

PROGNOSTIC VALUE OF EARLY CT IN PATIENTS WITH ACUTE PANCREATITIS

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Abstract

The purpose of this study was to determine whether early performing computer tomography is effective in assessing the prognosis of acute pancreatitis, highlighting the contribution of pancreatic necrosis as prognostic marker and to establish whether routine intravenous iodinated contrast agent is required when early CT is used for classifying the degrees of acute pancreatitis.

Key words: pancreas, pancreatic tumors, pancreatitis, CT, MRI

INTRODUCTION

Acute pancreatitis, an inflammatory disease of the pancreas, has a high incidence being able to evolve from mild to severe one, depending on the etiology rise to systemic complications such as multiple organ failure and sepsis. (McKay CJ, Imrie CW, 2004) Overall, about 20% of patients with acute pancreatitis present severe developments, and 10-30% of those with severe acute pancreatitis, die. (Isenmann R&co, 1997) Staging disease severity and early recognition of severe cases are essential so that the best treatment can be provided for each patient in order to reduce morbidity and mortality. (Beger HG&co, 1997). Clinical evaluation of acute pancreatitis is not reliable, because more than 50% of patients are diagnosed incorrectly. (Nordestgaard AG&co, 1986)

Studies in recent decades shows that computed tomography (CT) can help determine the prognosis of acute pancreatitis. This was correlated with the clinical evolution and complications, mortality in patients with acute pancreatitis. These findings have led to the development of CT severity score, a rating system that evaluates the inflammation of the pancreas and extrapancreatic space extension. (Balthazar EJ&co, 1985)

From the clinical point of view, acute pancreatitis can be mild or severe. Severe acute pancreatitis is usually the result of necrosis of the pancreas tissues. Morbidity and mortality associated with acute pancreatitis are substantially higher when necrosis is present, especially when the infected necrosis makes its way. Pancreas necrosis develops in 5-20 % of patients with acute pancreatitis. (Nordestgaard AG, 1986). This characteristic

feature is considered by some authors to be the most important for assessing morbidity and mortality because it is tied to the duration of hospitalization, mortality and local complications. For this reason, the evaluation of the pancreatic necrosis was added along with the degree CT - as a necrosis score - together constituting CT severity index.(Bradley EL III&co,1989)

Identification of pancreatic necrosis in CT is obtained only after intravenous administration of iodine contrast bolus devitalized areas being detected by the lack of contrast in the area concerned.(Wang YX&co,1999) The use of iodofil contrast is dependent of the creatinine clereance, this representing a risk of nephrotoxicity, particularly in patients with kidney failure and may also present potential adverse effects on the microcirculation of the pancreas sore.(Hill MC&co,1982)

Controversy exists regarding the time of performing the CT during the development of acute pancreatitis.(Clavien PA&co,1987) Most authors accept carrying out computer tomography (CT) at various intervals after the onset of symptoms, ranging from 48 hours to 10 days. Some authors recommended CT at 3-10 days after admission in case of severe acute pancreatitis, arguing that the CT scan is difficult to interpret before 72 hours and areas of necrosis are better defined after this period.(Yassa N&co, 1997)However, because necrosis develops within the first 2-4 days after onset of symptoms and rarely progresses, would clearly be advantageous to perform a CT scan early to estimate prognosis.(Glazer G, Mann DV.,1998)

Thus, the best time and the best way to perform a CT in order to obtain maximum results to assess the severity of acute pancreatitis remains uncertain.

MATERIAL AND METHODS

This observational, prospective and cohort study took place from March 2010-March 2014, over a total of 392 patients admitted with acute pancreatitis and was the result of a collaboration between departments Surgery I and Radiology at the Memorial County Hospital and departments of Surgery and Radiology at the Pelican Hospital Oradea.

