Acute Pancreatitis: Assessment Severity with Ranson Score and CT Evaluation

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Background: *Severe acute pancreatitis is a complex and challenging problem. The aim of the present study was to assess severe acute pancreatitis (SAP) with Ranson score and CT scan.*
Material and Method: *Between January 2000 and December 2005, all patients who had each of the following criteria (1) first-time diagnosis of acute pancreatitis, (2) acute pancreatitis as the primary admitting diagnosis and (3) contrasted-enhanced computed tomography (CE-CT) were retrospectively reviewed.*
Results: *Ninety-eight patients that met the present study criteria were identified. Of these patients, 27 were defined as SAP by using Ranson criteria and/or CE-CT. Within SAP group, factors showing significance ($p < 0.05$) in the patients that had a Ranson score between ≥ 3 and < 3 were age and biliary tract stone.*
Conclusion: *The incidence of severe acute pancreatitis in Srinagarind Hospital was 27.5%. Biliary disease and alcohol abuse together accounted for 81.48% of severe acute pancreatitis patients.*

Keywords: *Severe acute pancreatitis, Etiology, Clinical characteristics*

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Acute pancreatitis is a common disease with relatively high morbidity and mortality. The disease is an inflammation disease of the pancreas that is associated with little or no fibrosis of the gland. Severe acute pancreatitis (SAP) develops in about 25% of patients with acute pancreatitis. SAP is linked to the presence of other end organs failure and/or local complications such as necrosis, abscess, or pseudocyst[1]. While the overall mortality of acute pancreatitis without necrosis is close to zero, the mortality of SAP may occur in 20 to 50% of patients[2]. The aim of the present study was to assess SAP with Ranson score and CT scan.

Material and Method

Between January 2000 and December 2005, all patients admitted to Srinagarind Hospital with a primary diagnosis of acute pancreatitis were retrospectively identified.

Patients were selected for the present study based on having each of the following criteria (1) first-time diagnosis of acute pancreatitis, (2) acute pancreatitis as the primary admitting diagnosis and (3) contrast-enhanced computed tomography (CE-CT).

Ranson criterion is a clinical prediction rule for predicting the severity of acute pancreatitis. It was introduced in 1974[3]. All parameters are shown in Table 1. Computed tomography severity index (CTSI) is a grading system used to determine the severity of acute pancreatitis. It was introduced in the early 1990's[4] by Balthazar EJ (Table 2).

Medical records were then reviewed for demographic data, etiology or risk factors to precipitate disease, signs and symptoms, complete blood count, blood sugar, lactate dehydrogenase, aspartate aminotransferase, amylase (serum and urine), Ranson criteria assessment, hospital course and duration of hospital stay. Mild acute pancreatitis was defined by Ranson score < 3 or CE-CT grade A, B, or C. SAP was defined by Ranson score $\geq$ 3 or CE-CT grade D or E.

Data analysis were presented by using mean, standard deviation, number of subjects and percentages. Comparisons were conducted using Chi-square test for category variables and Student's t-test for continuous variables. Statistical significance was defined as $p < 0.05$.

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Table 1. Ranson criteria for severity of acute pancreatitis

Parameters	Value
At admission	
Age	> 55 years
WBC count	> 16,000 cells/mm^3
Serum glucose	> 11 mmol/L (> 200 mg/dL)
Serum AST	> 250 IU/L
Serum LDH (ALT)	> 350 IU/L
At 48 hours	
Hematocrit	Decrease of more than 10%
Serum calcium	< 2.0 mmol/L (< 8.0 mg/dL)
Pao_2	< 60 mmHg
BUN	Increase of more than 5 mg/dL (1.8 mmol/L)
Base deficit	> 4 mEq/L
Fluid sequestration	> 6 L

Table 2. Computed tomography severity index (CTSI)

Grade	CT findings
A	Normal pancreas
B	Pancreatic enlargement
C	Pancreatic inflammation and/or peripancreatic fat
D	Single peripancreatic fluid collection
E	Two or more fluid collections and/or retroperitoneal air

Results

Ninety-eight patients that met the present study criteria were identified. Of these patients, 27 were defined as SAP by using Ranson criteria and/or CE-CT (Table 3). The positive predictive value was 64.2% (9/14), while the negative predictive value was 84.5% (71/84). The sensitivity was 40.9% (9/22), while the specificity was 93.4% (71/76).

Within the SAP group, factors showing significance ($p < 0.05$) between the patients with Ranson score ≥ 3 and the patients with Ranson score < 3 were age and biliary tract stone (Table 4).

Seven patients with biliary tract stone were performed with endoscopic sphincterotomy and stone removal, while three patients were performed with cholecystectomy and choledocho-jejunostomy. Only one patient was performed necrosectomy with drainage and continuous postoperative lavage. Two patients died during hospital stay, 42 and 44 years of age, from multiple organ dysfunction syndrome.

