$^{131}$I, NCL-6-$^{131}$I, their 3-acetate, NCL-6-$^{77}$Br, 3H-CL, (II) Cholesteryl-$^{18}$F, $^{77}$Br, $^{131}$I, (CL-3-X), 3H-CL-3-X, (III) 3-Acetoxy-5-OH-6-$^{15}$F, $^{77}$Br)-cholestane (6-Halohydrin), 5-Halohydrin, 5- Br-hydrin-3-$\beta$-ol.

The radiochemical purity of these compounds was checked by thin layer chromatography. These compounds were administered intravenously to C3H mice and Wister rats with the aid of an emulsifier such as polyoxyethylene hydrogenated castor oil. Adrenal, liver, kidney, and blood concentrations were measured at 2,6 hours and 1,2,3,5, days after injection. Blood of injected rats was devided into several components; RBC, non bound fraction, and plasma protein bound fraction.

The comparison of adrenal uptakes between NCL-6-I and NCL-6-Br, and among CL-3-F, Br, I showed that iododerivatives accumulated significantly higher than bromo-and fluoro compounds. Except for CL-19-I, CL-3-F, and fluoroxydirin, the adrenal concentrations of all other compounds increased monotoneously until 2 or 3 days, thereafter the highest concentrations was retained in adrenal. On the contrary, the adrenal uptakes of CL-19-I and fluoro-compounds reached the peak shortly after injection, then decreased gradually.

In contrast to Counsell’s result (J.Nucl.Med; 14, 777, 1973), CL-19-I-3-Ac and NCL-6-1-3-Ac showed almost the same adrenal uptakes as NCL-

Rectal Administration of $^{13}$N-ammonia in Liver Diseases  2. its clinical use
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Ammonia arising from ingested ammonia salts or produced by bacteria in the gastrointestinal tract is absorbed into the portal circulation and is transported to the liver. Most of the ammonia is removed from the portal blood and converted to urea and glutamin, so that blood ammonia concentrations shouldn’t rise appreciably in the systemic circulation. In the presence of liver disease, some of the absorbed ammonia reaches systemic circulation through portasystemic shunts or as result of impaired metabolism in the liver. Elevated blood ammonia concentration are frequently found especially in hepatic coma, so that the significant of ammonia as an etiologic factor has been evaluated. In the present study, $^{13}$N-ammonia which was produced by NIRS cyclotron was administered intrarectally to 3 controls and 17 patients with liver disease in an attempt to investi-
gate the dynamic metabolism of ammonia and hepatic hemodynamics. A novel type positron camera connected with on line computer system was used for the imaging of the liver and the heart $^{13}$N-radioactivity over the head was recorded by the detectors used for renogram. Sequential changes of $^{13}$N-radioactivity in the blood were also measured.

Furthermore, chromatographic analysis of $^{13}$N-labeled substances using Dowex 50w×8 was carried out to measure $^{13}$N-metabolite derived from $^{13}$N-ammonia and to measure the ratios of $^{13}$N-metabolite relative to $^{13}$N-substances. In all subjects, $^{13}$N-radioactivity appeared in the liver in about 1 minute after rectal administration. $^{13}$N-radioactivity visualized the liver clearly in control subjects. However, in patients with liver cirrhosis the lung and the heart were clearly visualized in 5 minutes after administration when the liver image was still faint. $^{13}$N-radioactivity over the head was apparently higher in the cirrhotic group, compared with the control group. It was suggested that most of injected ammonia $^{13}$N-ammonia bypassed the hepatic cells and reached peripheral tissues (e.g. heart lung, brain). We determined the heart activity and the liver activity ratio ($^{13}$N-hear/liver ratio) 15 minutes after rectal administration. $^{13}$N-hear/liver ratio was founded to be correlated with various indices of portal hypertension.

Furthermore, the percentages of $^{13}$N-metabolites in the blood in 5 minutes after administration were lower in the cirrhotic group, suggesting reduced ability of the liver to remove ammonia in cirrhotic patients.

Differential Diagnosis of Brain Lesions on the Basis of Brain Scintigraphy

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The purpose of this paper is to evaluate how the brain scintigraphy is of significant value in the differential diagnosis of the brain lesions.

Radionuclide angiography and static brain scanning were done with 20-25mCi $^{99m}$Tc-DTPA and Nuclear-Chicago Pho-Gamma HP. Radionuclide angiography was recorded at a rate of one frame per two seconds. Static images were obtained 5 minutes and 2 hours after injection. Using 100 cases with abnormal static images, the differential diagnosis was attempted by the following three methods; 1) intuitive diagnosis by the specialist of nuclear medicine 2) flow-chart method 3) computed numerical diagnosis.

The difference among these three methods was appeared to be of little significance, although the computed numerical diagnosis was slightly superior to the other two methods. The results indicated that on the basis of the static images alone, the overall accuracy was 55% for the intuitive diagnosis by the specialist of nuclear medicine and brain tumor could not be distinguished from intracerebral hematoma, abscess or arteriovenous malformation. However, it was possible to distinguish the major categories, namely a) intracerebral masses, b) cerebral infarction, c) subdural collections (hematoma or effusion) in over 80 percent of the cases. Furthermore, the combination of the radionuclide angiography and static images improved significantly the results on the basis of the static images alone. Namely, the overall accuracy was 72% and the major categories were distinguished in over 90 percent of the cases. The rate of correct diagnosis in each lesions was as follows: 67% of glioblastoma (6/9), 100% of meningioma (5/5), 100% of acoustic neurinoma (9/9), 67% of craniopharyngioma (2/3), 43% of metastatic tumor (6/14), 44% of other brain tumors (4/9), 33% of intracerebral hematoma (2/6), 100% of arteriovenous malformation (2/2), 0% of abscess (0/1), 83% of infarction (24/29) and 92% of subdural hematoma (12/13).