

A rare pancreatic pseudoaneurysm in patient with acute pancreatitis and multiple myeloma



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A rare pancreatic pseudoaneurysm in patient with acute pancreatitis and multiple myeloma

The authors report the case of a 78-year old patient affected by multiple myeloma who develops acute pancreatitis and pseudoaneurysmal dilatation of the inferior pancreaticoduodenal artery causing erosion of the second portion of the duodenal wall and hematemesis.

The authors focus first on the supposed etiological relationship between multiple myeloma and acute pancreatitis, and they assume that the therapeutic treatment for the bone marrow disease (bortezomib) may have triggered the pancreatic inflammatory response. They then analyze the pathogenesis of the vascular complication which seems to be related to the lytic action of pancreatic enzymes on the vessel wall which results in the formation of a pseudoaneurysm first and a pseudocyst then.

The vascular complication was diagnosed by computed tomography (CT) thus avoiding selective angiography which was considered too invasive for the patient.

The careful and conservative treatment of the complication has allowed for full healing of the cephalopancreatic region, in addition to avoiding surgery or embolization treatment of the pseudoaneurysm which is accompanied by a mortality rate as high as 50%.

KEY WORDS: Acute pancreatitis, Computed tomography, Conservative treatment, Multiple myeloma, Pseudoaneurysm.

Introduction

Major vascular complications of acute pancreatitis are rare, usually reported as case reports, less frequent than in patients with pancreatic pseudocyst or chronic pancreatitis^{1,2} with an incidence ranging from 3 to 10 percent^{1,3-6}.

We report the case of an elderly patient affected by multiple myeloma with acute pancreatitis who developed an aneurysmatic dilatation of the inferior pancreaticoduodenal artery causing hematemesis. The combination of rare and complex diseases, as well as the lack of evidence raised diagnostic and treatment challenges that were addressed using individual experience and required a very cautious approach.

Case report

A 78 year-old-male presented with a 4-month diagnosis of multiple myeloma of Ig G-k type treated with 3 cycles of melphalan and prednisone. In addition, 1 month

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before hospitalization, he received the first of six treatment cycles with bortezomib and dexamethasone. Six days before hospital admission the patient complained of upper quadrant abdominal pain with hyperpyrexia followed by recurrent episodes of vomiting and hematemesis. On hospital admission, elevated blood levels of alpha-amylase (181 U/L - v.n.: 28-100 U/L) and in particular of lipase (544 U/L - v.n.: 0-60 U/L) were found. Count blood cells, liver enzymes, tumor markers and blood calcium levels were within normal limits. A diagnosis of acute pancreatitis in patient with multiple myeloma was made. In addition to structural alterations of the trunk and pelvic skeletal components, an inflammatory process in the pancreatic head generating a pseudoaneurysm of the inferior pancreaticoduodenal artery was seen on abdominal CT scan (Fig. 1). Patient was hemodynamically stable. Fasting, artificial nutrition and appropriate therapy progressively decreased pain and no further episodes of haematemesis were reported. On day three a esophagogastroduodenoscopy revealed an extrinsic compression of the second portion of the duodenum and hyperaemia of the mucosa with a central erosion area and no bleeding. On day 14, the CT scan showed a pseudocystic swelling at the now thrombosed pseudoaneurysm (Fig. 2). Pancreatic enzymes progressively decreased until normalization on day 18 when the patient was discharged. The patient was then in relatively good conditions and a follow-up CT scan after three months documented full healing of the cephalopancreatic region (Fig. 3).

