RANKING OF LIVER TESTS FOR DIFFERENTIAL DIAGNOSIS OF LIVER PARENCHYMAL DISEASES

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Summary

Liver function tests were ranked in the order useful to differentiate 8 liver parenchymal diseases in combination of tests by forward selection and backward elimination procedures in the likelihood method using a microcomputer. The orders were almost same in both procedures: indocyanine green plasma disappearance rate, glutamic pyruvic transaminase (GPT), zinc turbidity test, alkaline phosphatase, age, HBsAg, RA test, glutamic oxaloacetic transaminase (GOT)/GPT ratio, GOT, cholesterol, total protein, total bilirubin, albumin/globulin ratio and $\gamma$-globulin. The first 9 tests had almost all informations of all tests. The first likelihood diagnosis using the 9 tests was correct in 53% and the first or the second diagnosis was correct in 71% of 444 cases of 8 liver parenchymal diseases. A score table of likelihood diagnosis using the 9 tests was presented for manual application to new cases.

Key Words: liver function tests, differential diagnosis of liver diseases, multivariate analysis.

Introduction

A score table of a simplified likelihood method for differentiation of 8 liver parenchymal diseases using 12 liver function tests and age has been presented1). However, the tests seem to have similar informations and some tests may be redundant. Redundant tests have been omitted by stepwise discriminant analysis2-7) or forward selection and backward elimination procedures in multiple regression analysis8-10).

In this study, liver function tests useful for differential diagnosis are ranked by forward selection and backward elimination procedures in the likelihood method using a microcomputer.

Materials and Methods

Four hundred forty four patients with liver parenchymal disease were used as in the previous paper1). They were diagnosed by peritoneoscopy and liver biopsy. They were consisted of 23 cases of slight hepatic changes (SHC) such
as portal fibrosis and/or fatty metamorphosis, 21 of fatty liver (FL), 25 of alcoholic liver disease (ALD), 49 of acute hepatitis (AH), 45 of chronic persistent hepatitis (CPH), 46 of chronic active hepatitis 2A (CAH 2A), 102 of chronic active hepatitis 2B (CAH 2B) and 133 of liver cirrhosis (LC).

Fourteen informations were used for differential diagnosis of the 8 liver parenchymal diseases by the likelihood method. In this study, glutamic oxaloacetic transaminase (GOT)/glutamic pyruvic transaminase (GPT) ratio (GOT/GPT) was newly added to the 13 items of the previous paper, which were total serum bilirubin (T-Bil) mg/dl, GOT I.u./1, GPT I.u./1, serum alkaline phosphatase (ALP) Bessey Lawry u., serum cholesterol mg/dl, zinc turbidity test (ZTT) Kunkel u., serum total protein (T-protein) g/dl, serum albumin/globulin ratio (A/G), gamma globulin fraction (γ-globulin) % determined by electrophoresis using the cellulose acetate membrane, plasma disappearance rate of indocyanine green (KICG), RA test and HBsAg (reversed passive hemoagglutination). Data on admission were used.

Likelihood diagnosis was calculated by a microcomputer (Sord Computer Systems, Inc., M223 mark III, Tokyo) using the score table of the previous paper. Combinations of informations were chosen to get the highest correct diagnosis rate in the two procedures; forward selection and backward elimination. Forward selection was stepwise addition of an information which contributed most effectively to elevation of the correct diagnosis rate. Backward elimination was stepwise removal of an information from the total informations which had the least contribution to the diagnosis. The computer program was written by one of authors (TI) using BASIC.

Results

1) Distribution and scores of GOT/GPT in liver parenchymal diseases (Table 1, 2)

As GOT/GPT was newly added to the score table of the previous paper, the distribution of GOT/GPT is shown in Table 1 and the scores are in Table 2.

2) Correct diagnosis rate by individual information (Fig. 1)

The correct diagnosis rates of the first, and