Early Detection of Biliary Pancreatitis

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Biochemical tests (serum glutamic pyruvic transaminase, serum glutamic oxaloacetic transaminase, alkaline phosphatase, gammaglutamyltranspeptidase, bilirubin, and serum amylase) were performed upon admission in 84 patients with suspected (36) or proven (48) acute pancreatitis at the time of the first episode of acute abdominal pain suspected clinically as acute pancreatitis. These parameters all increased significantly more in patients with gallstone pancreatitis. Among them, the SGPT was the most discriminant test between biliary and nonbiliary pancreatitis. The positive predictive value of SGPT was 92%, when the cutoff point was chosen at twice the upper limit of normal. In patients with increased SGPT, a SGOT–SGPT ratio <1 is the rule (88%) for those with gallstone pancreatitis. This enzymatic determination allowed us to select more accurately the patients suitable for morphological procedures to confirm the biliary origin of the pancreatitis.

The two most frequent causes of acute pancreatitis are alcoholism and gallstones. The importance of making a precise discrimination between nonbiliary and biliary pancreatitis has been recently stressed mainly because of differences in management (1–5). Various methods have been proposed: the level of serum amylase (6, 7), echography (8), radionuclide scanning (9) and computer analysis (10).

In 1979, McMahon showed that increased concentrations of serum glutamic oxaloacetic transaminases (SGOT) on the day of admission suggest a biliary origin of the disease, providing that excessive alcoholic consumption is absent (11). The discriminant value of SGOT has nevertheless been questioned by several authors (12, 13). The aim of this study was to compare SGOT with other enzymatic determinations—serum glutamic pyruvic transaminase (SGPT), alkaline phosphatase, gammaglutamyltranspeptidase (SGGTP)—and with bilirubin and the serum amylase level.

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MATERIALS AND METHODS

Our prospective series included 84 patients, studied during the last 3 years at Erasme Hospital and at the Ixelles Hospital, presenting with a first episode of acute abdominal pain and in whom the diagnosis of acute pancreatitis was initially suspected on clinical grounds. The criteria for inclusion in the study were as follows. (1) Suspected acute pancreatitis: (A) typical abdominal pain and increase of blood amylase higher than five times the upper limit of normal (normal, less than 40 IU) (20 cases); and (B) A plus an amylase–creatinine clearance ratio > 5 (16 cases). (2) Confirmed acute pancreatitis: (C) A plus morphological signs of acute pancreatitis detected by echography and/or CT scan and/or endoscopic retrograde cholangiopancreatography and/or laparotomy (44 cases); and (D) C without an increase of blood amylase.

Blood samples were taken on admission and on the following days.

The following determinations were performed: SGOT, SGPT, alkaline phosphatase, SGGTP, bilirubin, and serum amylase. Investigations for biliary tract disease were carried out as soon as possible after admission. Only patients in whom gallstones have been identified and who denied any alcoholic intake were included in the biliary group (Table 1).

Alcoholism was considered as the etiologic agent only if the daily alcohol consumption was greater than 100 g or

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if the episodic intake was equal to 15 or more glasses of beer. In the alcoholic patients, the absence of biliary tract disease was confirmed one month after the acute attack by echography, cholecystography, and/or ERCP.

Our data were analyzed using the Student's t test and according to the equations described by Patton (14) to calculate the sensitivity, specificity, and positive predictive value.

RESULTS

Among the 84 patients classified as having suspected or proven acute pancreatitis, 44 (52%) were subsequently found to have gallstones while 40 (48%) had pancreatitis due to nonbiliary causes. Alcoholism was present in 32 cases. The etiology of the disease was unknown in eight cases. According to the criteria previously defined, the diagnosis of acute pancreatitis was confirmed in 26 cases of the biliary group and suspected in 18 cases. In the nonbiliary group, pancreatitis was confirmed in 22 cases and suspected in 18 cases.

