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A Study on Biliary Lipids in a Case with Cholecystolithiasis After Ileostomy*)

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ABSTRACT

Biliary lipids of a case who developed in cholecystolithiasis 3 years after ileostomy were analyzed. The hepatic bile in this patient was supersaturated with cholesterol, secondary to the low bile acid pool after ileostomy. Therefore, care must be taken for the development in cholesterol gallstones after ileostomy or ileal resection. Preventive administration of the dissoluble agents for cholesterol gallstones is recommended in the patient with ileostomy or ileal resection.

INTRODUCTION

Bile acids are synthesized in liver and secreted into bile. Biliary bile acids are excreted to the duodenum and mainly reabsorbed from the terminal ileum. However, if the reabsorption is suppressed by ileal inflammations or surgical resection, bile acid pool in healthy body may not be maintained and the resultant supersaturated bile may lead to cholelithiasis. In this paper, such a case with cholecystolithiasis is presented.

CASE REPORT

This 51 year-old female was first admitted to a certain hospital with the diagnosis of familial polyposis coli. Soon after admission, she underwent total colectomy and ileostomy in 1970, when any gallstones were not found in the biliary tracts. Subsequently she had been in relatively good health until July 1973, when she was required hospitalization for colicky pain of the rt-hypochondrium. In secretory cholangiography, two gallstones without calcification were found in gallbladder. In August 1973, cholecystectomy was completed. Stones from the excised gallbladder were all cholesterol ones. She discharged without any complications after several weeks (Table 1).

Table 1. History of the surgical treatment

	Date	Diagnosis	Procedure
First operation	1970	Familial polyposis coli	Total colectomy and Ileostomy
Second operation	1973	Cholecystolithiasis	Cholecystectomy

In September 1982, liver function tests showed slight abnormality and then PTC was performed, at that time hepatic bile was taken for bile lipid analysis.

BILE LIPID ANALYSIS

Bili acids, cholesterol and phospholipids of the hepatic bile were analyzed. Bile acids and cholesterol were detected by gas-liquid chromatography as previously described[2]. Phos-

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pholipids were quantitated by enzymatic method[8]. The results are shown in Table 2. The

Table 2. Biliary lipids analysis

	mg/L	mmol/L	mol%
Total bile acids	9980	21.2	60.2
Phospholipids	8150	10.3	29.4
Cholesterol	1417	3.7	10.4
Lithogenic index	1.03		

concentration of total bile acids, cholesterol and phospholipids were 9980 mg/L, 1417 mg/L, 8150 mg/L, respectively. Lithogenic index by Thomas and Hofmann[9] was 1.03. The composition of biliary bile acids is shown in Table 3.

Table 3. Distribution of bile acids

Primary bile acids	Cholic acid	38.9%
	Chenodeoxycholic acid	59.6%
Secondary bile acids	Deoxycholic acid	1.4%
	Lithocholic acid	0.1%

Chenodeoxycholic acid occupied more than half of total bile acids. Ratio of glycine conjugated bile acids to taurine ones (G/T) was 4.92 using densitometry with dual-wavelength chromatoscanner[4].

DISCUSSION

In this case, it is clear that gallstones were formed after ileostomy because they had not been found at the first operation. It has been said[6] that the suppression in ileal absorption of bile acids induces lithogenic bile. Some authors[1] warned against cholelithiasis after ileostomy as iatrogenic gallstones. We cannot imagine whether lithogenic index in this patient had been higher than 1.0 before ileostomy or not, because bile samples were not taken for the analysis at the first time operation. However, it may be considered with great possibility that this patient developed in cholecystolithiasis as a result of ileostomy.

Interestingly, low amounts of secondary bile acids were found in this patient. This means that very small amounts of primary bile acids are dehydroxylated and transformed to secondary bile acids in small intestine.

In bile acid composition, much more chenodeoxycholic acid was present than cholic acid. It is widely accepted that poor reabsorption of bile acids from the intestine increases bile acid synthesis in the liver. Hoshita described[3] that cholesterol 7 α-hydroxylase was much more stimulated than steroid 12 α-hydroxylase in liver in the circumstance with increased synthesis of bile acids, e.g., ileostomy or ileal resection. Therefore, chenodeoxycholic acid may be main bile acid in this patient. Sjövall[7] reported that G/T ratio in healthy man was 3.2. Moreover, Kibe et al.[5] found that most newly synthesized bile acids were conjugated with glycine under the condition of increased bile acid synthesis. In this case G/T ratio was higher than healthy man, therefore it can be said bile acid synthesis in the liver was very active in this patient.

In conclusion, gallstones are apt to be formed in the patients with ileostomy or ileal resection from the aspect of dynamic change in biliary lipid metabolism. Therefore, follow-up of lithogenic index and/or preventive administration of UDCA or CDCA are indispensable for the management of the patients with ileostomy or ileal resection.

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