

## Pancreatic cancer complicated by splenic infarction and abscess

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### Rezumat

#### *Cancer de pancreas complicat cu infarct și abces splenic*

Atât diagnosticul cât și tratamentul adenocarcinomului generat de coada pancreasului, sunt dificile. Deși sunt progrese tehnice și de tratament, prognosticul rămâne infaust. După diagnostic, în mod caracteristic, supraviețuirea în medie este de 5-8 luni de zile. Atât infarctul cât și abcesul de splină, sunt complicații destul de rare ale cancerului de pancreas. În cazul existenței infarctului de splină, trebuie să se cerceteze cu atenție posibilele surse de embolie. În plus, abcesul splenic trebuie suspectat la pacienții cu infarct splenic, în special dacă semnele de infecție persistă în condițiile unui tratament adecvat. Diagnosticarea și tratamentul rapid sunt esențiale, deoarece s-a dovedit că situația este cu risc vital crescut. Aici a fost prezentat un pacient cu infarct și abces de splină care a apărut ca o complicație a cancerului de coadă de pancreas. Tratamentul ales a fost pancreatectomie distală și splenectomie. Examenul clinic și imagistic, modificările descoperite în diagnosticul diferențial a leziunilor de pancreas și de splină, impune luarea în discuție la un pacient cu stare septică a acestui gen de patologie. Variabilitatea clinico-imagistică impune luarea în discuție a acestei patologii în diagnosticul diferențial al multor leziuni splenice și pancreatice.

**Cuvintele cheie:** tumorile de pancreas, splină, abces, infarct

### Abstract

Pancreatic tail adenocarcinoma is both a diagnostic and therapeutic challenge. Despite technical and therapeutic advances, the prognosis remains dismal; the average survival time after diagnosis is characteristically only five to eight months. Both splenic infarction and abscess are very rare complications of pancreatic cancer. In this case of splenic infarction, the possible source of emboli should be carefully investigated. In addition, splenic abscess must be suspected in patients with splenic infarction, especially if the infectious signs persist despite appropriate treatment. Rapid diagnosis and treatment are essential as its course can prove fatal. The patient presented herein had a splenic infarct and abscess as complications of pancreatic tail carcinoma. The treatment of choice was splenectomy and distal pancreatectomy with resection of involved organs. The variability in clinical presentation and imaging studies warrants consideration of this entity in the differential diagnosis of many splenic and pancreatic lesions.

**Key words:** pancreatic neoplasms, spleen, abscess, infarction

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### Introduction

Splenic infarction is a rare complication of pancreatic cancer (1-3). Clues related to splenic infarction may be obscured, and the diagnosis is quite challenging even for experienced

physicians or surgeons. However, splenic abscess caused by pancreatic cancer has been reported only rarely (4-6). Splenic abscess must be suspected in patients with splenic infarction, especially if the infectious signs persist despite appropriate treatment. Rapid diagnosis and treatment are essential, as its course can prove fatal. In clinical practice, diagnosis and management of splenic infarct and abscess in association with pancreatic cancer are difficult because of the rarity of the condition. Herein, we report the first case of splenic infarct and abscess in association with pancreatic cancer cured by definitive surgery.

## Case presentation

A 47-year-old male consulted the emergency department of a local hospital due to sudden onset of left upper quadrant pain for two days. The pain was severe and permanent. He reported fatigue, anorexia and weight loss of two months duration. The initial investigation was inconclusive, and he was transferred to our tertiary hospital. The physical examination revealed tenderness over the left upper quadrant of the abdomen. His body temperature was 39.6°C. Laboratory studies disclosed leukocytosis (white blood cell count, 26900/mm<sup>3</sup>) and thrombocytopenia (platelet count, 98000/mm<sup>3</sup>). Biochemical parameters were all normal. Tumor markers were elevated (CEA 11.45, normal range: 0-3 ng/ml; CA 19-9 2049, normal range: 0-35 U/ml). Because of the excruciating pain, an urgent computed tomography (CT) was performed. CT study of the abdomen showed air-fluid level and nonenhancing hypodense areas in the spleen and irregular enlargement of the pancreatic tail, recumbent to the splenic hilus and colon (Fig. 1). The radiologic impression suggested splenic infarction and abscess with pancreatic cancer. Considering these findings together, a final diagnosis of splenic infarction and abscess due to pancreatic cancer was made, and laparotomy and splenectomy were planned. Operative findings revealed splenic infarct caused by pancreatic tail cancer invading the splenic hilus and splenic

