMAGE IN HEPATOMA. T.Kashiwagi, T.Ikawa, K.Katayama, M.Azuma, H.Yoshioka, N.Mitsutani, T.Koizumi, K.Takashi and K.Kimura. Osaka Kosei-Nenkin Hospital and Osaka University School of Medicine, Osaka.

Using Tc-99m-PMT functional image which shows regional hepatic uptake and excretion functions topographically, functions in tumor and non-tumor regions in hepatoma were determined. Tc-99m-PMT functional image was made as follows. During the 60 min after injection of Tc-99m-PMT, 60 sequential images were obtained by a gamma camera with a computer system. After setting the hepatic region, Tc-99m-PMT time-activity curves over the liver were extracted from sequential images every each element. According to the following formula, these curves were analyzed by a nonlinear regression method and hepatic uptake rate (Ku) and excretion rate (Ke) were obtained.

$$C(t) = C_0(e^{-K_{et}t} - K_{ut})$$

C: count rate, C₀: C of time 0

The values of Ku and Ke were displayed as color images in 64 color steps. In hepatoma with Tc-99m-PMT uptake in tumor region, functional image clearly showed that Ku was not different between tumor and non-tumor regions and Ke was markedly decreased in tumor region as the image. When the intrahepatic bile duct was obstructed by hepatoma, cholestatic region in the liver was observed as low excretion rate area. In patients with transcatheter arterial embolization therapy (TAE), regional changes of uptake and excretion functions before and after TAE were demonstrated as images. Therefore, Tc-99m-PMT functional image is considered to be useful for evaluation of regional hepatic functions in hepatoma.

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ISOTOPIC METHODS FOR THE PRE- AND POST-OPERATIVE EVALUATION OF BILIARY ATRESIA T.Ogawa, T.Miyano, K.Kimura, H.Shimomura and K.Nagase. Dept of Pediatr. Surg. and Radiol., Juntendo University School of Medicine, Tokyo.

Two computer-assisted isotopic methods of hepato-biliary system were effectively applied for the evaluation of pre- and postoperative state of biliary atresia. Hepatobiliary scintigram with 99mTc-PMT was effective to make a quantitative assessment of total hepatic ability of accumulation and excretion. RI-hepatogram with 99mTc pertechnetate was applied to evaluate the circulatory change in the liver after cirrhosis. This method enables to predict the occurrence of intestinal bleeding due to portal hypertension. Cholangiogram was also performed on these cases and compared. In all, recovery of Tc-PMT excretion, no deterioration of Tc pertechnetate hepatogram and visible bile ducts by cholangiogram were the essential points to the expected recovery after hepatic porto enterostomy for the biliary atresia.

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HEPATOBIILIARY SCINTIGRAPHY IN THE DIFFERENTIATION OF CONGENITAL BILIARY ATRESIA AND FOLLOW UP STUDIES.

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Hepatobiliary scintigraphy with 99mTc-labeled agents were evaluated with regard to differentiation of congenital biliary atresia from neonatal hepatitis and assessment of bile secretion in patients with surgical correction in congenital biliary atresia. Subjects were 41 infants with CBA (preop 29 cases, postop 28 cases) and 18 infants with NH.

In preoperative study, intestinal radioactivity was not seen in 7 patients with NH. Diagnosis of biliary atresia with scintigraphy was not so reliable, when compared to duodenal fluid collection.

In postoperative studies, those infants who had clinically good functioning portenterostomy demonstrated prompt excretion of tracer into the GI tract. But those who had no significant fall in serum bilirubin and were believed to have poorly functioning portenterostomy showed delayed excretion. Hepatobiliary scintigraphy was thought to reflect the bile secretion of postoperative infants.