Severe attacks occurred in 12 cases (seven in the biliary group, five in the nonbiliary group), including four deaths. As shown in Figure 1 the mean levels of SGPT, SGOT, alkaline phosphatase, SGGTP, bilirubin, and serum amylase on the day of admission were higher in the biliary group than in the nonbiliary group. These differences were statistically significant ($P < 0.001$). Furthermore, the mean level of SGPT was significantly more increased ($P < 0.005$) than that of SGOT in the biliary group, whereas no difference was observed between SGPT and SGOT in the nonbiliary group.

When the cutoff point of SGPT was chosen at the upper limit of normal, misclassification occurred in eight cases (six false positive and two false negative). When the cutoff point was chosen at twice that level, misclassification was observed in 12 cases (three false positive and nine false negative). Use of the SGOT was associated with a larger number of misclassified cases (14 cases for a cutoff point at the upper normal level, and 20 cases for a cutoff point at twice that level) (Figure 2).

Table 2 shows the sensitivity, specificity, and positive predictive value of raised levels of the six parameters which were evaluated in the early detection of biliary pancreatitis. It readily appears that SGPT has the highest positive predictive value provided that the cutoff point is chosen at twice the upper limit of normal. SGGTP is the most sensitive parameter, but its low degree of specificity explains its lower positive predictive value. Those results apply to suspected as well as to proven cases of acute pancreatitis.

The discriminatory power of the SGOT–SGPT ratio is shown in Table 3. This ratio was less than 1

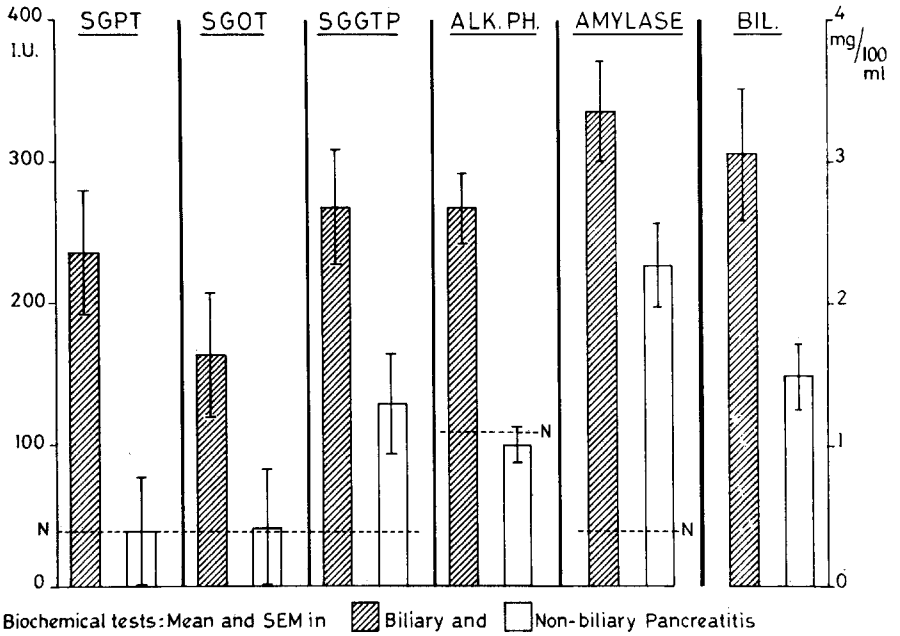

Fig 1. Mean level ± SEM of biochemical parameters (SGPT, SGOT, SGGTP, alkaline phosphatase, bilirubin, and serum amylase) upon admission in biliary and nonbiliary pancreatitis.

