BILE ACID SECRETION FOLLOWING RELEASE OF BILIARY OBSTRUCTION

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Summary

Daily measurements of bile acids in bile and in serum by gas-liquid chromatography were done on patients with cholecystolithiasis, choledocholithiasis and bile duct obstructions caused by malignant tumours, all having external bile fistulas. The group of cholecystolithiasis had no jaundice while the latter two groups had developed jaundice.

The results obtained are as follows:

1) In the group of gallbladder stone patients with no jaundice, the total bile acid concentration and daily amount of secretion were lowest on the first day after operation, but gradually increased since and arrived at a stable plateau in passage of a week. However, the bile acid changes were more clearly reflected in the amount secreted than concentration, presenting clear rising patterns. The minimum secretion was 358 mg/day which appeared on the first day after operation, and the average at the plateau a week later was about 2.7 g.

2) In some cases of infected choledocholithiasis, concentration and amount of secretion were dissociated.

3) In the group of malignant tumour-induced, complete biliary obstructions, the amount secreted were low in many cases for a long post-operative period, but the tendency was stronger in the “white bile” group than in the “colored bile” group. The intraoperative bile acid concentrations of the “white bile” group were all extremely low.

4) Bile acid fractions after operation were practically cholic (C) and chenodeoxycholic (CDC) acids only, and in the cases of less hepatic disorders, gradual increase of CDC contrasted the sudden increase of C. In cases of heavier hepatic disorders, C was in dominance after operation practically in all cases, but the C/CDC ratio was unstable. Lithocholic acid was recognized even under the state of complete blockage of enterohepatic circulation, which suggested acceleration of an alternative pathway.

5) The bile acid concentration level in serum after release of biliary obstruction declined rapidly to 10 μg/ml in 24-48 hours, and the decrease of the post-operative bile acid secretion in jaundice cases was esteemed to have been caused by hepatic disturbances rather than the feedback inhibition by the bile acids in blood serum.

Key Words: bile acid, bile, biliary obstruction.
Introduction

The liver plays a major role in bile acid metabolism—its synthesis, conjugation, secretion and intake, and almost all of the bile acid pool is in the enterohepatic circulation (EHC)\(^1\), forming a specifically closed circuit. Therefore, it is most likely that any pathological change that takes place in the liver and biliary tract will directly influence the bile acid dynamics. The recent advances in the bile acid measurement methods have made their minute measurements possible and searches for pathological changes owing to bile acid conditions have become to yield more dependable results. On the other hand, in patients with jaundice having an external bile fistula, which is a surgically important procedure, when the jaundice is persistently extreme, it is now a common procedure to first reduce the jaundice by percutaneous transhepatic cholangial (PTC) drainage and wait until the general conditions improve before applying the next, more radical procedure of treatment. In such cases, recovery of the liver function is commonly determined with references to the decrease of serum bilirubin value and other biochemical test results. However, often in such cases of extreme jaundice, the patient may have hepatic disorders of minute levels in his metabolic and other reserves, and these test results only are not enough to depend on for determination of the hepatic reserve of the patient. If an external bile fistula is made, since it blocks the enterohepatic circulation, the bile acids contained in the bile secreted from the fistula can be a direct reflection of the liver conditions. We have observed that grasping the change of this particular portion of bile acids can present a parameter for determination of the liver functions, and have done a gas-liquid chromatographic determinations of bile acids of the patients having fistulas, and studied the results.

Subjects and Method

The subjects of the experiment were 11 cases of gallstone diseases (consisting of 6 cases of cholecystolithiasis and 5 of choledocholithiasis), 9 cases of gallbladder cancer, 10 cases of pancreatic cancer, 3 cases of gastric cancer-caused biliary duct obstruction. For our study, the cases were grouped as follows.

Group I: 6 cases of cholecystolithiasis having no jaundice, presenting generally no abnormal liver function tests, and having T-tube placed after the cholecystectomy and choledochotomy.

Group IIA: 2 cases of choledocholithiasis with T-tube placed after the cholecystectomy and choledochotomy, and having had no infection during and after the operation.

Group IIB: 3 cases of choledocholithiasis having a T-tube placed after the same operations as IIA and was found to have bacteria in the bile taken from the bile duct drainage process after placement of T-tube.

Group IIIA: 11 cases whose bile was yellow colored or tarry-like when obtained from the puncture for PTC drainage.

Group IIIB: 11 cases whose bile was "white" when obtained from the puncture for PTC drainage.

Group I had no jaundice while the latter two groups had developed jaundice.

All the above cases were subjected to the daily measurements of the total bile acid concentration in the bile and fractions of the bile acids by gas-liquid chromatography for 2 weeks starting on the very day of the operation or PTC drainage. In some cases of Group III, continuous measurement was interrupted, mainly because of irrigation or bleeding through the drainage catheter. The 18 cases of jaundice were also subjected to measurement of bile acids in blood before operation and several times after the operation. Sampling of