

CLINICAL APPLICATION OF THE AMYLASE-CREATININE INDEX FOR THE DIAGNOSIS OF ACUTE PANCREATITIS

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The considerable difficulties in the diagnosis of acute pancreatitis are related not only with the topographic location of the pancreas, its immediate vicinity of other organs which when affected are often accompanied with symptoms similar to that of pancreatic ones, but also with the variety of the clinical course of pancreas disorders. According to Shalimov (cited after 1) the incidence of acute pancreatitis among surgical diseases varies between 0,8 and 4,5 per cent but it is higher when only the acute surgical diseases are concerned (11,8 per cent) coming third after the acute appendicitis and cholecystitis. The incidence of perforated ulcer, ileus and incarcerated hernia is considerably lower now. The errors in acute pancreatitis diagnostics and the inadequate therapeutic behaviour resulted from them have often fatal consequences. N. Vasilev and N. Tzankov (4) report similar mistakes in 20—40 per cent of the cases. V. M. Lashtefker (5) found out that errors of clinical diagnosis occurred in 7,9 per cent of the cases. The examination of external secretory pancreas function based on determination of enzymes secreted from it (diastase, lipase, trypsin etc.) plays an essential role in acute pancreatitis diagnostics. Pancreatic amylase in serum and urine is most assessible for practical use. However, hyperamylasemia and hyperamylasuria can be found in other abdominal diseases — both acute and chronic ones (acute cholecystitis, ulcer, acute and chronic hepatitis, liver cirrhosis, acute and chronic adnexitis) as well as in salivary gland diseases, lung cancer and especially in diseases related with ischemic changes in intraabdominal organs such as ileus, mesenteric thrombosis, etc. (1, 3, 6) which is due to the activation of heterogeneous sources producing amylase isoenzymes in liver, lungs, uterine tubes, salivary glands, etc. (3, 5, 10). Recently, some authors (Warshaw, Lee, Birk, etc.) (cited after 5) introduced in the practice the amylase-creatinine index (ACI). It is a ratio of amylase clearance to creatinine one. This index is based on the fact that pancreatic amylase clearance realizes with 80 per cent more rapidly than that of salivary one. The authors establish that in normal conditions about 24 per cent of serum amylase retains in the kidneys and accept that ACI is a strictly specific index for the presence of an acute pancreatitis because it reflects the basic pathobiochemical changes of the illness: pancreostasis with an increased enzyme elimination from the serum through renal processes such as filtration, reabsorption and secretion (3).

Material and methods

In the present work we aim the investigation of the practical significance of ACI as an objective criterion in diagnostics and prognosis of the acute pancreatitis as well as in determination of indications for required surgical intervention. During the period — 1st January, 1982 — 31th December, 1983 a total number of 192

patients with preliminary and clinical diagnosis of acute pancreatitis were hospitalized in 1st Surgical Clinic at the Higher Institute of Medicine, Varna. It means 4,2 per cent of all patients. 52 ones were with cholecystopancreatitis. We examined and calculated ACI during the first 48 h after hospitalization in 60 newly admitted patients with hyperamylasemia and hyperamylasuria and preliminary diagnosis of acute pancreatitis. We used the following formula:

$$ACI = \frac{\text{creatinine in blood} \times \text{amylase in urine}}{\text{creatinine in urine} \times \text{amylase in blood}} \times 100 = 1 - 4 \% \text{ (norm)}$$

The data obtained were compared with the character and severity of the clinical course of the disease. Both amylase and creatinine clearances were determined several times by means of simultaneously taken blood and urine samples. Besides a complete paraclinical examination of the patients was performed as well as fibrogastroscoy, biligraphy, echography, liver scintigraphy, laparoscopy when required, etc.

Results and discussion

We established increased ACI levels (above 4 per cent) in 41 patients (68,3 per cent) with well-expressed clinical manifestations of acute pancreatitis: abdominal syndrome, cardiovascular alterations, pancreatosuprarenal syndrome, etc., as well as expressed to a different extent paraclinical changes. There was a hyperamylasemia with 45 patients (75 per cent), hyperamylasuria with another 60 (100 per cent), leukocytosis with 27 ones (45 per cent), hyperglycemia with 18 ones (30 per cent), hypercalcemia with 7 ones (11,7 per cent), hypokalemia with 8 ones (13,5 per cent), and proteinuria with 11 ones (18,3 per cent). With most patients ACI varied between 4 and 8 per cent. 6 patients were operated as emergency cases and the diagnosis was intraoperatively confirmed (table 1). F. Barda et al.

