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Severe Acute Pancreatitis as a Part of Multiple Dysfunction Syndrome

Vladimir Gašparović[1], Kristina Đaković[2], Ivan Gornik[1] and Radovan Radonić[1]

[1] University of Zagreb, School of Medicine, University Hospital Centre Zagreb, Intensive Care Unit, Department of Medicine, Zagreb, Croatia
[2] University of Zagreb, School of Medicine, Zagreb, Croatia

A B S T R A C T

Acute pancreatitis is a disease with various degrees of clinical manifestations. Mild and moderate severe acute pancreatitis is an illness characterized with chemical inflammation which, in general, passes without major complications. Clinical picture of severe acute pancreatitis other side is commonly complicated with functional deterioration of other organs, and frequently has characteristics of multiple organ dysfunction or failure syndrome with or without bacterial super infection. We studied 82 patients admitted to the intensive care unit with severe acute pancreatitis, 14 died. The mortality was in statistically significant correlation with the severity of clinical condition at admission assessed by APACHE II score, and higher Ranson's and Glasgow criteria by admission. Adequate volume supplementation, on time, as well as percutaneous drainage of infected pancreas collection reduces a risk of pure outcome.

Key words: *acute pancreatitis, bacterial super infection, multiple organ failure*

Introduction

Acute pancreatitis has various prognosis and incidence of complications, depending on the severity of the organ inflammation. Milder forms subside without major complications and with low acute pancreatitis has various prognosis and incidence of complications, in dependence of the severity of the organ inflammation. Milder forms subside without major complications and with low mortality, while severe acute pancreatitis is a serious event with frequent involvement of several organs or organ systems. Defined diagnostic criteria listed in literature assist in the prognosis of severe acute pancreatitis. According to Ranson, severe pancreatitis is an entity which comprises at least three criteria[1]. In particular, severe alcoholic pancreatitis is also characterized by at least three scores on Glasgow scale[2].

Patients and Methods

The studied patients were hospitalized in our intensive care unit in the five years. Eighty-two patients of different age were admitted with clinical picture of severe pancreatitis. Many of them had other associated diseases (COPD, liver lesion, myasthenia gravis etc.). In 35 cases acute pancreatitis was the consequence of biliary calculosis or postcholecystectomy syndrome, and in 29 cases of alcoholism. Seven patients had recurrent clinical picture of pancreatitis. APACHE II score was estimated at admission (APACHE II_0), after 24 h, 48 h, 72 h, and on the 4th, 7th, 10th and 14th day (APACHE $II_{1,2,3,4,7,10,14}$)[3]. Scoring according to Ranson and Glasgow criteria was estimated. Statistical analysis of the results was done. The outcome of acute pancreatitis depending on etiology was observed in the whole group, as well as the frequency of complication and involvement of other organs systems.

Results

In the five years period 82 patients with severe acute pancreatitis were admitted in medical intensive care unit. Severe form of acute pancreatitis in this period was more frequent in men (54 male) than women (28 female). Mortality rate was 17.1% (Table 1). The difference in the severity of clinical settings defined by APACHE II score, Ranson's and Glasgow criteria at admission and after 24 hours between those who survived or died was strongly

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TABLE 1
PATIENTS WITH SEVERE ACUTE PANCREATITIS HOSPITALIZED IN MEDICAL INTENSIVE CARE UNIT

Pts	Age	Sex	Apache II0 $\bar{X}$+SD	Apache II1 $\bar{X}$+SD	Ranson	Glasgow	Outcome
1-82	52.4+16.6	54 M + 28 F	10.7+9.6 Median 9	10.3+7.4 Median 9	4.7+11.0 Median 3	3.7+11.0 Median 2	68 Alive 14 Dead

TABLE 2
INFLUENCE OF THE SEVERITY OF CLINICAL PICTURE ON DISEASE OUTCOME

Scoring	Apache II0 $\bar{X}$+SD	Apache II1 $\bar{X}$+SD	Apache II3 $\bar{X}$+SD	Ranson $\bar{X}$+SD	Glasgow $\bar{X}$+SD
Alive	9.8+9.8	8.1+4.5	7.1+4.2	2.79+1.8	1.96+1.6
Dead	15.5+7.1	20.1+9.8	19.8+12.2	6.42+1.2	4.64+1.3
p	0.04	0.000	0.000	0.000	0.000

TABLE 3
ETIOLOGY AND OUTCOME OF SEVERE ACUTE PANCREATITIS

Diagnoses	Pts alive (dead)	%
Cholelythiasis, St.post cholecystectomiam	35 (4)	(11.4)
Alcoholisms	29 (7)	(24,1)
Other	18 (3)	(16.6)
Total	82 (14)	(17.1)

TABLE 4
FREQUENCY OF COMPLICATIONS IN SEVERE ACUTE PANCREATITIS AND INFLUENCE ON SURVIVAL

Abscess and/or Sepsis	Pseudo-cyst	Artificial Ventilation	Acute Hemodialysis	Outcome
9	13	4	4	Alive
4	2	5	5	Dead

statistically significant (Table 2). Predominant ethyology were biliary disease and alcoholism. The mortality rate in alcoholism was the highest one (Table 3). Mortality in patients with severe acute pancreatitis was expectedly higher in pancreatitis due to alcoholism. Very severe forms of acute pancreatitis were associated with failure of other organs. Respiratory and renal failure which demanded artificial ventilation and/or haemodialysis were a particularly ominous sign (Table 4).