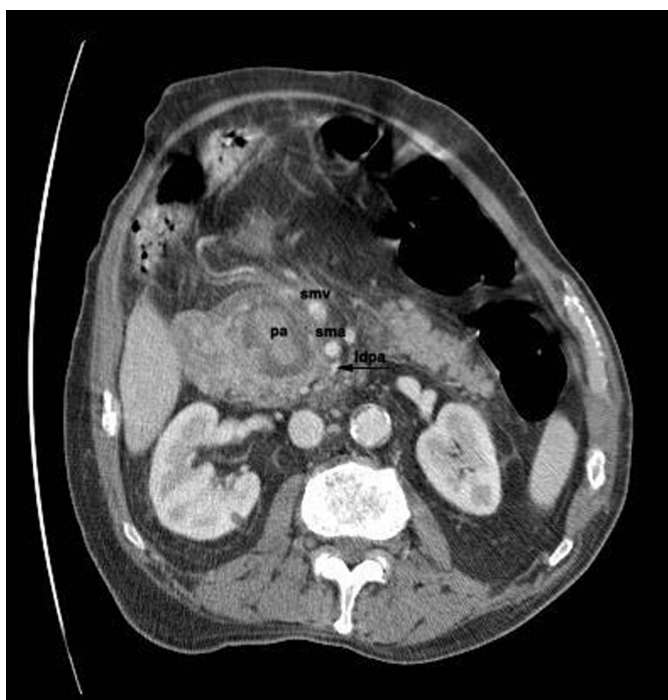


Fig. 1: Pseudoaneurysm of the inferior duodenal-pancreatic artery. The contrast in the cavity enhanced the pseudoaneurysm.
Legend: smv: superior mesenteric vein - sma: superior mesenteric artery - ipda: inferior duodenal-pancreatic artery - pa: pseudoaneurysm.



Fig. 2: Pseudocyst of the head of the pancreas.
Legend: pc: pseudocyst.



Fig. 3: Restitutio ad integrum of the head of the pancreas.

Discussion

Multiple myeloma has often been considered as the cause of acute pancreatitis even though bibliography is rare and often outdated⁷⁻¹², probably because this etiological relationship has been overestimated as hyperamylasaemia in myeloma patients should not always be associated with acute pancreatitis but it may be determined by a paraneoplastic syndrome responsible for producing the enzyme by the tumor tissue. This was first described in a patient with pulmonary heteroplasia¹³ and then in patients with other epithelial tumors or, less frequently, in patients with non-epithelial tumors like osteosarcoma, pheochromocytoma and multiple myeloma whose cells,

as demonstrated by cell culture and immunohistochemical studies, secrete amylase, mainly of salivary type¹⁴⁻¹⁶. This secretion has also a prognostic meaning as the paraneoplastic production of amylase is associated with a greater aggressiveness of the disease characterized by a resistance to the specific therapy which suggested to consider the enzyme as a disease marker¹⁴⁻¹⁸. All authors agree that in order to consider hyperamylasemia as a paraneoplastic phenomenon, acute pancreatitis should be ruled out in the patient affected by multiple myeloma. About our patient we can be reasonably confident that hyperamylasemia was not associated with multiple myeloma, but with an inflammatory process of the pancreas, both because of the clinical symptoms reported and the elevated blood levels of pancreatic amylase and lipase in particular, and last but not least the CT scan findings. On the other hand, it is difficult in a patient like ours who has no biliary lithiasis, no hypercalcemia and no history of alcohol abuse, to make a definite correlation between multiple myeloma and acute pancreatitis, except maybe the therapeutic treatment as bortezomib has recently been considered to be an etiological agent for acute pancreatitis¹⁹ even if the pathogenesis is not known.

In the event of a rare complication like pseudoaneurysm in a patient with acute pancreatitis, the splenic artery is definitely the most affected vessel (more than 40%), whereas lower percentages (approx. 20%) are reported for the gastroduodenal artery and, like in our case, for the pancreaticoduodenal artery^{3,4,6,20,21} (Fig. 1).

Pseudoaneurysms are characterized by the presence of a trauma or inflammatory disease of the pancreas in a setting of normal arteries²⁰. The pathogenetic mechanism is based on the self-digestion of the vessel wall by pancreatic enzymes discharged from a destroyed pancreatic duct resulting in a primary formation of a pseudoaneurysm or rupture of the vessel into a pre-existing pseudocyst which only then converts into a pseudoaneurysm. In our case, in consideration of the CT scan findings and of the fact that the patient had never suffered from acute pancreatitis in the past, we are inclined to a primary aneurysmal dilatation of the pancreaticoduodenal artery localized in the cephalic region of the pancreas where, following thrombization of the pseudoaneurysm and subsequent lysis of clots, a "pseudocyst-like" cavity developed.

The dramatic consequence of these alterations is the rupture of the pseudoaneurysm into the digestive tract, with hematemesis or melena, or into a solid organ (liver or spleen) or into the retroperitoneum or peritoneal cavity¹⁻⁶. In our patient, we believe that hematemesis could have been the result of the secondary erosion of the duodenal mucosa which induced bleeding^{5,6,21}, and less likely be the result of hemobilia as the CT scan morphological analysis of the biliary ducts was normal.