Table 1

Distribution of the patients with an acute pancreatitis in relation to ACI levels

	ACI levels					Total
	4-5 %	5-6 %	6-8 %	8-10	Over 10 %	
Number of patients	11	10	10	6	4	41
%	25,8	24,4	24,4	14,9	9,5	100

(7) accept that a severely complicated acute pancreatitis can be considered if ACI values are above 10 per cent. In fact, similar severe course was observed in 4 of our patients with ACI levels above 10 per cent. Two of them with ACI 18 and 26,5 per cent, respectively, were immediately operated: in fact necrotic pancreatitis and diffuse peritonitis were detected.

18 patients (30 per cent) with both hyperamylasemia and hyperamylasuria and normal ACI values were considered to suffer from some other diseases. The diagnosis was intraoperatively confirmed with 12 of them. There was an ulcerous disease in 4 patients. A perforated ulcer was observed with one of them. Chronic cholecystitis was established with 4 cases, mesenteric thrombosis and adnexitis — with 2 ones each. Several diseases were observed with single patients only —

pancreatic cyst, choledocholithiasis, ileus (volvulus of the sigmoid colon), chronic hepatitis, chronic pancreatitis, and stomach cancer — each with one patient only.

One patient with primary aggressive hepatitis, during several weeks, shew hyperamylasuria between 9000 and 13 000 UI. For a 6-day interval a normal ACI value was established, twice (3,8 per cent). It was notable that one female patient with ACI above 7 per cent and accompanying chronic pyelonephritis and chronic renal failure in the presence of clinical data of diffuse peritonitis was operated as an emergency case. A mesenteric thrombosis with intestinal tract necrosis without any pancreas lesions was observed which was most probably due to the increased values of creatinine clearance in chronic renal failure.

We started the treatment of the acute pancreatitis according to the conventional conservative tactics consisting of application of atropin, spasmolytics, contrical, antibiotics, infusions, starvation, rest, stomach probe, maintenance aspiration of gastroduodenal contents. We performed paranephral blockades with 0,5 per cent novocaine solution after Vishnevskij only once with control ACI determination next day with 8 patients with a severe clinical course of the disease. 7 patients felt much better subjectively. Simultaneously, we registered a normalization of paraclinical indices and ACI both until the 48th hour after blockade. After fading away of the acute phenomenon pseudocysts were formed with 2 of the patients and they were operated according to plan.

We could draw the following main conclusions:

1. Both hyperamylasemia and hyperamylasuria are a valuable but not strictly specific symptom of the acute pancreatitis. Hyperamylasuria possesses a more trustworthy diagnostic significance.

2. Higher ACI levels presume a severe course with complications of the acute pancreatitis while normal ones orientate our diagnostic opinion to an eventual other disease imitating acute pancreatitis.

3. In our opinion, ACI could and must be applied in the practice as an objective criterion for diagnosis and prognosis of acute pancreatitis. Its determination and calculation after Benks' concise formula is easy and rapid.

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**КЛИНИЧЕСКОЕ ПРИМЕНЕНИЕ АМИЛАЗОКРЕАТИНИНОВОГО ИНДЕКСА
ПРИ ДИАГНОСТИКЕ ОСТРОГО ПАНКРЕАТИТА**

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Р Е З Ю М Е

В первой хирургической клинике ВМИ — Варна с 1982 года применяется АКИ (амилазокреатининовый индекс) при дифференциальном диагнозе острого панкреатита. АКИ представляет собой отношение клиренса р-панкреатической амилазы к клиренсу креатинина. В течение двух лет проведены наблюдения 192 больных. У 60 из них установлен АКИ. У 30 % больных с гиперамилаземией и гиперамилазурией, но с нормальных АКИ, при помощи рентгенологических, эндоскопических и других методов диагностированы другие заболевания, имитирующие острый панкреатит, мезентериальный тромбоз, язвенную болезнь, аднексит и др. Учитывается также значение АКИ в качестве прогностического критерия после оперативного лечения и паранефральных новокаиновых блокад.