*flexura of the colon. Splenectomy, distal pancreatectomy and resection of the involved colonic segment were performed. Pathological examination revealed pancreatic ductal adenocarcinoma leading to invasion of the splenic hilus and colon together with splenic infarction and abscess. The postoperative period was uneventful, and the patient was discharged on the postoperative 7th day.*

## Discussion

Splenic infarction is a rare disorder that may present as acute abdomen (7). Occlusion of the splenic artery or its branches due to emboli or thrombi is the main cause. Splenic infarction commonly occurs in patients with atrial fibrillation, certain hematologic diseases and thromboembolism (8). Because of the anatomical relationship, namely, that the pancreas is a retroperitoneal organ in close proximity to the splenic vessels, splenic involvement can include infarction, abscess, intrasplenic pseudocysts, and hemorrhage (9); however, splenic infarction caused by pancreatic cancer has been reported only rarely (1-3). In the setting of splenic infarction associated with pancreatic cancer, infarction of the splenic artery may be caused principally by torsion, direct invasion of the tumor, compression, or thromboembolism. In this case, splenic vessels were invaded by the tumor. It is also known that complex factors associated with cancer contribute to the hypercoagulable and thrombophilic state of cancer patients (10,11). Prompt diagnosis and appropriate antibiotic treatment are needed to reduce the risk of morbidity. In addition, complications of splenic infarction, including splenic abscess, hemorrhage, or rupture should be carefully screened throughout the course of treatment.

Splenic abscess is uncommon, occurring in 0.14% to 0.7% of autopsy studies (12). Its diagnosis is difficult and its outcome is often fatal if left untreated. Although it may have various causes, it is most frequently associated with trauma and infections of the spleen. The latter are more common in the presence of a different primary site of infection, especially endocarditis, or in cases of ischemic infarcts that are secondarily infected. Moreover, immunosuppression is a major risk factor. However, splenic abscess as a complication of pancreatic cancer has been reported in only a few cases to date (4-6).

Splenic abscess is a rare entity that still presents a diagnostic challenge. Since the clinical features may be misleading, the diagnosis is generally delayed even in the age of improved imaging technology (13). In addition, the presence of underlying conditions may obscure the presentation, and vice versa. When splenic infarct or abscess is suspected, ultrasound may be the initial preferred modality, but in urgent cases, CT should be the first choice. In the current case, a CT scan was the most useful imaging test.

The pathogenesis of splenic abscess is multifactorial, including pyogenic infection, splenic trauma, hemoglobinopathies, contiguous infection, and immunosuppression (6). We believe our case represents a contiguous infection. The colon wall and splenic capsule were simultaneously disrupted by an extending pancreatic neoplasm, allowing bacterial seeding to



**Figure 1.** The appearance of the splenic abscess (black arrow) and splenic infarct (white arrow) on the CT scan

the splenic parenchyma. Seeding of the spleen by a hematogenous spread of organisms that gained access to the vasculature after the colon wall was disrupted cannot be ruled out. For this reason, splenic infarction would have been predisposed to infection. However, in this patient, the nature of the splenic lesion in the pathologic examination suggests contiguous infection as the cause of the splenic abscess.

The location of the tumor appears to be an important factor in the development of splenic abscess. Pancreatic carcinoma occurs most commonly in the head, and as such, usually presents with obstructive jaundice. Conversely, the least common location for pancreatic carcinoma, as seen in our patient, is in the tail. These cancers tend to present later and are larger at presentation than pancreatic head tumors, with signs of advanced disease, such as contiguous organ extension, vascular invasion and distant metastases (5).

In conclusion, this case is unique in the literature with the presentation of splenic infarct and abscess due to pancreatic tail cancer. Although seen rarely, we should pay greater attention to potential splenic infarct and abscess in association with pancreatic cancer and should consider a multimodal management.

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