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MULTIMEDIA ARTICLE - Clinical Imaging

Air in the Wirsung Duct. An Unusual Finding

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Air in the pancreas is frequently reported to be associated with an abscess or a pancreatic fistula but has also been demonstrated in normal pancreatic glands. Air in the Wirsung duct has been reported in three pediatric patients with duodenal obstruction [1], in a child with biliary and pancreatic ascariasis with liver abscesses and a pancreatic pseudocyst [2], in an adult patient with cystic dilatation of the main pancreatic duct limited to the head [3], and in 11 patients with various acute or chronic pancreatic and/or biliary diseases [4]. We report an additional case of air in the Wirsung duct; in the present case, we also observed the presence of air in the duct of Santorini .

A 53-year-old male was admitted to our Department after having had two previous attacks of acute pancreatitis without a definite etiology. He was a light drinker (he had started drinking 40 g of pure alcohol per day at the age of 24 years) and a non-smoker. At the age of 44 years, he had experienced an episode of pain localized to the upper abdomen which lasted 36 hours; blood examination revealed increased serum pancreatic enzymes and pancreatic enlargement was found at ultrasonographic (US) examination. At the age of 52 years, the patient had had another attack of pain which lasted 24 hours associated with increased serum pancreatic enzymes, but pancreatic or biliary alterations were not found at US and contrast enhanced computed tomography (CT). After this episode, he had had weekly episodes of moderate pain together with a

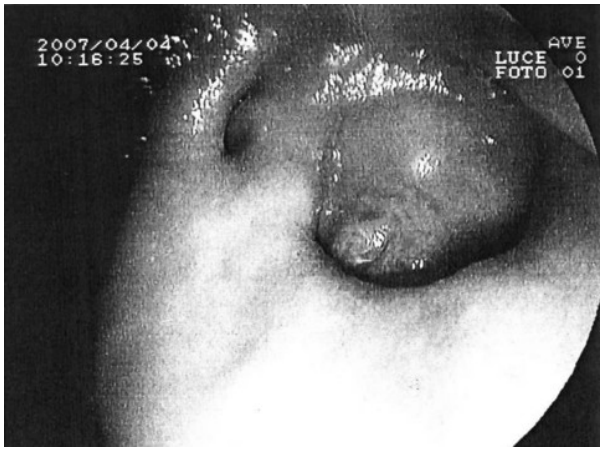

Image 1.

Image 2.

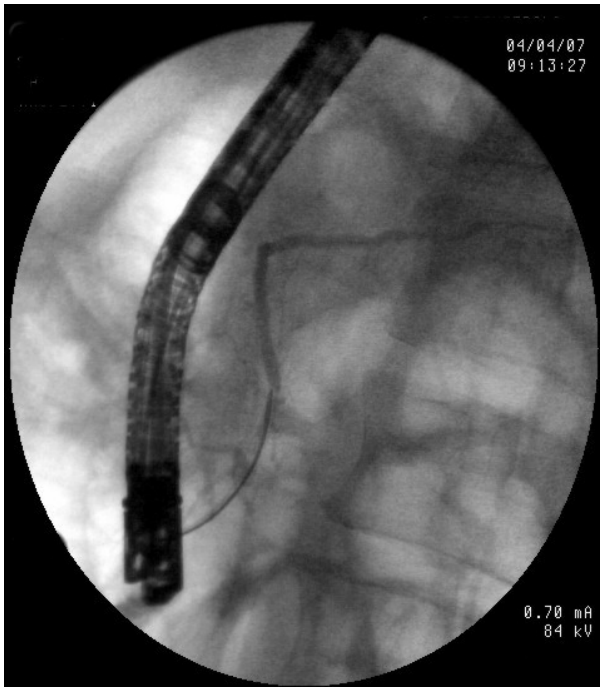

Image 3.

weight loss of 10 kg. The patient underwent another CT of the pancreas which confirmed the absence of alterations of the pancreatic gland and an US which showed a normal aspect of both the gallbladder and the common bile duct. Furthermore, he underwent diagnostic ERCP; the endoscopist saw the papilla of Vater located on the bottom of a duodenal diverticulum (Image 1); biliary (Image 2) and pancreatic (Image 3) ducts