Respiratory failure is very serious complication of severe acute pancreatitis. In Figure 1 is presented ARDS as a complication of this disease, in Figure 2 X ray of lungs after improvement with artificial ventilation in the some patient. Development of pancreatic collection is one additional possible complication of severe pancreatitis. Figure 3 demonstrate peripancreatic drainage as useful procedure to eliminate inflammatory collection.

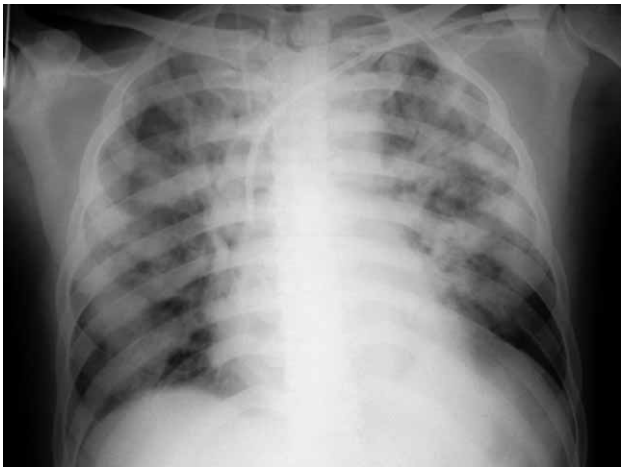

Fig. 1. ARDS in patient with severe pancreatitis on artificial ventilation.

Discussion

Clinical picture of acute pancreatitis varies from mild and moderate disease, which affects only the pancreas, to severe forms characterized by deterioration of function of other organs or organ systems. Clinical picture of acute pancreatitis varies from mild and moderate severe disease, which affects only the pancreas, to severe forms characterized by deterioration of function of other organs or organ systems and development of multiple organ dysfunction/failure as a final consequence and a need for organ substitution. Vigorous volume replacement in acute pancreatitis is in all situations unavoidable recommendation, because of significant volume loss (vomiting, sweeting, loss in »third space«) Acute renal failure is in the first phase common extrarenal origin, but septic complications, coagulation disturbances as well as toxic reasons (infection itself, associated medication and other reasons) lead to intrinsic reasons. Intermittent hemo-

Fig. 2. Control chest X-ray, at discharge.

dialysis or continued extracorporeal procedures in the case of circulatory instability by patients with acute renal failure can help in survival of these patients, as our survived patients showed[4]. Complications and lethal outcome in mild forms of pancreatitis practically do not occur, but severe acute pancreatitis is characterized by more serious prognosis and involvement of several organ systems like respiratory insufficiency, renal failure, coagulation disturbances, and gastrointestinal tract bleeding etc.[5]. Our results point to bacterial super infection in »chemical« inflammation, with impairment and failure of primarily respiratory and renal function, sometimes associated with bleeding from the upper gastrointestinal tract. The predictive value of different scoring systems, like APACHE II, Ranson and Glasgow, is maybe limited, but showed which patients are in significant higher risk for death (Table 2). These data are observed also by other authors[6,7]. These data emphasize the need for multidisciplinary approach in the treatment of this condition. Exacerbation of severe acute pancreatitis with necrosis and hemorrhage results in respiratory insufficiency and cardiovascular hemodynamic impairment and very high mortality of over 90%. Involvement of other organ systems demands team work and consultation of other specialists (respiration monitoring, hemodialysis, photocoagulation, sclerotherapy of localized bleeding in the upper gastrointestinal tract)[8]. Severe respiratory insufficiency caused by secondary ARDS development, or by pneumonia, caused mostly by nosocomials should be treated by mechanical ventilation according ARDSNET guidelines and with appropriate chosen antibiotics not rare together with antifungal drugs. When respiratory insufficiency start to improve it is possible to switch to noninvasive mechanical ventilation (see X-ray Figure 1 and Figure 2 from one of our survived patients).

