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Fluid Collections Associated With Acute Pancreatitis: A Pictorial Essay

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Abstract

The terminology and classification scheme of acute pancreatitis proposed at the initial Atlanta Symposium was reviewed, and a new consensus statement was recently proposed. Major changes include subdividing acute fluid collections in the first 4 weeks into ''acute peripancreatic fluid collection'' and ''acute necrotic collection'' based on the presence of necrotic debris. Delayed fluid collections have been similarly subdivided into ''pseudocyst'' and ''walled-off necrosis.'' Correct use of the new terms that describe these collections is important because they lead to different treatment decisions. The purpose of this article is to present an overview of fluid collections associated with acute pancreatitis, with an emphasis on their prognostic significance and impact on clinical management, and to illustrate the new terminology.

Résumé

La terminologie et la structure de classification relatives à la pancréatite aiguë formulées dans le cadre du premier symposium d'Atlanta ont été passées en revue et un nouvel énoncé de consensus a récemment été proposé. Les principaux changements comprennent la subdivision en deux catégories des collections liquidiennes aiguës qui surviennent au cours des quatre premières semaines d'une pancréatite aiguë, soit les « collections liquidiennes péripancréatiques aiguës » et les « collections nécrotiques aiguës », selon la présence ou non de débris nécrotiques. Les collections liquidiennes tardives ont également été subdivisées en deux catégories, soit les « pseudokystes » et les « nécroses kystiques collectées ». Il est important de recourir à la nouvelle terminologie pour décrire ces collections, puisque celles-ci mènent à des décisions distinctes en matière de traitement. Cet article vise à fournir un aperçu des collections liquidiennes associées à la pancréatite aiguë, en portant une attention particulière à leur signification pronostique et à leur incidence sur la prise en charge clinique, ainsi qu'à illustrer la nouvelle terminologie.

Key Words: Acute pancreatitis; Fluid collection; Walled-off necrosis; Computed tomography; Magnetic resonance imaging

Acute pancreatitis is an acute inflammatory disease of the pancreas that may also involve peripancreatic tissues and even remote organs. Different clinical or radiologic scoring systems to predict severity and outcome in acute pancreatitis have been developed since the early 1980s. In 1992, the Atlanta Symposium developed a consensus statement that defined both severe acute pancreatitis and its complications [1]. Recently, the terminology and classification scheme proposed at the initial Atlanta Symposium was reviewed, and a new consensus statement proposed [2]. Major changes include subdividing acute fluid collections in the first 4 weeks into ''acute peripancreatic fluid collection'' (APFC) and ''acute necrotic fluid collection'' (ANC) based on the presence of necrotic debris. Delayed fluid collections have been similarly subdivided into ''pseudocyst'' and ''walled-off necrosis'' (WON). The terms such as pancreatic abscess and phlegmon have been abandoned [2]. Appropriate use of the new terms that describe the fluid collections is important for management decision making for patients with acute pancreatitis [3].

Currently, contrast-enhanced computed tomography (CT) is the mainstay of imaging in evaluating the extend and evolution of acute pancreatitis and its complications [4]. The

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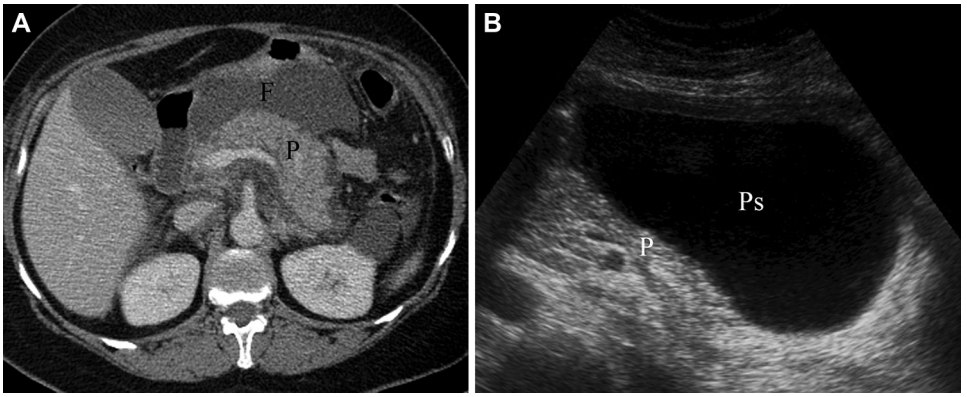