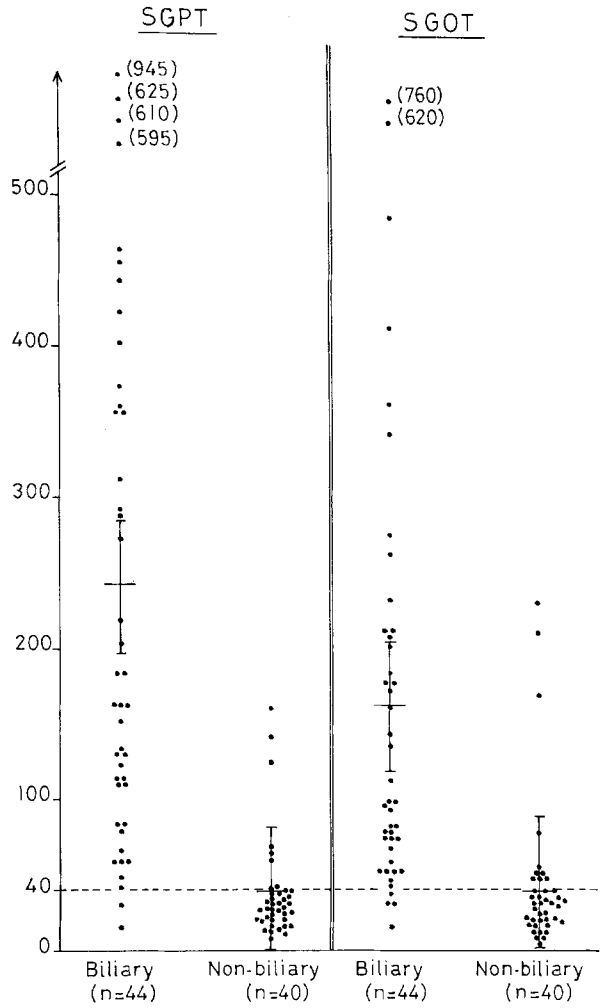

Fig 2. Transaminases in biliary and nonbiliary pancreatitis upon admission.

in only two cases of the nonbiliary group with high transaminases levels and higher than 1 in three cases of the biliary group. In patients with an increased SGPT, a SGOT–SGPT ratio <1 is the rule for gallstone pancreatitis (88%). Measurement of SGOT–SGPT ratio decreased the number of misclassified cases in the nonbiliary group (three cases with an SGPT higher than twice the upper limit of normal). The ratio was >1 in all those cases. On the other hand, in the three cases of the biliary group with SGOT–SGPT >1, the level of SGOT was unexpectedly high (more than 10 times the upper limit of normal). This abnormality did not correlate with the severity of pancreatitis. The fall of SGPT and SGOT in the following days after admission was parallel for both types of pancreatitis.

DISCUSSION

In many hospitals, the morphological procedures developed to detect the presence of underlying gallstones in acute attacks of pancreatitis may not yet be immediately available, although they can provide a high rate of precise diagnosis for pancreatitis and gallstones (8, 9). Although computerized diagnosis of diseases may be the method of choice for the future, it is not yet routinely adapted to emergencies (10). On the other hand, the biochemical markers of biliopancreatic diseases can be routinely achieved under emergency conditions in nearly all laboratories.

In agreement with other authors (6, 7), we found that the increase of blood amylase is greater in gallstone pancreatitis than in nonbiliary pancreatitis. However, the positive predictive value of this biochemical test for a gallstone etiology reaches only 80%. The data reported here in patients with acute biliary pancreatitis show a simultaneous increase of SGOT, SGPT, alkaline phosphatase, and SGGPT in about 90% of the cases and of bilirubin in about 80% of the cases on admission. Furthermore, as evidenced by its higher specificity, the increase of SGPT above twice the upper limit of normal has the highest positive predictive value (92%), the values for alkaline phosphatase and SGOT being 87% and 84%, respectively.

