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Update of the Atlanta Classification of Severity of Acute Pancreatitis: Should a Moderate Category Be Included?

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Key Words
Pancreatitis, acute necrotizing · Multiple organ failure · Severity of illness index · Persistent organ failure

Abstract
Background: Persistent and multiple organ failure (POF and MOF) are predictive of death in acute pancreatitis (AP). Local complications without organ failure are associated with morbidity but a low risk of mortality. ***Aim:*** To design a three-category classification of AP severity and to compare it with the Atlanta Classification (AC) in terms of morbidity and mortality. ***Method:*** Severe AP was defined as death, POF (>48 h) or MOF. Moderate AP was defined as the presence of acute collections and/or pancreatic necrosis. Mild AP was defined by exclusion. We compared this classification with AC in 144 episodes of AP. ***Results:*** In the three-category classification, severe AP was associated with significantly more frequent intensive care unit admission, invasive treatment and mortality than moderate and mild AP ($p < 0.01$). Severe AP patients required longer hospital stay and more nutritional support than mild AP patients ($p < 0.01$). Patients with moderate AP had significantly longer hospital stay and more need for nutritional support than patients with mild AP ($p < 0.01$). Five patients died, all of them with MOF and/or POF. ***Conclusions:*** A three-category classification distinguishes three homogeneous groups of severity.

Introduction

Acute pancreatitis (AP) is a frequent disease (it is ranked third in the list of hospital discharges for gastrointestinal diseases) whose incidence has increased over the last decades [1]. Most patients with AP, approximately 80–85%, follow a favorable clinical course with a quick cessation of abdominal pain and beginning of oral nutrition within a few days, so a short hospital stay is likely. These patients usually suffer from interstitial pancreatitis which is characterized by edema in the gland. However, in 15–20% of the cases the disease development is not fa-

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Table 1. Severity criteria of acute pancreatitis (AP) according to the Atlanta Classification

	Atlanta Classification
Severe AP	At least one criterion: Pancreatic necrosis >30% Pancreatic abscess Pseudocyst SBP <90 mm Hg pO_2 ≤60 mm Hg Creatinine >2 mg/dl after rehydration Gastrointestinal bleeding >500 ml in 24 h Death
Mild AP	Absence of criteria of severe AP

SBP = Systolic arterial pressure.

vorable mainly because of organ failure and/or local complications. These patients usually suffer from necrotizing pancreatitis. Medical literature did not agree on the definition of AP, its local complications and severity until the early 1990s. Thus, definitions of pancreatic necrosis, abscess and pseudocyst were almost as heterogeneous as the number of published articles [2, 3]. The classification of organ failure associated with AP was not so clear. In 1993, a clinically based classification system was published after an international symposium on AP held in Atlanta in 1992. The Atlanta Classification (AC) was considered a revolution, a standard that made it possible to compare studies on AP. It defined AP, its local and systemic complications, and its severity (table 1). After more than a decade and for different reasons the AC needs revision. With regard to the classification of severity, the AC defines situations with quite different prognoses as severe: (1) a patient with organ failure has a higher risk of mortality than those patients with pseudocysts, pancreatic abscess or pancreatic necrosis without organ failure; (2) it does not define a validated organ failure scale; (3) it considers gastrointestinal bleeding as a systemic complication of AP when it is an infrequent fact, (4) finally, great progress has been made regarding the natural history of AP. We currently know that prognosis is not the same for every organ failure. Persistent organ failure (POF), exceeding 48 h in duration, is associated with a much higher mortality than transient organ failure [4, 5]. It has been shown that multiple organ failure (MOF) presents higher morbidity and mortality than single organ failure (SOF) [6, 7].

The classification of severity into 2 categories divides patients into a mild group that is homogeneous (low morbidity, no mortality) and a severe group that we consider as heterogeneous as it includes patients who die or have a high probability of dying as well as patients with a low probability of dying but a considerable morbidity. A three-category classification might identify a mild AP group without morbidity and mortality, a moderately severe group with high morbidity and low mortality, and a severe group with high morbidity and mortality, as described recently by Vege et al. [7] from the Mayo Clinic.

Our aim is to take part in the discussion about revising the AC. We propose a hypothetical three-category classification of AP severity based on the concept suggested by the Mayo Clinic group [7], and we compare it in a cohort of patients in terms of morbidity (hospital stay, need for ICU, nutritional support and invasive treatment) and mortality with the AC.

Methods

Three-Category Classification of Severity

In the severe AP category we included patients with a high risk of mortality: (1) patients who die; (2) patients who develop POF defined as a Marshall score of ≥2 for at least one of the following three organ systems for more than 48 h: respiratory (PaO_2 (mm Hg)/FiO_2 <300), renal (serum creatinine ≥1.9 mg/dl) or cardiovascular (systolic blood pressure <90 mm Hg, not fluid responsive) [8], and/or (3) patients with MOF (more than one organ affected, without considering its transient or persistent nature, according to the criteria established above). Moderate AP was designed to include patients with significant morbidity but low mortality risk. It includes patients without POF or MOF but with (1) acute collections and/or (2) pancreatic necrosis of >30%. The definition of these local complications was based on the AC. Mild AP was defined by exclusion of other categories and represents patients with low morbidity and no mortality.

Comparison of the Classifications of Severity

We used our prospective database on AP to check the morbidity and mortality of the different categories according to AC and the three-category classification. The database includes 200 variables about epidemiological, clinical, laboratory, image and outcome data about every patient admitted in the pancreatic unit of our center since December 2007. Inclusion criteria are: age ≥18, and diagnosis of AP based on at least 2 of the following: amylase levels 3 times the upper limit of normal, imaging compatible with AP and/or abdominal pain compatible with AP. Patients from other hospitals were excluded to avoid severity bias. The severity criteria of AC is shown in table 1.

General management of AP in our hospital is as follows: after admission a patient with adequate fluid resuscitation is put on a nil-by-mouth regimen and the vital signs are monitored. From the 3rd day after admission an abdominal CT is performed on those patients with C-reactive protein of ≥150 mg/l, persistent