Figure 1. Evolution of a pseudocyst. Interstitial oedematous pancreatitis in a 64-year-old woman with gallstones. (A) A contrast-enhanced computed tomography (CT) image, obtained at admission, revealing acute peripancreatic fluid collection (F) predominantly collected in the lesser sac. (B) An ultrasound image of the same patient, obtained 5 weeks after the CT, showing the development of a pseudocyst (Ps) in the lesser sac. P = pancreas.

main role of magnetic resonance imaging (MRI) is in the assessment of fluid collections for the presence of solid necrotic debris in patients for whom drainage is being considered, because CT may show fluid that appears to be moderately homogeneous and fail to detect necrotic debris [5,6]. MRI is also useful for those patients with contrast allergy or renal insufficiency and as magnetic resonance cholangiopancreatography for the assessment of a disconnected pancreatic duct. The purpose of this article is to illustrate the new terminology for fluid collections in acute pancreatitis and to show their prognostic significance and impact on treatment.

APFCs

APFC is a collection of enzyme-rich pancreatic juice predominantly collected adjacent to the pancreas. It develops within the first 48 hours in 30%-50% of patients with acute pancreatitis [7]. APFC is most frequently collected in the lesser sac but may be seen in the anterior pararenal space (most commonly, left); transverse mesocolon; mesenteric root; and gastrohepatic, gastrosplenic, and gastrocolic ligaments (Figure 1). Most of the APFCs remain sterile and disappear spontaneously within 2-4 weeks in 50% of the patients. When APFCs do not resolve, they evolve into pseudocysts after 4 weeks or more but occasionally sooner [7].

In the first week of acute pancreatitis, differentiation between APFC and ANCs may be difficult because both fluid collections may appear as areas of nonenhancement. If nonenhancing components of variable attenuation are seen in these collections, then the diagnosis of peripancreatic necrosis with nonliquified components (hemorrhage, fat, and/or necrotic fat) is suggested [3].

Pancreatic Pseudocysts

Pancreatic pseudocyst is defined as a fluid collection of pancreatic juice enclosed by a nonepithelialized wall of fibrous or granulation tissue [1]. Formation of a pseudocyst usually requires at least 4 weeks from the onset of interstitial oedematous pancreatitis, and they occur in approximately 10%-20% of cases. Pseudocysts usually develop in the lesser sac, although they may be seen in anywhere from the mediastinum to the pelvis or even present in the thigh (Figures 1B and 2) [8]. On contrast-enhanced CT, pseudocysts are usually seen as a thin-walled (1-2 mm), round or oval cystic lesion, with a density <20 HU [7]. Their walls may be thick and irregular, and develop calcification over the time. Pseudocysts are uniloculated, encapsulated fluid collections that are seen as hypotense on T1-weighted and hyperintense on T2-weighted images (Figure 3). Enhancement may be observed in the walls on contrast-enhanced CT or MRI [9]. Pancreatic pseudocysts have been reported to communicate with the pancreatic duct in 25%-58% of cases [7,8].

Approximately 50% of pseudocysts are asymptomatic and resolve spontaneously over time [7,8]. Occasionally, spontaneous drainage into adjacent stomach or transverse colon may develop [10]. Only half of the nonspontaneously resolved pseudocyts cause clinical symptoms or complications such as pain, secondary infection, hemorrhage related to the erosion of adjacent vessels, systemic inflammatory response syndrome due to the rupture into the peritoneal cavity, and bile duct obstruction or gastric outlet obstruction due to the mass effect [10]. Pseudocysts should be treated with percutaneous or endoscopic drainage or with surgery if they are symptomatic, their size is larger than 5 cm or gradually increasing, and if they persist longer than 6 weeks [10].

According to the new definition, pancreatic pseudocysts should be described as noninfected or infected. Infected (suppurative) pseudocyst is the new name for what had been described in the Atlanta Symposium as a pancreatic abscess [1,2]. An infected pseudocyst is a well-circumscribed, pus-containing, encapsulated fluid collection near the pancreas. The only reliable sign of an infected pseudocyst on CT is gas, with or without fluid levels within the lesion, being seen in