Computed tomography visualizes pancreas in 98% of the cases; this imaging investigation is limited by the presence or the presence of flatulence and intestinal gastric stasis (2%). In 29% of the cases of acute pancreatitis, the appearance of the pancreas is normal and in other cases the followings are described: diffuse increase with convex margins, aspect of hypodense parenchyma/hipofixant, hyperdense aspect of pancreatic parenchyma (50 -70 UH)(Balthazar EJ&co,1993) in hemorrhagic pancreatitis, fluid collections intra/peripancreatic the exact balance of rockets, no pancreatic tissue iodofiliei - necrosis, peripancreatic fat

infiltration and thickening of perirenal fascia, pseudocyst: collection of fluid bounded by a dense own wall abscess - collection (Beger HG&co1997) of fluid bounded by thick sometimes containing gas bubbles, assessing the appropriateness and ways to approach optimal acute postpancreatitis cloazotate collections.(LupescuI.,2003)

By examining CT native, pancreatic lesions were evaluated according to the degree CT (Balthazar).

We analyzed also the absence or presence of pancreatic necrosis, defined as absence of contrast uptake in the pancreas after intravenous injection.

RESULTS AND DISCUSSION

254 patients with acute pancreatitis who were hospitalized in the Surgical Clinic of the Memorial County Hospital and in the Surgery department of the Pelican Hospital, were subjects to our study.

Acute pancreatitis has been caused, mainly, by gallstones in a rate of 57%, followed by alcohol in a rate of 31% and 12% of triglycerides ($p < 0.0001$) (Table. 1).

Table no. 1

Total patients = 254			<i>p</i> +
Etiology	Gallstones	144 (56,69%)	<i>p</i> < 0,0001**
	Alcohol	78 (30,71%)	
	Hypertriglyceridemia	32 (12,60%)	

Following the CT native, 139 patients had mild pancreatitis and 115 patients had severe pancreatitis (Table. 2).

Table no. 2

Mild acute pancreatitis	139 (54,72%)
Grade A	64 (46,04%)
Grade B	34 (24,46%)
Grade C	41 (29,50%)
Severe acute pancreatitis	115 (45,28%)
Grade D	47 (40,87%)
Grade E	68 (59,13%)

Out of the 254 patients, 9.84% (n = 25) had complications resulting from acute pancreatitis on CT with E grade (13 with pancreatic necrosis and

12 without pancreatic necrosis): 5 abscesses, 9 pseudocysts, 6 patients with severe multiple organ failure and 5 patients with sepsis (Table No. 3 - 4).

Table no. 3

		Mild Acute Pancreatitis	Severe Acute Pancreatitis	Total	<i>p</i> ⁺
Morbidity	Without complications	139	90	229	<i>p</i> < 0,000001*
	With complications	0	25	25	
Total		139	115	254	

Table no. 4

		Mild Acute Pancreatitis	Severe Acute Pancreatitis	Total	<i>p</i> ⁺
Mortality	With Death	139	109	248	<i>p</i> = 0,008007*
	Death	0	6	6	
Total		139	115	254	

Surgical debridement and drainage of abscesses was performed in 4 patients and internal drainage of pancreatic pseudochistelor was performed in 2 patients. Drainage shock was performed for an abscess and 5 extrapancreatic pseudocysts with total resolution of these collections fluid. Two very small pancreatic pseudocysts were resorbed spontaneously during drug treatment for acute pancreatitis.

6 patients died, 4 due to multiple organ failure and 2 due to sepsis.

All complications and deaths occurred in the group with severe acute pancreatitis, especially in patients with grade E in the native CT, with statistically significant difference for both morbidity ($p < 0.000001$) and mortality ($p = 0,008,007$) compared to patients with mild disease (Table No. 3 -4;). These findings confirm the results obtained in other studies.

The sensitivity and specificity of the early native CT to predict morbidity was 100% (25/25) and 60.7% (139/229) (Table 3).

The sensitivity and specificity of the early native CT for mortality was 100% (6/6) and 56.05% (139/248) (Table 4).

