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CASE REPORT / ПРИКАЗ БОЛЕСНИКА

Fistula of a pancreatic pseudocyst into the superior mesenteric and portal veins causing erythema nodosum and aseptic polyarthritis – case report and review of literature

Nikica Grubor[1], Radoje Čolović[2], Čedomir Vučetić[2,3], Aleksandar D. Ninić[1], Henry Dushan Atkinson[4]

[1]University of Belgrade, Faculty of Medicine, University Clinical Center of Serbia, First Surgical Clinic, Belgrade, Serbia;
[2]University of Belgrade, Faculty of Medicine, Belgrade, Serbia;
[3]University Clinical Center of Serbia, Clinic of Orthopaedic Surgery and Traumatology, Belgrade, Serbia;
[4]North Middlesex University Hospital NHS Trust, Division for Surgery and Cancer Services, London, United Kingdom

SUMMARY

Introduction Extra-pancreatic complications of acute and chronic pancreatitis that do not relate to vital organs are rare. The most common include subcutaneous paniculitis, arthritis, bone marrow fat necrosis, and vasculitis. These associated conditions have been termed pancreatic disease syndrome (PDS), which can occur not only with pancreatitis but also in other pancreatic diseases. PDS is believed to be caused by circulating pancreatic enzymes, which can occur when the pancreas is in direct communication with the circulation. Pancreatic pseudocyst erosion into the superior mesenteric and portal veins is extremely rare; and there have only been 22 previously reported cases in literature. The authors endeavoured to describe a manifestation of PDS with formation of a pseudocystic-portal fistula, its complications, and propose adequate surgical management.

Case outline We present a 37-year-old man with chronic alcoholic pancreatitis and a pancreatic pseudocyst within the head of the pancreas which communicated with the main pancreatic duct on one side and eroded into the superior mesenteric and portal veins on the other, causing erythema nodosum-like vasculitis, and polyarthritis. The patient was initially treated conservatively, but subsequently required multiple arthrotomies and finally underwent pylorus preserving duodenopancreatectomy and direct repair of the affected veins.

Conclusion The majority of cases required aggressive surgical intervention due to heightened risk of hemorrhage. In patients who develop disseminated fat necrosis, an earlier surgical intervention can be justified. The authors would recommend that, where practical, a pylorus-preserving pancreaticoduodenectomy should be performed.

Keywords: pancreas; pseudocyst-portal vein fistula; pancreatic disease syndrome

INTRODUCTION

Pancreatic pseudocysts often follow acute pancreatitis, and though they can resolve spontaneously, they can also be associated with potential complications. These include bleeding [1, 2], ruptures into the abdominal cavity [3], splenic vein obstruction [4], portal vein thrombosis [5, 6], and the formation of fistulae into the surrounding organs [6, 7, 8] and the inferior vena cava [9]. Erosion of a pancreatic pseudocyst into the portal vein to create a pancreas duct – portal vein fistula (PPF), however, is extremely rare, with only 22 other previously reported cases [5, 6, 10–28].

CASE REPORT

A 37-year-old man, with a 15-year history of alcoholism, presented with worsening epigastric pain requiring admission to a peripheral hospital. On examination he was found to have a tender upper abdomen and had a hematest-positive melaena stool. Apart from a moderate leucocytosis, other laboratory tests were within normal limits. An upper endoscopy revealed a hiatus hernia and *Helicobacter pylori* gastropathy. An ultrasound (US) scan defined a 5 × 4.5 cm hypoechogenic lesion within the uncinate process of the pancreas, which on computed tomography (CT) scan appeared to be inhomogeneous with a 2 cm central hypodense area. A US-guided fine needle aspiration of the lesion produced a dark green-rusty dense fluid, with a high pancreatic enzyme content. Though anti-*Helicobacter pylori* treatment gave only mild relief of his symptoms, he refused operative drainage of the pancreatic pseudocyst, taking his own hospital discharge.

Two weeks later he was admitted to a second hospital with worsening abdominal pain, and four days later developed erythema nodosum-like cutaneous lesions on the front and sides of both his lower legs. Within two weeks, he had developed a moderate fever, raised serum and urine amylase, generalized arthralgia, restricted

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Correspondence to:
Nikica M. GRUBOR
University Clinical Center of Serbia
First Surgical Clinic
Institute for Digestive Diseases
Koste Todorovića 6
Belgrade 11000, Serbia
gruborn13@gmail.com

