

Severe Acute Pancreatitis in the Intensive Care Unit for Surgical Emergencies

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Abstract

Acute necrotizing haemorrhagic pancreatitis (ANHP) represents 10 to 25% of all forms of acute pancreatitis (AP). Their high mortality and morbidity are related to the onset of multiple organ dysfunction syndrome (MODS) and superinfection of necrosis. The principal aetiologies are gallstones (45%) and ethyl poisoning (35%).

We analysed 204 cases of acute necrotizing haemorrhagic pancreatitis hospitalized in the intensive care unit for surgical emergencies of the Ibn Rochd University Hospital in Casablanca.

The aim of this descriptive study is to analyse the epidemiological, clinical, radiological, therapeutic, and evolutionary data of ANHP. The severity of AP was defined by a Ranson score > 3 and APACHE II > 8, visceral failure and the presence of extensive necrosis.

The average age was 52, with a female predominance. Biliary aetiologies remained the most frequent (81%). Pain and vomiting were present in 95% and 77% of cases, respectively. Abdominal ultrasound revealed gallbladder lithiasis in 60% of patients and abdominal CT scan revealed several necrosis casts in 49% of cases. Treatment was mainly symptomatic and the course was marked by 38% mortality.

Several prognostic factors were found: female sex, haemodynamic and/or respiratory distress, high severity scores, infection, and length of hospitalization.

Keywords: *Acute Necrotizing Haemorrhagic Pancreatitis (ANHP); Acute Pancreatitis (AP); Multiple Organ Dysfunction Syndrome (MODS)*

Introduction

Acute necrotizing haemorrhagic pancreatitis is a severe acute pancreatitis with poor prognosis and whose overall mortality rate can reach 80% in patients hospitalized in intensive care units. The current concept of the illness has changed and AP, in its severe form, is considered a systemic illness. The pathogenesis and intracellular mechanisms of this pathology have been studied and are currently better known, allowing important therapeutic changes. The purpose of the diagnostic process is to make the positive diagnosis, assess the initial severity and complications. The therapeutic management is above all symptomatic due to the lack of specific treatment.

We propose, through a series of 204 cases, to analyse in a descriptive way the epidemiological, clinical, radiological and evolutionary aspects of severe AP.

Materials and Methods

This is a retrospective study of 204 patients admitted to the resuscitation ward for surgical emergencies of the Ibn Rochd University Hospital in Casablanca, with severe AP. The study ran from January 2015 to December 2020. The cases selected were those with severe AP, confirmed by abdominal computed tomography and whose severity was judged by high biologic and clinical scores (Ranson, BISAP, IMRIE, APACHE II), visceral failure and the presence of extensive necrosis.

Results

Patients characteristics are summarized in table 1. The mean age of the patients was 52 years [24 - 80] with a maximum incidence between 51 years and 60 years and female predominance (73.5%).

	n = 204
Female	150 (73.5%)
Male	54
Mean age (range)	52 (24-80)
Biliary cause	166 (81.37%)
Alcohol	27 (13.23%)
Other or unidentified cause	11 (5.4%)
Mean BISAP score in 48h (range)	2.41 (1-5)
Mean hospital stay (range)	17 (7-21)
Hospital deaths	78 (38.23%)

Table 1: Characteristics of patients with acute pancreatitis.

Biliary origin was found in 166 cases (81.37%) and 67.65% of patients (138 patients) had no history of bilio-pancreatic illness. Alcohol was the cause in 27 cases (13.23%).

The most frequent functional signs were pain and vomiting with respective rates of 95.1% and 77.5%.

The physical signs were dominated by epigastric defence (41%) and abdominal meteorism (16.7%).

On admission, 70 patients (34.3%) were in shock, 82 (40.2%) presented with respiratory distress, 58 (28.4%) had neurological disorders, and 78 patients had renal failure.

Abdominal ultrasound was performed in 172 patients showing gallstone in 104 patients (60.5%), a dilated main bile duct in 24 patients (13.9%), and an edematous pancreas with necrosis cast in 41.9% of cases (72 cases).

152 patients underwent a computed tomography scan. The Modified CT Severity Index was then used. In 65.8% of cases, the total score was greater than 7.

Metabolic disturbances were dominated by hyperglycaemia (80.4%) and renal failure in (57.8%).

Ranson and IMRIE scores were used for 184 patients (90.2%) at admission and in 48h. They were greater than 3, respectively, in 58.7% and 66% of patients.

BISAP score in 48h was assessed in 172 patients. A scoring of 2 was found in 67 cases (40%), 3 in 45 cases (26.1%), 4 in 19 cases (11%), and 5 in 7 cases (4%).