Various possibilities of better management of severe acute pancreatitis are being investigated, among others place and role of prophylactic antibiotic therapy in chemical necrosis, place and role of parenteral in relation to enteral nutrition, etc. Two studies showed better survival of patients who received antibiotic prophylaxis (imipenem, ciprofloxacin, ceftazidine) compared to those on placebo[9,10]. However, these results were later not confirmed. Prophylactic antibiotic therapy is today, even in severe acute pancreatitis, not recommended. Other side it is absolute need for antibiotic therapy in the case of documented and confirmed infection by fine needle biopsies. Very common this strategy is more from theoretical significance and in the case of suspected infection after few days antibiotic therapy is indicated. The choice of antibiotic therapy is of course important. In the case, that there is not antimicrobial specimen, antibiotic penetrating in pancreas parenchyma like imipenem, meropenem, ceftazidim are important. Enteral nutrition at the level of jejunum in severe pancreatitis did not show worse results than parenteral nutrition. Enteral nutrition with nasojejunal tube is important to prevent bacterial translocation from the gut and to restore integrity of enteral

Fig. 3. Percutaneus drainage of peripancreatic collection.

mucosa[11,12]. On the other hand, parenteral intravenous therapy with solution of glucose and amino acids represents appropriate nutrition, since it does not increase amylase secretion, as has been proven in experiments[9]. Regarding the sex distribution of our patients with severe pancreatitis, this disease is more frequent in males, as a consequence of cholelithiasis or postocholecystectomy syndrome, and alcoholism. The development of pancreatic collection needs percutaneous drainage on time, this will show possible bacterial super infection, and targeted antibiotic therapy. Removal of the colliquative content, can significantly improve the general condition and/or eliminate the need for surgical intervention [10, 11]. According to our results, severe acute pancreatitis is often associated with deterioration of function of other organ systems. Respiratory failure which demands artificial ventilation is the most serious prognostic indicator. Exacerbation of hemorrhagic necrotizing pancreatitis leads to respiratory failure of such degree that it demands artificial ventilation frequently has lethal outcome (according to our results, in over 85% of cases). Suppuration with or without the development of pseudocyst has better prognosis, after percutaneous drainage as a final solution in some cases, as our Figure 3 showed, this is also confirmed from others[13]. In some cases percutaneous drainage is useful as a preparation for later surgical intervention. Analysis of our results shows that severe acute pancreatitis is as a rule a severe systemic disease with severe multiple organs dysfunction and at the end multiple organ failure. Supportive therapy of different organ systems is very important to bridge acute insufficiency phase. The improvement of severe acute pancreatitis will lead to stabilization of organ failure and break of vicious circle. If the clinical picture is due to superimposed bacterial infection (most common in pancreas or lunge, as in some our patients), this will lead to multiple organ failure, the final outcome frequently depending also on the possibility to manage superimposed bacterial infection with antibiotics or adequate surgical operation on time. It is important to stress that surgical procedure should be postponed until adequate demarcation of necrotizing pancreas parenchyma occurred which is observed mostly after 6 weeks time. The prompt surgical therapy is only indicated in the case of abscess formation with confirmed bacterial infection of pancreatic parenchyma. The severe acute pancreatitis with multiple organ failure is much more clinical syndrome, characterized with basic illness (pancreatitis) on one side and failure of different organ system (respiratory, renal, GI, cerebrovascular, coagulation) on the other. Prognosis of this syndrome, according our results, depends not only from pancreatic gland improvement, then also on control and stabilization of systemic manifestations of this multi organ dysfunction syndrome, as others also observed[14].

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V. Gašparović

University of Zagreb, School of Medicine, University Hospital Centre Zagreb, Department of Internal medicine, Division of Intensive Care medicine, Kišpatićeva 12, 10000 Zagreb, Croatia
e-mail: vgasparovic111948@yahoo.com

TEŠKI AKUTNI PANKREATITIS KAO DIO SINDROMA VIŠESTRUKOG POREMEĆAJA FUNKCIJE ORGANA

SAŽETAK

Akutni pankreatitis je stanje sa različitim kliničkim manifestacijama. Blagi i umjereno teški oblik akutnog pankreatitisa je oboljenje karakterizirano kemijskom upalom, koja u pravilu prolazi bez većih komplikacija. Klinička slika teškog pankreatitisa kompliciran je oštećenjem niza organskih sustava i često ima karakteristike višestruke disfunkcije organa ili čak zatajenja s ili bez bakterijske superinfekcije. Obradili smo 82 bolesnika s kliničkom slikom teškog akutnog pankreatitisa upućenih u Intenzivnu jedinicu, od kojih je 14 završilo letalno. Smrtnost pacijenata s teškim pankreatitisom statistički značajno korelirala je težini kliničkog stanja prema APACHE II skoru, te višim skorovima po Ranson i Glasgow kriterijima. Pravovremena volumna nadoknada i perkutane drenaže inficirane pankreasne kolekcije smanjuje rizik lošeg ishoda.