

SOME BIOCHEMICAL TESTS IN PATIENTS WITH GALLSTONES

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INTRODUCTION

Many investigations have been conducted in order to determine the biochemical identification of patients with gallstones associated with pancreatitis (1-6). The biochemical tests have included aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), total bilirubin (BIL), and amylase (AMY) in these previous studies. We have carried out a detailed analysis of additional biochemical tests in patients with only gallstones and with functioning gallbladder in order to evaluate the predictive value of these tests and the possible, subtle liver cell surface damage due to gallstone.

MATERIALS AND METHODS

Thirty female patients (ages ranging from 21 to 58) and 35 healthy subjects (ages ranging from 28 to 62) were included in the study. Both groups had no medication during sampling. The patients had gallstones and functioning gallbladders, and the definite diagnosis was made by several means such as ultrasound and routine radiologic contrast studies. Also, the patients had no hepatic and pancreatic diseases. The females were selected for patients and controls in order to avoid any differences in biochemical parameters due to hormonal and metabolic characteristics.

In serum samples obtained immediately before surgical intervention, AMY, lipase, ALP, AST, ALT, gamma-glutamyl transferase (GGT), lactate dehydrogenase (LDH), phosphorous (P), triglycerides (TG), cholesterol (CHOL), BIL, phospholipids (PL) (all by commercial reagent kits, Boehringer Mannheim,

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W. Germany), 5'-nucleotidase (5NT) (by method of Campbell (7)), and total bile acids (BA) (Merckotest), determinations were made.

Student's t-test was used for statistical evaluation.

RESULTS

The statistical evaluation of the results obtained is shown in Table 1.

The biochemical parameters we tested can be divided into three groups: (a) the tests differing from controls over the normal ranges (AMY, ALP, 5NT, GGT, BA) (b) the tests differing from controls within normal ranges (lipase, AST, CHOL, TG, BIL, PL), and (c) the tests having no difference between two groups (ALT, LDH).

The patients with gallstones of functioning gallbladder had increased levels of AMY, ALP, 5NT, GGT, AST, CHOL, TG, BIL, PL, and BA in serum, whereas they had decreased levels of only lipase. However in remaining tests, there was no statistically significant difference between the patients and controls.

DISCUSSION

Although many technics have been developed to detect gallstones, it is well known (8,9) that they may sometimes fail to demonstrate the gallstones. For this reason, some biochemical tests should be developed to support these technics. On the other hand, on the basis of clinical enzymology, many conditions related to liver and gallbladder such as biliary tract obstruction (10-12), acute cholecystitis (13), and liver cell damage (14) have been identified.

We did not subgrouped the patients according to their bile duct status because we were not related to the bile duct but biochemical pattern of their sera.

Our detailed biochemical analyses show that, of 13 tests performed in this study, 5 are predictive of gallstone and slight liver cell involvement, suggesting the shed of such cell surface enzymes as ALP, 5NT, and GGT by lithogenic bile and cholestasis. These are AMY, ALP, 5NT, GGT, and BA. Some other tests such as AST, CHOL, TG, BIL, and PL may also have predictive value in this condition.

The rise in serum ALP, CHOL, TG, BIL, PL, BA in patients with gallstone of functioning gallbladder may be caused by a relatively rised bile duct pressure. On the other hand, increased ALP, 5NT, GGT, and AST levels in serum may show a slight liver cell surface damage due to gallstone. However, we were not able to explain increased AMY and decreased lipase levels in serum of patients when compared with those of control subjects.

Table 1. Statistical evaluation of the results.

Test name	Patients with gallstones X±SD (n=30)	Controls X±SD (n=35)	P (<)
<i>Enzymes</i>			
AMY (IU/L, 37°C)	225.0±65.0 ^a	95.0±19.0	0.01
LIPASE (IU/L, 37°C)	129.0±46.0	185.0±38.0	0.01
ALP (IU/L, 37°C)	62.0±13.0 ^a	41.0±10.0	0.05
5NT (IU/L, 37°C)	18.0±2.6 ^a	9.5±2.5	0.01
GGT (IU/L, 37°C)	43.0±9.5 ^a	30.0±8.2	0.05
AST (IU/L, 37°C)	49.0±12.5	33.0±9.7	0.05
ALT (IU/L, 37°C)	41.0±8.0	38.0±10.1	NS
LDH (IU/L, 37°C)	387.0±95.0	336.0±85.0	NS
<i>Others</i>			
TG (mg/dL)	118.0±44.0	81.4±28.5	0.01
CHOL (mg/dL)	205.0±48.0	186.0±32.0	0.05
BIL (mg/dL)	1.2±0.3	0.6±0.2	0.01
PL (mg/dL)	235.0±80.0	181.0±31.0	0.01
BA (µmol/L)	10.5±2.8 ^a	4.6±1.3	0.01

NS : Not significant.

a : The high values are over the normal ranges of corresponding parametres.

SUMMARY

This study evaluates the diagnostic value of some biochemical parameters in 30 female patients with gallstones in functioning gallbadder. Serum amylase, lipase, alkaline phosphatase, 5'-nucleotidase, gamma-glutamyl transferase, asparatate aminotransferase, alanine aminotransferase, lactate dehydrogenase, triglyceride, total cholesterol, total bilirubin, phospholipids, and total bile acids were determined preoperatively. Of these tests, serum amylase, alkaline phosphatase, 5'-nucleotidase, gamma-glutamyl transferase, asparatate aminotransferase, total cholesterol, total bilirubin, phospholipids, and total bile acids were found to differ from control values. These differences may be predicitive of gallstone and of any subtle liver cell surface damage caused by gallstone.

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