The medical treatment aimed at the correction of the hydro-electrolyte disturbances (fluid resuscitation and/or vasoconstrictors).

Early enteral nutrition by jejunal tube or jejunostomy was preferred to parenteral nutrition.

Analgesia was provided by morphine derivatives.

Antibiotic therapy was initiated in the event of a strong suspicion of superinfection or in the event of a documented infection.

Surgical treatment consisted of cholecystectomy in 76 patients, abscess drainage in 48 patients, necrosectomy in 28 cases, and percutaneous drainage in 12 patients.

The outcome was favourable for 126 patients (61.76%). The average hospital stay was 17 days with extremes going from 7 to 21 days.

78 deaths were recorded, i.e. 38.23% of patients, and sepsis was the leading cause.

CT grade	Grade score	Definition
A	0	Normal pancreas
B	1	Pancreatic enlargement
C	2	Pancreatic inflammation and/or peripancreatic fat
D	3	Single peripancreatic fluid collection
E	4	≥ 2 fluid collections and/or retroperitoneal air
% of necrosis	Necrosis score	Definition
None	0	Uniform pancreatic enhancement
< 30%	2	Non-enhancement of region(s) of gland equivalent in size of pancreatic head
30-50%	4	Non-enhancement of 30-50% of the gland
> 50%	6	Non-enhancement of over 50% of the gland
CT Severity Index	Morbidity	Mortality
0-1	0	0
2-3	8%	3%
4-6	35%	6%
7-10	92%	17%

Table 2: CT Severity Index (Modified from: Balthazar EJ, Robinson DL, Megibow AJ, Ranson JH. Acute pancreatitis: value of CT in establishing prognosis. *Radiology*. 1990; 174:331-6 [10].

Discussion

Severe acute pancreatitis is an acute inflammation of the pancreas with the persisting involvement of regional tissues or organ systems [1]. Acute necrotizing pancreatitis accounts for 10 to 25% of AP, with a mortality rate reaching 80%. It is greater than the 10% mortality rate of AP.

The diagnosis of acute pancreatitis can be done in the presence of at least two of three criteria: abdominal pain consistent with the disease, serum lipase greater than three times the upper limit of normal, and characteristic computed tomography findings [8].

Severity of acute pancreatitis is defined by a persistence of organ failure for more than 48 hours [9,14].

Gallstones and alcohol consumption account for 80% to 90% of the aetiologies. The role of aetiology as a prognostic factor has also been studied. Alcohol, hyperlipidaemia, obesity (BMI > 30 kg/m²) and postoperative AP are linked to a worse prognosis.

In our study, it is the simple enzyme assays for lipasemia which made it possible to diagnose AP. Clinical signs in conjunction with lab tests (BUN, creatinine, leucocytes, LDH, AST, hematocrit, calcium, glycaemia, base excess...) are necessary for the assessment of AP's severity [11].

From a radiological standpoint, ultrasound remains an excellent examination for the aetiological research of BP. In our series, it objectified pancreatic abnormalities in only 41.9% of patients and confirmed biliary aetiology in 60.5% of cases.

The indication for computed tomography (CT) for diagnostic purposes concerns difficult clinical situations, particularly patients seen late when serum enzyme concentrations are normal. A prospective study carried out on 204 patients proposes not to perform routine CT in the acute phase for a Ranson score equal to 2 and to perform late CT only in case of worsening of the clinical condition. This attitude is also the one supported by the American College of Radiology. In contrast, another prospective study of 231 patients concluded that the Ranson and IMRIE scores were not performing well enough to diagnose necrosis and that CT within the first 72 hours cannot be replaced or bypassed [3]. The ideal time to visualize pancreatic necrosis would be 2 to 3 days after the onset of symptoms [2].

Current recommendations call for an initial CT scan to assess necrosis and the extent of casting, which correlates directly with the severity of the involvement.

In our study, this examination was carried out in 152 patients (74.5% of cases) and revealed pancreatic lesions in favour of severe AP (stage E) in 100 patients, or 49% of cases.

The extent of necrosis is the principal criterion for assessing severity. There is currently no way to detect pancreatic necrosis as reliably as with a CT scan. The Dolphy study [3] showed that necrosis, and in particular its extent in terms of the percentage of pancreatic tissue affected, was an essential predictor of severity. In our study, Balthazar stage D-E was noted in 80% of our patients with a necrosis rate > 30% and a modified CT severity index ≥ 7 in 65.8% of those patients.