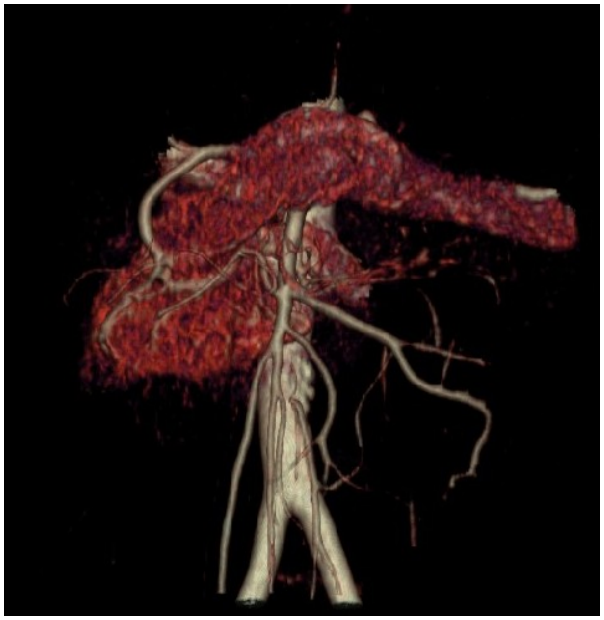

Image 4.

Image 5.

were normal. After 6 months, the patient was admitted to the Department of Digestive Diseases and Internal Medicine for the persistence of the abdominal pain. At physical examination, the epigastric pain was exacerbated by palpation. Laboratory examination revealed a normal white blood cell count, hemoglobin, mean cellular volume, hematocrit, and platelet count; the renal and hepatic functions (AST, ALT, GGT and alkaline phosphates) were also normal. Plasma glucose was 0.83 g/L (reference range: 0.65-1.10 g/L) and plasma C-peptide 0.41 ng/mL (reference range: 0.8-3.9 ng/mL). Serum lipase was also normal (27 U/L, reference range: 8-78 U/L) as were both serum carcinoembryonic antigen and serum CA 19-9. An abdominal multidetector CT (MDCT) was carried out; this examination showed a normal aspect of the pancreatic

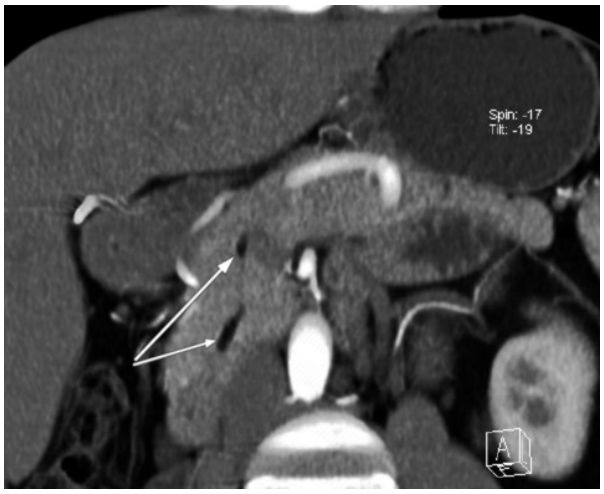

Image 6.

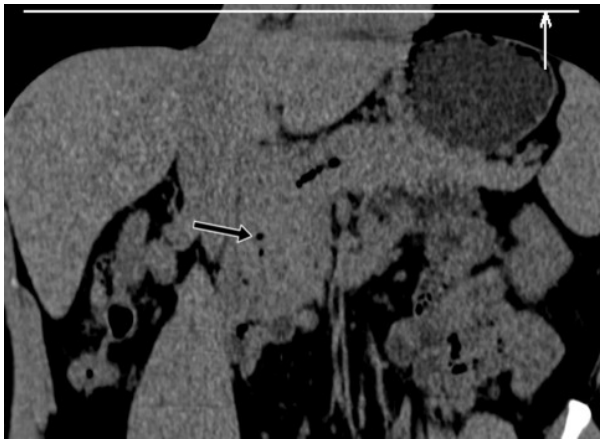

Image 7.

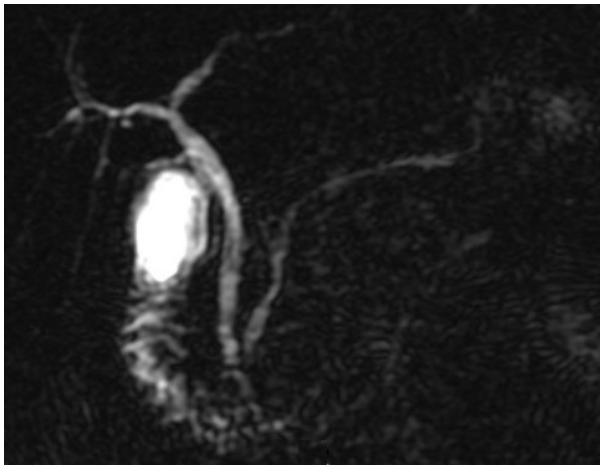

Image 9.

gland (Image 4), the presence of a duodenal diverticulum (Image 5, arrow) and a dilated main pancreatic duct in the head of the pancreas with the presence of air (Image 6, arrows). Air was also present in the duct of Santorini (Image 7, black arrow). To better evaluate the pancreatic ductal system a cholangio-Wirsung magnetic resonance with secretin stimulation was carried out. The duct of Wirsung was normal before (Image 8) and 5 minutes after secretin administration (Image 9). No air was documented in the pancreatic ductal system, and the examination further confirmed the presence of a duodenal diverticulum (Image 10, arrow) 15 minutes after secretin administration. Treatment with ursodeoxycholic acid at a dosage of 900 mg per day was started. The pain progressively disappeared and the patient is symptom-free after 6 months.