The value of pancreatic necrosis as a predictor of complications was evaluated in 115 patients with severe CT grade (D and E) (Table 5). Thus, 20% of patients had pancreatic necrosis, a percentage that corresponds to the range (5-20%) as described in the literature. The results showed a significant difference between groups $p = 0.000036$.

10 patients with necrosis on CT with contrast had favorable clinical evolution, 4 of these patients had grade D and the other 6 were grade E. In all 10 cases necrosis affected less than 30% of the pancreas.

In patients with high CT level, chances of developing severe complications were 8 times higher when necrosis was visible at CT than in its absence.

The sensitivity and specificity for early detection of pancreatic necrosis CT as a marker for prediction of complications was 52% (13/25) and 86.95% (80/92) (Table 5).

Table no. 5

		Without necrosis	With necrosis	<i>p</i> ⁺	<i>Odds ratio (95% CI)</i> <i>p</i> [†]
Morbidity	Without complications	80	10	<i>p</i> = <i>0,000036*</i>	<i>8,6667**</i> <i>3,1138 – 24,1218</i> <i>p < 0,0001</i>
	With complications	12	13		
Total = 115		92 (80%)	23 (20%)		

We also analyzed the value of pancreatic necrosis as predictor for mortality in patients with severe CT level. Death occurred in 5 of the 23 patients with necrosis, compared with one death, in a patient with grade E at CT out of 92 patients with pancreatic necrosis. Moreover, the final diagnosis of hemorrhagic necrotic pancreatitis could be confirmed by postmortem histopathology.

The increased risk of mortality for patients with necrosis was 25 times higher than for those without necrosis (Table 6).

Table no. 6

		Without necrosis	With necrosis	<i>p</i> ⁺	<i>Odds ratio (95% CI)</i> <i>p</i> [†]
Mortality	Without death	91	18	<i>p</i> = <i>0,000036*</i>	<i>8,6667**</i> <i>3,1138 – 24,1218</i> <i>p < 0,0001</i>
	With death	1	5		
Total = 115		92 (80%)	23 (20%)		

Finally, the sensitivity and specificity of necrosis for predicting death in the group of patients with severe CT level was 83.33% (5/6), respectively, 83.48% (91/109) (Table 6).

CONCLUSIONS

1. The early native CT examination of patients with acute pancreatitis in order to classify the CT degree of inflammation of the pancreas was a sensitive indicator of the degree of severity of acute pancreatitis and the patient's clinical course. Thus, none of the patients with mild disease (CT grade A, B and C) did not develop complications, while 21.73% of patients with severe disease (CT grade D, E) had complications and 5.21% died.
2. Thus, our study shows the validity of native CT as an imaging method for predicting the prognosis of acute pancreatitis when performed early, within 72 hours of the onset of symptoms.
3. 20% of the patients had severe CT grade pancreatic necrosis, a result that is within the range 5-20% described in the literature. Pancreatic necrosis was a good predictor of morbidity and mortality in this group showing high specificity, morbidity and mortality rate was 8, respectively 25 times higher in these patients than in patients in whom pancreatic necrosis was not detected in early contrast CT scan. However, even considering pancreatic necrosis as the main cause of morbidity and mortality in acute pancreatitis one should not overlook that patients with severe CT grade (D or E) may also be at risk and the present study demonstrated it comparing to the literature.
4. Retroperitoneal fat necrosis, which can melt and become infected, may be partially responsible for the development of local complications in this subgroup of patients. A significant shortcoming of current imaging techniques is their inability to distinguish between extrapancreatic fluid collections and fat necrosis.
5. In summary, the native CT performed early, within 72 hours after onset of symptoms, for highlighting inflammatory lesions of acute pancreatitis defined by CT grades proved to be a good predictor of prognosis for mild and severe disease by assessing the risk of morbidity and mortality. The absence of necrosis and favorable clinical outcome in all patients with mild disease makes contrast CT be indicated only in patients with severe native grade CT. Performing an early CT increases the specificity of an estimate prognosis in severe acute pancreatitis.

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