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Disease progression of acute pancreatitis in pediatric patients

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ABSTRACT

Background: Approximately 10% of patients with acute pancreatitis (AP) progress to chronic pancreatitis. Little is known about the factors that affect recurrence of pancreatitis after an initial episode. We retrospectively investigated patients with AP, focusing on their outcomes and the predictors for disease progression.

Methods: Between July 2003 and June 2015, we retrospectively enrolled first-time AP patients with medical records on disease etiology, severity (according to the Atlanta classifications), and recurrence of AP. Independent predictors of recurrent AP (RAP) and chronic pancreatitis were identified using the logistic regression model.

Results: Of the total 159 patients, 45 (28.3%) developed RAP, including two episodes of RAP in 19 patients, and 9 (5.7%) developed chronic pancreatitis. The median duration from the time of AP to the onset of RAP was 5.6 ± 2.3 months. RAP patients were identified as more common among patients with idiopathic first-time AP. The presence of severe ascites, pancreatic necrosis, and systemic complications was independent predictors of RAP in pediatric patients. Experiencing over two RAP episodes was the predictor for developing chronic pancreatitis. No influence of age or number of AP episodes was found on the occurrence of abdominal pain, pain severity, and the prevalence of any pain.

Conclusions: Severity of first-time AP and idiopathic first-time AP are related to RAP. Recurrence increases risk for progression to chronic pancreatitis. The risk of recurrence increased with increasing numbers of AP episodes.

Introduction

Acute pancreatitis (AP) is uncommon but has serious effects for the individual, as the treatment requires inpatient hospital care and involves time, labor, and financial resources [1,2]. After the first attack of AP, approximately 20% of the patients will develop recurrent AP (RAP), usually with one or more recurrent episodes of AP [3,4]. To diminish suffering and deterioration caused by pancreatitis, it is imperative that there is a better understanding of the predictors associated with RAP and chronic pancreatitis (CP). The well-known risk factors for both AP and CP adult patients are being an alcoholic

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and smoking. Recent studies have suggested that >25% of patients developed RAP after the initial episode of alcoholic AP [5,6]. However, published data on the patients with nonalcoholic etiologies of AP or pediatric patients are limited, and the risk factors for RAP and CP after the first attack of AP are somewhat contradictory. RAP may also be closely associated with other possible risk factors, for example, obesity and endocrine and exocrine pancreatic malfunction.

AP may provoke morphologic changes such as ductal strictures, pseudocysts, and inflammatory masses, which have been referred to as the risk factors for RAP [7–9]. However, few empiric data have indicated whether, how often, and in which patients AP progresses to CP. At the same time, little information is known regarding the prognostic factors in pediatric patients with AP due to its low morbidity and mortality. Until the age of 18 y, AP patients are generally managed by pediatricians or pediatric surgeons. After the age of 18 y, these patients are managed by gastroenterologists. It is therefore important that gastroenterologists become aware of the natural course of the disease even from an early stage of childhood.

The aim of this retrospective study was to determine the development of RAP after the first AP and the risk factors before the CP attack. Here, we report the findings of our retrospective study on the risk of RAP and subsequent diagnosis of CP in a cohort of patients who had their first attack of AP between 2003 and 2014. This might help in attempts to understand the pathogenesis of recurrent disease and in preventing relapses and deterioration.

Methods

Patient characteristics

This is a retrospective study of all the pediatric patients (<18 y) admitted to our institution for AP in 2003–2014. This observational study protocol was approved by the ethics committee of the Chongqing Medical University. The Children's Hospital of Chongqing Medical University has a capacity of 1500 beds and can provide tertiary care in southwest China. Our institution is the only acute hospital care provider in this area, and although patients may be transferred to the hospital from elsewhere, there are no referrals of patients with AP from this hospital. The Department of Hepatobiliary Surgery is a level III, 50-bed ward and has 1000–5000 admissions per year. The medical records of the hospital are fully computerized, including clinician and nurse notes, laboratory tests, imaging examinations, and histopathology results. Objective data in the maternal, birth, and patient history before and at the time of admission to our facility were obtained. All medical records were scrutinized to confirm the diagnosis of AP. Regular blood tests, hepatic tests, prothrombin time, internationalized normalized ratio, color Doppler ultrasound, and endoscopy were performed in all patients and were available in the clinical records. A 64-slice computed tomography (CT) procedure was performed in 87 of 159 patients. Procalcitonin (PCT) and C reactive protein (CRP) were measured 24 hours from admission in all patients, and all local and systemic complications were recorded.

For patients who received a laparotomy, pathology, when available, was reviewed. We also collected successor data to evaluate hospital outcomes. After the end of the study, all patient data were reviewed to ascertain eligibility for inclusion into the study. Additionally, patients were excluded if they were receiving an experimental treatment trial or were unable to have regular follow-up assessments.

Diagnosis and definitions

The diagnosis of AP was estimated on two of the following three features: (1) presence of acute upper abdominal pain, (2) serum amylase and/or lipase greater than three times the upper limit of normal, and (3) characteristic performance of contrast-enhanced CT scan (if available). AP severity was graded as mild, moderate, or severe, determined according to the revised Atlanta criteria and acute physiology and chronic health evaluation–II. Complications and organ failure were evaluated by means of medical record analysis and CT scans, if available. Furthermore, according to the morphologic criteria revealed by radiological findings or ultrasound, the patients were classified into necrotizing or interstitial edematous pancreatitis. The criteria for pancreatic necrosis were as follows: (1) >3 cm of nonenhanced pancreatic parenchyma; or (2) >30% of the nonenhanced area of the pancreas. According to bacteriologic findings obtained during surgery, necrotizing pancreatitis was further classified into infected or sterile necrosis. RAP was defined as recurrent of second or more episodes of AP after the first AP attack. Chronic pancreatitis was diagnosed according to the Luneburg scoring method [10].

The detailed description for the characteristics of the patients is summarized in Table 1.

Table 1 – Clinical and analytical characteristics of the patients at first admission.

Groups	Biliary ($n = 62$)	Idiopathic ($n = 38$)	Virus ($n = 59$)
Age, mean (SD), y	4 (2.3)	8 (3.7)	5 (2.1)
CRP (mg/L), normal value: 0–10 mg/L	228.8 ± 101.5	273.2 ± 134.3	211.9 ± 88.6
PCT (ng/mL), normal value: 0–0.5 ng/mL	7.6 ± 2.6	11.4 ± 4.3	2.9 ± 1.1
Body mass index	28.3 ± 5.4	22.9 ± 2.9	23.1 ± 2.5
Serum amylase (U/L), normal value: 0–160 U/L	218 ± 47	247 ± 39	229 ± 76
Fasting time (d)	2.6 ± 0.7	4.1 ± 1.6	1.5 ± 0.9
Interstitial edematous pancreatitis (*n*)	57	30	59
Necrotizing (infected) (*n*)	0	2	0
Necrotizing (sterile) (*n*)	5	6	0
Surgical procedure(*n*)	46	8	0
Time to RAP, median (IQR), mo	5.3 (1.2–83)	3.9 (1.5–38)	0
RAP (%)	23	21	1
Chronic pancreatitis (*n*)	2	7	0

Values are expressed as the mean ± standard deviation.