The presence of air in the pancreatic ductal system has rarely been reported [1, 2, 3, 4]. The mechanism which may explain the presence of air in the pancreatic ductal system is as follows:, as a result of the presence of a patulous papilla, air passes into the Wirsung duct since, during duodenal phase III motor activity of the interdigestive period, the mean duodenal pressure at times exceeds the mean pancreatic pressure and reflux of duodenal contents into the pancreatic duct may occur; in fact, normally, pancreatic and biliary sphincteric mechanisms play a major role in regulating secretory flow and preventing reflux [5]. In the majority of cases reported in the literature, the air was visualized by US [1, 4] and only in two cases was the air seen at CT. Thus, the case we report seems to be the third case in which air in the main pancreatic duct was demonstrated by CT. In the other previously reported cases, the air was present

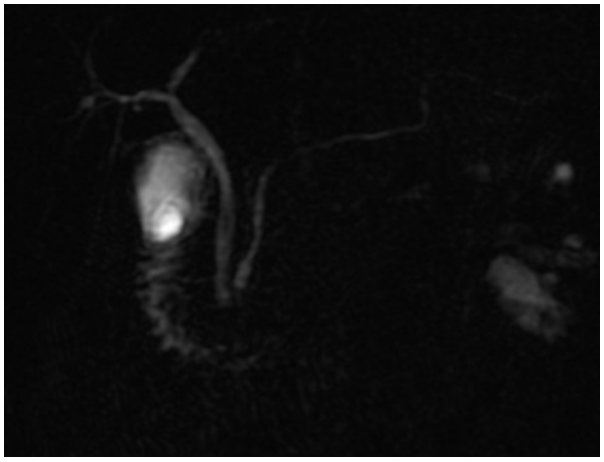

Image 8.

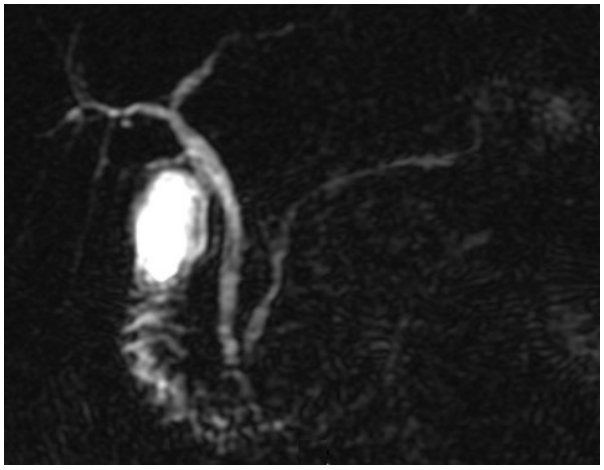

Image 10.

only in Wirsung's duct [1, 2, 3, 4]; in our case, the presence of air also in the duct of Santorini was detected for the first time. We hypothesized a passage of air from the main pancreatic duct to the duct of Santorini because of the presence of a patulous papilla of Vater; in fact, the presence of a patulous minor papilla seems to be less plausible as an explanation for the presence of air in the duct of Santorini. In our case no air was detected in the biliary tree as had been reported in some of the previously described patients [2, 4]. Another interesting observation in our patient was the spontaneous disappearance of air from the main pancreatic duct after a few days, as demonstrated by its absence at cholangio-Wirsung magnetic resonance. This is also another particular feature of the case reported because Costa and Righini [4] have shown that intravenous injection of secretin caused air expulsion and normal dilatation of the pancreatic duct in one of the 11 patients reported. Finally, we do not believe that air in the main pancreatic duct may cause pain, and in the other published papers [1, 2, 3, 4] there was no mention about this particular aspect. On the contrary, regarding the progressive disappearance of pain with the ursodeoxycholic acid treatment, Testoni *et al*. [6] reported that this drug may be effective over a long follow-up period in preventing a recurrence of acute pancreatitis in those patients with the suspect of microlithiasis or dysfunction of either the biliary or pancreatic duct segments of the sphincter of Oddi.

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