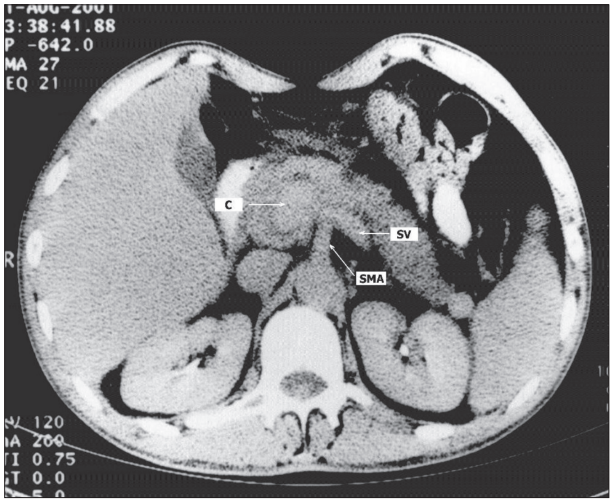

Figure 1. Computed tomography showing contrast within the central area of the cyst – C;
SV – splenic vein; SMA – superior mesenteric artery

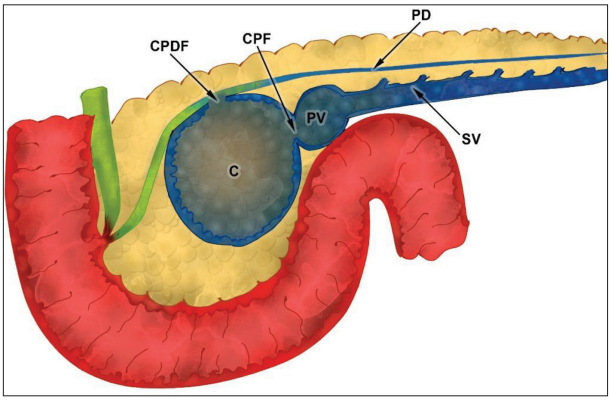

Figure 2. Diagram showing operative findings;
C – pancreatic pseudocyst; PV – portal vein; SV – splenic vein; PD – pancreatic duct; CPF – cyst portal fistula; CPDF – cyst pancreatic duct fistula

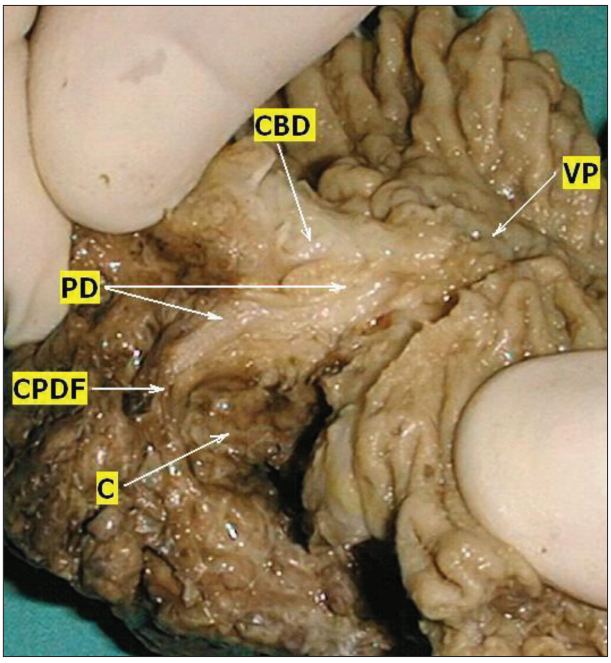

Figure 3. The intra-operative specimen;
C – pancreatic pseudocyst; PD – pancreatic duct; CPDF – cyst pancreatic duct fistula; VP – Vater's papilla; CBD – common bile duct

active and passive joint motion, and swelling of all the major joints.

He was transferred to our institution because of a clinical deterioration, and on admission was found to be pale and lethargic, with generalized arthralgia, large joint effusions, and abdominal pain. His fibrinogen was 10.4 g/L, white blood cell count 25×10^9/L, and erythrocyte sedimentation rate 110/1h. The cyst within the head of the pancreas had recollected on repeat CT, and now demonstrated a central contrast-enhancing area (Figure 1). He passed further melaena stool after admission, but a repeat upper endoscopy once more showed no active bleeding site.

Over the next 24 hours, he developed spontaneous discharge of a dense, viscous, light-brown pus-like material from his swollen left knee. Surgical arthrotomies of his other large joints were performed, after which his joint pains and swellings resolved. Neither direct examination nor cultures of the joint samples were positive for bacteria, and histology found only non-specific aseptic inflammation of the synovial membranes and joint capsules.

Despite a general improvement in his condition, the patient's epigastric pain continued and the decision was made to operate on the pancreatic pseudocyst. At laparotomy, a cyst-like lesion was found within the head of the chronically inflamed pancreas, close to the mesenteric vein. No fat necrosis was found within the abdomen. Cyst aspiration was performed and blood-like aspirate obtained; containing 58,040 U/L of amylase on laboratory analysis. The cyst was formally opened with the aim of performing a cystojejunostomy, particularly as there was a chance that the blood that had been aspirated might have been from an accidentally punctured blood vessel. Following exploration, the bleeding became more brisk, requiring tamponade, and fearing an arterial aneurysm, a pylorus preserving pancreatic head resection was performed.