The survival of these patients depends on the diagnosis which should be as early and circumstantial as possible.

Over the last decades, the diagnostic accuracy of this disease has definitely improved thanks mainly to selective angiography, which, even though it has a high sensitivity^{2,5,6,21}, cannot be used systematically as it may be too invasive in patients who are often unstable. Reliable data may also be provided by computed tomography, which is less invasive thanks to the new multilayer scanners which allow for multiphase acquisition, MIP (maximum intensity projection) multi-planar reconstruction with three-dimensional angiographic images and which allow to evaluate the acute pancreatitis, as well as better diagnose the pseudoaneurysm whose contrast is strongly and rapidly enhanced after administration of the contrast medium, thus detecting, in the portal phase, any thrombus in a newly formed cavity^{1,4}.

We therefore believe that angiography in these patients may be used as a second-level diagnostic tool¹ but above all as an embolization treatment to stop bleeding in an elevated number of cases (73-94%)^{1-3,5,6,21} and avoid the need for surgery which is indicated when the patient is unstable or in case of rebleeding after embolization (12-30% of cases)^{2,3,5}.

If, on the one hand, the mortality rate in untreated patients can reach 90% of cases⁵, on the other hand in treated patients it ranges from 10 to 50% and it is significantly greater in patients undergoing surgery, especially when surgery is the first therapeutic approach^{1,5,6,21}. In our patient, an early and circumstantial diagnosis, a self-limiting bleeding and a close monitoring allowed us to avoid the need for invasive treatment (angiography or surgery), definitely a high-risk procedure for an elderly patient with other serious comorbidities, and achieve full healing of the cephalopancreatic region with regard to both the inflammatory process and the vascular disease (Fig. 3).

A more recent technique that may replace embolization or surgery has been recently proposed by Gonzalez³ who suggests the use of EUS (Endoscopic Ultrasound) coupled with Doppler, not only for diagnostic purposes¹ but which may also be suitable for sclerosis or embolization of a pulsating artery at the center of the pseudoaneurysm.

The low incidence of this disease and the frequent need for urgent treatments preclude randomized trials, and no evidence is available on the best diagnostic strategies and most suitable surgical treatments which still depend on the experience of the single experience.

Riassunto

Gli autori riportano il caso di un paziente di 78 anni che in corso di mieloma multiplo sviluppava un quadro clinico e laboratoristico di pancreatite acuta associato ad episodi ricorrenti di ematemesi. Una tomografia computerizzata dell'addome evidenziava, nell'ambito di un processo infiammatorio della testa del pancreas, una dilata-

zione pseudoaneurismatica dell'arteria pancreatico-duodenale inferiore, ed una esofago-gastro-duodenoscopia, successivamente eseguita, visualizzava un'estesa erosione mucosa della seconda porzione del duodeno. Il soggetto, emodinamicamente stabile, veniva sottoposto a terapia medica e a monitoraggio tomografico del pseudoaneurisma che a tre mesi di distanza permetteva di evidenziare una completa risoluzione della suddetta patologia.

Gli autori inizialmente si soffermano criticamente sui sempre supposti rapporti eziologici esistenti tra mieloma multiplo e pancreatite acuta sottolineando come, in questo caso, il trattamento terapeutico del primo (bortezomib) possa essere stato causa della seconda. Essi quindi analizzano la patogenesi di una così rara complicanza vascolare in corso di pancreatite acuta sottolineando come questa possa essere conseguenza di un'azione litica degli enzimi pancreatici sulla parete della arteria pancreatico-duodenale inferiore con successiva formazione, in un primo momento, di un pseudoaneurisma e successivamente di una pseudocisti.

La diagnosi di tale complicanza è stata possibile grazie alla tomografia computerizzata multistrato le cui ricostruzioni tridimensionali hanno fornito immagini vascolari che hanno permesso di evitare l'esecuzione di una certamente più invasiva metodica angiografica che gli autori ritengono debba essere riservata ad una diagnostica di secondo livello o a un trattamento embolizzante non differibile come non è stato nel caso da noi descritto. Infatti, il vigile trattamento conservativo della dilatazione aneurismatica in corso di pancreatite acuta ha consentito la restituito ad integrum della regione cefalo-pancreatica evitando trattamenti embolizzanti o chirurgici che sono accompagnati da una mortalità superiore al 50%.

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