To target patients who will have an unfavourable course from the onset of symptoms, numerous studies have compared the bioclinical scores existing between them and / or with the radiological scores. It appears that no specific gravity score (Ranson, Imrie) or generalist gravity score (APACHE II, SAP) is really better [6]. For severity, their sensitivity is 57-85% and their specificity 68 - 85% [5]. Ranson and Imrie scores with an accuracy of about 70-80% and APACHE II of 77-88% (at admission and at 48 hours).

At admission, Ranson score had better diagnostic accuracy for predicting severity, organ failure, and mortality [4]. APACHE II score is the best suited for predicting mortality [4,11,13].

AP is a serious disease which, in its necrotizing form, requires urgent medical treatment and monitoring by a medico-surgical team in an intensive care unit. Currently surgery is increasingly restrictive in its indications, reserved mainly for infectious complications of necrosis, and in its therapeutic gesture with a tendency to preserve as much healthy pancreatic tissue as possible. Apart from perforation of a hollow organ, haemorrhagic shock, or land-locked gallstones, there is no indication for surgery in the initial management of AP [7].

Figure 1 illustrates the therapeutic process for ANHP.

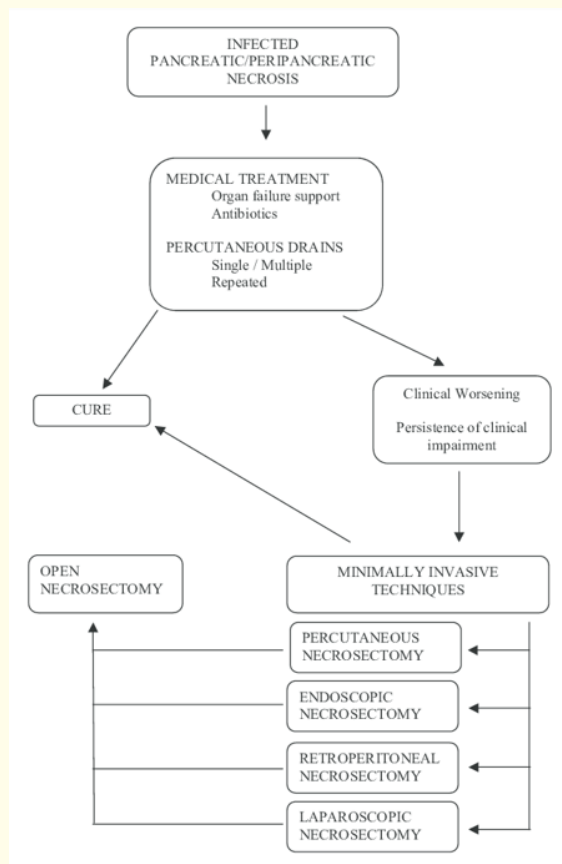


Figure 1: Therapeutic algorithm for acute necrotizing haemorrhagic pancreatitis.

Enteral nutrition has been shown to reduce morbidity and mortality over parenteral nutrition [5]. Oral “on demand” low fat solid diet can be offered to patients, with assessment of patients’ tolerance [6]. For intubated patients, enteral feeding may be delivered with a nasogastric feeding tube, unless there is evidence of gastric outlet obstruction, in which case endoscopic placement of a nasojejunal feeding tube or a jejunostomy may be pursued [4].

The death rate of acute necrotizing pancreatitis varies between 25 and 70%. In our series, this rate remains high and is 38%, compared to Bank., *et al*'s study with a 20% mortality rate for severe pancreatitis cases [16]. These deaths occur within 2 to 8 days, usually by MODS or septic shock. Hence, the interest in researching prognostic factors predicting the severity of pancreatic involvement.

The four significant endpoints in the Dolphy study [3] are age, objective pancreatic size, abnormal peri-pancreatic fat, and extent of necrosis. In our study, the significant criteria for the severity of the impairment found were female sex, the presence of haemodynamic and respiratory distress, high specific and nonspecific severity scores, infection, and prolonged hospital stay.

Conclusion

Acute necrotizing haemorrhagic pancreatitis (ANHP) is a severe acute pancreatitis with poor prognosis and an overall mortality rate of 25% liable to reach 80% for patients hospitalized in intensive care units.

In our study, this rate remains high (38%) due to infectious complications. Among all measures, some are the subject of controversy: sterile necrosis surgery, indications for biliary surgery and endoscopic retrograde cholangiopancreatography, early prophylactic antibiotic treatment and selective digestive decontamination as well as nutritional support.

Currently, no precise rule exists and no strategy has been able to show a significant advantage.

Ultimately, the management of ANHP, which is necessarily multidisciplinary, often remains a school issue, subject to local customs.

Conflicts of Interest

Authors have no conflict of interest to declare.

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