After pancreatic transection, the head was slowly and carefully dissected from the very adherent superior mesenteric and portal veins. Unfortunately, the brisk bleeding continued, and the bleeding source was established as a 2.5×0.5 cm communication between the cyst cavity and the portal vein (Figure 2). A temporary clamp was placed to control the bleeding and the fistula was oversewn, making use of the thickened cyst wall.

Pathological analysis of the resected specimen confirmed a broad fistula between the cyst (and the superior mesenteric) and portal veins; an additional fistula was also identified between the cyst and the pancreatic duct (Figure 3).

The patient's postoperative recovery was uneventful, with an almost immediate resolution in his abdominal symptoms. After a rehabilitation programme and intense physiotherapy, the patient regained most of his musculoskeletal function, remaining ambulatory and well at a recent six-year review.

This case report was approved by the institutional ethics committee, and written consent was obtained from the

patient for the publication of this case report and any accompanying images.

DISCUSSION

The precise mechanism of PPF formation remains unknown [10]. Pancreatic enzymes activated by intestinal enterokinases are thought to be responsible for the erosion into the neighbouring blood vessels [14]. Any venous thrombosis in these vessels is then likely to be dissolved by these same enzymes, thereby allowing their free flow into the blood circulation, causing PDS [18].

There have been 22 previously documented cases of PPF, almost all being single-case reports [5, 6, 10–28]. Including this currently reported case, these have been predominantly male patients (82% or 19/23 patients), with a mean age of 50 years (range 29–82 years) at presentation and most had a history of chronic alcohol abuse and chronic pancreatitis. The majority presented with abdominal pain and of those tested all had a raised serum amylase [22]. One patient had recurrent gastrointestinal bleeding and pain [18].

Fifteen (65%) had pseudocyst formation in the head of the pancreas (in close proximity to the portal vein), and four patients had pseudocysts involving the tail. Including the current case, 10 (43%) were suffering from PDS [14, 17, 22], erythema nodosum was evident in eight (35%) [10–16, 22], polyarthritis in seven (39%) [11–17], and disseminated fat necrosis in five (28%) patients [17, 22].

Conventional invasive and noninvasive imaging can often (though not always consistently) identify a PPF [22]. Contrast-enhanced CT scan can demonstrate a thrombus within the portal vein in PPF patients, though does not typically demonstrate the fistula. Magnetic resonance and magnetic resonance cholangiopancreatography (MRI/MRCP) can demonstrate an increased fluid signal in the portal vein, assess the pancreatic ductal system, and identify other extrinsic pathology. US can also demonstrate absent portal vein flow from thrombus formation, but not necessarily the fistula formation. Endoscopic retrograde cholangiopancreatography (ERCP) will demonstrate a fistula but only if the pseudocyst directly connects to the pancreatic duct. Percutaneous transhepatic portography (PTP) by definition directly visualizes the portal system and can also yield portal vein fluid for analysis [22]. Image-guided (CT or US) cystography and angiography can also be useful.

Of the (now 23) reported PPF cases, four (17%) were diagnosed through ERCP [5, 6, 23, 24], four (17%) through cystography [19, 20, 27], three (13%) through PTP [18, 21, 22], two (11%) through MRI/MRCP [25, 26], one through CT [28], and one (4%) through angiography [11].

In this particular reported case, despite having had two upper endoscopies, an US, and two CT scans, the diagnosis of a PPF was only actually made during surgery and then confirmed through histopathological analyses. Of the remaining reported PPF cases, two were similarly diagnosed during surgery [12, 17], while five (22%) were only discovered at post mortem [10, 13–16]. Thus, despite multimodal diagnostics, eight (35%) patients had their diagnosis established either at surgery or at post mortem.

The majority of these patients can be managed expectantly, and PPF have been known to close spontaneously [23]. However, prompt surgical intervention is indicated where dessminated fat necrosis develops or when there is a significant clinical deterioration, as these are associated with significantly poorer outcomes, and even death [6, 15, 25].

Nine of the 23 PPF patients underwent surgery. A pylorus preserving pancreaticoduodenectomy was performed in two patients [12, 22], similar to the procedure which our patient also underwent, resulting in the immediate resolution of the PDS. Another patient underwent surgical ligation of the incoming vessels with no symptom improvement. A Whipple's procedure was then performed at a second sitting, which resulted in the disappearance of the "PDS" [11]. A fifth patient underwent local pancreatic resection and panceaticojejunostomy; unfortunately, this patient had a recurrence of subcutaneous fat necrosis, but fortunately responded to steroids [17]. An unusual sixth patient with three cysts underwent splenectomy and a partial left pancreatectomy. Following this, the dilated pancreatic duct and the pancreatic pseudocyst walls were opened longitudinally and a "Y" side-to-side pancreaticojejunostomy was performed. A catheter was then inserted through the splenic vein into the portal tree to drain it externally and to prevent portal hypertension during the postoperative period. The catheter stopped draining pancreatic juice after a few days and the drain was removed 15 days postoperatively [20]. This patient was doing well at the time of publication two years after surgery. A seventh patient had simple operative drainage of their ascites and after three months was discharged from hospital. They were noted to be well at the time of publication [19]. However, no time period for this was stated. One further patient underwent pancreaticojejunostomy [18], another a pancreaticoenterostomy [25].