Discussion

The incidence of SAP in Srinagarind Hospital was 27.5%. In the present study, biliary disease and alcohol abuse together accounted for 81.48% of SAP patients, similar to other studies[5,6]. Even though the mortality of SAP was around 20-50%[2], two patients (7.4%) died in the present study. Some studies[7-9] suggested that the older the patients, the higher mortality they have. The oldest patient in the SAP group was 78 years old, but two who died were 42 and 44 years old. However, the mean age of patients with Ranson score ≥ 3 was significantly higher than patients with Ranson score < 3.

The use of CE-CT was shown to be an accurate method of predicting severity in patients with pancreatitis[4] and seemed to be superior to Ranson criteria[10]. In the present study, the sensitivity of Ranson criteria was only 40.9%, while CE-CT was 64.2%. However, the specificity of Ranson criteria was higher than CE-CT (93.4% vs. 84.5%).

All patients were initially treated medically, consisting of withholding oral intake, inserting nasogastric tube, providing pain relief, restoring fluid, and electrolytes intravenously and administration of

Table 3. Ranson score and CE-CT of the patients with acute pancreatitis

Ranson score	CE-CT		Total
	Grade D, E	Grade A, B, C	
≥ 3	9	5	14
< 3	13	71	84
Total	22	76	98

CE-CT = contrast-enhanced computed tomography

Table 4. Factors related to Ranson score of the SAP patients

Factors	Score < 3 (n = 13)	Score > 3 (n = 14)	p-value
Age (years)	35 $\pm$ 10.1	54.6 $\pm$ 19.9	0.007
Male	10	9	NS
Female	3	5	NS
Alcohol	6	6	NS
Biliary tract stone	2	8	0.046
Length of stay (days)	9 $\pm$ 4.1	13.7 $\pm$ 8.7	NS

SAP = severe acute pancreatitis

prophylactic antibiotics. If necessary, the surgical intervention was performed from low to high aggressive approach, because patients with stable severity did not benefit from operation[11]. In the case of biliary tract stone, endoscopic sphincterotomy and stone removal were tried before laparotomy with cholecystectomy and choledocho-jejunostomy.

Potential conflicts of interest

None.

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โรคตับอ่อนอักเสบเฉียบพลัน: การประเมินความรุนแรงด้วย Ranson score และเอกซเรย์คอมพิวเตอร์

พจน์ชวิทย์ อภินิเวศ, ชนันญา กรุณาสุเมตตา, วัชรพงศ์ พุทธิสวัสดิ์, โอวตือ แซ่เซียว

วัตถุประสงค์: *เพื่อศึกษาการใช้ Ranson score และการตรวจเอกซเรย์คอมพิวเตอร์ในการประเมินภาวะตับอ่อนอักเสบเฉียบพลันชนิดรุนแรง*

วัสดุและวิธีการ: *ผู้ป่วยที่มีลักษณะดังต่อไปนี้ (1) ได้รับการวินิจฉัยเป็นโรคตับอ่อนอักเสบเฉียบพลันเป็นครั้งแรก (2) โรคตับอ่อนอักเสบเฉียบพลันเป็นโรคหลักในการเข้ารับการรักษาในโรงพยาบาล (3) ได้รับการตรวจเอกซเรย์คอมพิวเตอร์ในระหว่างการรักษาในโรงพยาบาล ช่วงระหว่างปี พ.ศ. 2543 จนถึงปี พ.ศ. 2548 ถูกรวบรวม และวิเคราะห์ข้อมูลต่าง ๆ จากเวชระเบียน*

ผลการศึกษา: *ผู้ป่วยจำนวนทั้งสิ้น 98 ราย ที่ได้รับการวินิจฉัยเป็นโรคตับอ่อนอักเสบเฉียบพลัน ในจำนวนนี้ 27 ราย อยู่ในภาวะตับอ่อนอักเสบเฉียบพลันชนิดรุนแรง ปัจจัยที่เกี่ยวข้องกับการเกิดโรคตับอ่อนอักเสบเฉียบพลันชนิดรุนแรง เมื่อเปรียบเทียบกับโรคตับอ่อนอักเสบเฉียบพลันชนิดทั่วไป ได้แก่ อายุและนิ่วในทางเดินน้ำดีมีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติ*

สรุป: *อัตราการพบโรคตับอ่อนอักเสบเฉียบพลันชนิดรุนแรงในผู้ป่วยของโรงพยาบาลศรีนครินทร์ เท่ากับร้อยละ 27.5 ของผู้ป่วยที่เป็นโรคตับอ่อนอักเสบเฉียบพลันทั้งหมด โดยความผิดปกติในทางเดินน้ำดีและสุรา มีส่วนทำให้เกิดโรคตับอ่อนอักเสบเฉียบพลันชนิดรุนแรง ถึงร้อยละ 81.48*