

The Imaging Assessment of the Severity of Acute Pancreatitis May Change in the Near Future

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The diagnosis and the assessment of the severity of acute pancreatitis has been completely revolutionized by the routine use of dynamic contrast-enhanced computed tomography (CT) in clinical practice. Furthermore, objective CT assessment of the disease has made the various diagnostic and therapeutic studies on acute pancreatitis comparable for the first time [1, 2, 3, 4]. CT has two major roles for patients with suspected acute pancreatitis: to evaluate the severity of the inflammatory process and to detect the complications of the disease, such as the identification and quantification of parenchymal necrosis early. The CT severity index proposed by Balthazar *et al.* [5] is at present largely applied in all pancreatological centers in the world in order to assess and to stratify the severity of acute pancreatitis. Because the CT findings of necrosis may be equivocal during the first 24-48 hours, it has been suggested that the initial CT scan obtained in patients with clinically severe acute pancreatitis should be done after this period [6, 7]. CT is also largely used to obtain pancreatic specimens for microbiological examination in order to detect the presence of bacterial contamination in pancreatic necrosis [8]; using this imaging technique, we are also able to treat some of the complications of acute pancreatitis such as infected fluid collections and pseudocysts [9, 10].

The rapid appearance of new imaging techniques may change the present scenario in some respects. The first of these studies

regards magnetic resonance imaging (MRI) which has been proposed as a reliable method for staging the severity of acute pancreatitis [11]. Arvanitakis *et al.* studied 39 consecutive patients with acute pancreatitis in whom the severity was clinically assessed by using the Atlanta criteria. CT examination was used as a comparative imaging technique and the Balthazar criteria were used to measure the imaging severity of the illness. MRI and CT were carried out within 5 days of the onset of symptoms and within 3 days of admission. A significant correlation was found between the CT and MRI severity indices on admission and seven days later. After intravenous injection of secretin, a pancreatic duct rupture was observed in 17% of the patients with severe pancreatitis. Furthermore, the MRCP findings correlate with those of ERCP in 11 (73%) of the 15 patients with biliary pancreatitis in whom the MRCP was carried out before ERCP. From these results, it seems that, from a diagnostic point of view, MRI is similar to CT for assessing the severity of acute pancreatitis and MRI seems to be better than CT in assessing the etiology of the illness as well as the pancreatic duct disruption in patients with necrotizing acute pancreatitis. From an interventional point of view, at present, CT remains, obviously, a better radiological approach to necrotizing pancreatitis than MRI.

Transabdominal US, especially in European countries, represents the first imaging technique usually utilized for evaluating

patients with acute pancreatitis, but plays only a limited role in its diagnosis, even if it is a good technique to assess the etiology of acute pancreatitis [12]. US can detect an increased volume of the inflamed pancreas, changes of the pancreatic parenchymal structure and the presence of local fluid collection. The use of Doppler technology may give information about potential vascular complications such as the thrombosis of the splenic vein. Similar to CT, US may also be used by clinicians for assessing the possible infection of necrosis and for treating some complications such as pseudocysts [13]. The appearance of echo-enhancers has led to the possibility of better evaluating the vascularization of the pancreas and it is now used for the diagnosis of pancreatic cancer [14]. Very recently, using the same methodological approach of Arvanitakis *et al.* [11], German researchers have proposed echo-enhanced ultrasound as a valid technique in the initial approach to severe pancreatitis [15].

The German researchers carried out echo-enhanced US within 72 days of admission and CT was performed in each patient four hours after US. The Balthazar criteria were used to measure the imaging severity of the illness. Thirty-one consecutive patients with acute pancreatitis were studied and a significant correlation was found between the CT and US severity indices. Furthermore, a good correlation between US and CT was also found for the extent of pancreatic necrosis and the spread of acute fluid collections.

What conclusion can be drawn from these studies? The CT index remains, of course, the best index for evaluating the severity of acute pancreatitis and it can be used in conjunction with other more recent imaging techniques such as MRI and contrast-enhanced US; MRI seems to be the technique of choice to detect disruption of the main pancreatic duct in patients with necrotizing pancreatitis and also to assess the biliary origin of acute pancreatitis; the contrast-enhanced US may become the imaging technique of choice in assessing the severity of acute pancreatitis in emergency situations. Further studies are necessary to assess the clinical impact of

these new imaging techniques in larger series of patients with acute pancreatitis.

Keywords Contrast Media; Magnetic Resonance Imaging; Pancreatitis, Acute Necrotizing; Tomography, X-Ray Computed; Ultrasonography

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