Despite the successful closure of the PPF, some of these surgically managed patients continued to suffer serious disability from ongoing recurrent extrapancreatic disease.

Our patient clearly suffered from chronic alcoholic pancreatitis with an associated pseudocyst. However, we failed to recognize that the pre-operative dark brown aspirated fluid and the presence of contrast within the central area of the cyst on CT indicated a probable communication of the cyst with a neighbouring blood vessel. In retrospect, these findings obviously warranted angiographic imaging. The absence of contrast within the peripheral area of the cyst should also have been recognized as resulting from thrombosis. The laboratory findings of high concentrations of amylase from the intraoperative blood aspirated from the cyst would have also indicated a possible cyst–portal fistula. The upper gastrointestinal bleeding with a normal upper endoscopy can also be explained by the pathology finding of a communication between the pancreatic pseudocyst and the pancreatic duct; and this could have been identified earlier by ERCP. The direct emptying of the

pancreatic enzymes into the mesenteric and portal veins was probably the cause of PDS, which completely resolved after surgery.

The authors would recommend that, where practical, a pylorus-preserving pancreaticoduodenectomy should be performed. This resulted in a rapid resolution in our patient's PDS symptoms, which has also been the experience of other authors with similar cases [12, 22].

Conflict of intrest: None declared.

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Фистула панкреасне псеудоцисте са горњом мезентеричном и портном веном која је довела до нодозног еритема и асептичног полиартритиса – приказ болесника и преглед литературе

Никица Грубор[1], Радоје Чоловић[2], Чедомир Вучетић[2,3], Александар Д. Нинић[1], Хенри Душан Аткинсон[4]

[1]Универзитет у Београду, Медицински факултет, Универзитетски клинички центар Србије, Прва хируршка клиника, Београд, Србија;
[2]Универзитет у Београду, Медицински факултет, Београд, Србија;
[3]Универзитетски клинички центар Србије, Клиника за ортопедску хирургију и трауматолгију, Београд, Србија;
[4]Универзитетска болница Фондације Националне здравствене службе Северени Мидлсекс, Одсек за хирургију и онкологију, Лондон, Уједињено Краљевство

САЖЕТАК

Увод Екстрапанкреатичне компликације акутног и хроничног панкреатитиса које се не односе на виталне органе су веома ретке. Најчешће компликације су супкутани паникулитис, артритис, масна некроза косне сржи и васкулитис. Ова асоцирана стања се једним именом називају синдром болести панкреаса и могу се јавити не само уз панреатитис већ и у другим болестима панкреаса као што су тумори, траума и литијаза панкреатичних канала. Синдром болести панкреаса је вероватно узрокован циркулишућим ензимима панкреаса (конкретно липазе) када је панкреас у директној комуникацији са крвотоком. Ерозија псеудоцисте панкреаса у горњу мезентеричну и портну вену је веома редак догађај; постоје само 22 претходно објављења случаја панкреатично-порталних венских фистула у литератури. Аутори су настојали представити обољење које настаје код синдрома болести панкреаса ретким формирањем псеудоцистично-порталне фистуле, могуће компликације, уз препоруку о адекватном хируршком третману са детаљним прегледом светске литературе.

Приказ болесника Представљамо необичан случај тридесетседмогодишњег човека са хроничним алкохолним панкреатитисом и псеудоцистом главе панкреаса која једном страном комуницира са главним панкреатичним водом, а другом је широком ерозијом у контакту са горњом мезентеричном и портном веном, изазивајући васкулитис налик нодозном еритему (*Erythema nodosum*) и полиартритис. Иницијално, болесник је лечен конзервативно, али су накнадно урађене многоструке артротомије када је у крајњем акту урађена пилорус-презервирајућа дуоденопанкреатектомија и директна реконструкција оштећених вена.

Закључак Већина случајева захтевала је агресивно хируршко лечење, јер је опасност од крварења велика. Ранија хируршка интервенција може бити оправдана и ако се код болесника развија дисеминована некроза масти која додатно погоршава исход. Аутори препоручују да се у пракси учини пилорус-презервирајућа панкреатикодуоденектомија.

Кључне речи: панкреас; псеудоцистично-портална венска фистула; синдром болести панкреаса