These findings add some complementary precision to the data of McMahon, who showed that the SGOT was the most discriminant diagnostic feature (11). The reasons for the discrepancy between the SGPT and SGOT are not evident. The main location of SGPT in the cytoplasm of the hepatocyte could offer an explanation. A fast and transient release of this enzyme would be related to the injury of the hepatocytes following the sudden increase of bile duct pressure, occurring in cases of stone migration to the papilla of Vater. Moreover, patients having SGPT values greater than four times the upper limit of normal had gallstone pancreatitis in all cases. In alcoholics, the transaminase values were much lower, probably because of nonacute injury.

TABLE 1. INVESTIGATIONS AFTER 44 ATTACKS OF ACUTE PANCREATITIS WITH EVIDENCE OF GALLSTONES

Investigations	N
Ultrasonography and/or intravenous cholangiography	9
Endoscopic retrograde cholangiopancreatography	27
Laparotomy	8
Total	44

TABLE 2. SENSITIVITY, SPECIFICITY, AND POSITIVE PREDICTIVE VALUE OF 6 BIOCHEMICAL PARAMETERS TO DETECT EARLY BILIARY PANCREATITIS AT CUTOFF POINT OF UPPER NORMAL LEVEL *(N)* AND TWICE NORMAL *(2N)*

	SGOT		*SGPT*		*Alkaline phosphatase*		*SGGTP,*	*Amylase*	*Bilirubin*
	>N	>2N	>N	>2N	>N	>2N	*> N*	*> 300 IU*	*> 1 mg/dl*
Sensitivity (%)	90	61	93	81	88	52	97	85	79
Specificity (%)	75	88	85	93	65	92	20	75	66
Positive predictive value (%)	79	84	87	92	73	87	54	80	65

Various authors have been unable to confirm McMahon's observations. No precise explanation has been found for these discrepancies. Dissimilarities between the population groups were suggested by McMahon (14, 15). Differences in criteria for the diagnosis of acute pancreatitis could be another possibility. Damman et al (12) have suggested that the absence of discriminant value of biological parameters in his series of 297 patients could be due to the fact that he studied only patients with a first attack of acute pancreatitis, while McMahon's patients had previous attacks (12).

These statements are inconsistent with the fact that in our series only patients with a first attack of abdominal pain were included. Moreover, there was no difference between the groups with suspected pancreatitis and those with proven pancreatitis. One might argue that the main differences between the groups are due to the delay between the onset of the attack and the performance of blood tests, since it is well-known that enzyme abnormalities are mostly transient. In 93% of the patients with biliary pancreatitis the SGOT–SGPT ratio is less than 1, while it is greater than 1 in the nonbiliary group (80%).

The measurement of this ratio corrected misclassifications in the nonbiliary group in three patients with SGPT and SGOT values higher than twice the upper limit of normal. Nevertheless, in the biliary group a ratio >1 was observed in three cases with high levels of transaminases (over ten times the upper limit of normal). Such high levels of transaminases have been considered to be a poor prognostic sign (15, 16). This observation was not confirmed in this series.

TABLE 3. SGOT–SGPT RATIO FOR BILIARY (N = 42) AND NONBILIARY CASES (N = 10) WITH TRANSAMINASES (SGOT AND/OR SGPT) HIGHER THAN UPPER NORMAL LEVEL

	<1	*>1*
Biliary cases	39	3
Nonbiliary cases	2	8

To summarize, we consider that SGPT is a valuable test for the early detection of the biliary origin of an abdominal attack suspected to be of pancreatic origin on clinical and biochemical grounds. The positive predictive value of SGPT was 92% when the cutoff point was chosen at twice the upper limit of normal. Moreover, in patients with acute pancreatitis, a biliary origin can be suspected in all cases in which the SGPT is higher than four times the upper limit of normal or in nearly all cases (88%) in which SGPT is increased with a SGOT–SGPT ratio less than 1.

Since the results of the biochemical tests can be obtained very easily, we recommend them as a screening procedure in order to select better the patients suitable for morphological procedures that can confirm the biliary origin of the pancreatitis.

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