

Case Report

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*Case Report*

# Uncommon Location for a Large Hepatic Subcapsular Pancreatic Pseudocyst: A Rare Case Report and Review

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## Abstract

The pancreatic pseudocyst is a collection of pancreatic fluid surrounded by a non-epithelialized wall composed of granulation tissue and fibrosis, occurring in approximately 10% of patients diagnosed with acute pancreatitis and in 20–38% of those with chronic pancreatitis. Most pseudocysts are situated in the head and pancreatic body, but about 20% developed in extrapancreatic locations. We present the case of a 46-year-old male patient diagnosed with chronic alcohol pancreatitis with acute exacerbation, who developed a large pancreatic pseudocyst with subcapsular location in the right hepatic lobe, successfully treated by laparoscopic surgical drainage. The computed tomography scan and postoperative biochemical analysis of the intracystic fluid played a key role in establishing the diagnosis of this rare condition. Intrahepatic pancreatic pseudocyst is a rare location of pancreatic pseudocysts, but the one located in the right hepatic lobe is an extremely rare location. The treatment of intrahepatic pancreatic pseudocysts may be conservative, or endoscopic, percutaneous, or surgical drainage may be necessary. The presence of symptoms, signs of extrinsic compression or complications require drainage of the pseudocyst.

**Keywords:** extrapancreatic pseudocyst; intrahepatic pancreatic pseudocyst; subcapsular hepatic pancreatic pseudocyst; giant extrapancreatic pseudocyst; laparoscopic treatment of extrapancreatic large pseudocyst

## 1. Introduction

Pseudocysts are the most common pancreatic cystic lesions. They represent a collection of pancreatic fluid surrounded by a non-epithelialized wall composed of granulation tissue and fibrosis [1–3]. Pseudocysts occur most frequently as a complication of chronic pancreatitis and less commonly as a complication of acute pancreatitis [1,4,5]. An acute pseudocyst presents as a collection of pancreatic fluid bordered by early granulation tissue, typically developing within 3–4 weeks following an episode of acute pancreatitis [1,2,6]. This collection may resolve spontaneously in approximately 50% of cases, although spontaneous regression is less likely in the case of large pseudocysts exceeding 6 cm. Conversely, pseudocysts that increase in size on serial evaluations and become symptomatic require surgical treatment [1]. Most pseudocysts are situated in the cephalic and body portion of the pancreas, but about 20% grow in extra pancreatic locations, with unusual sites including the kidney, liver, pleura, or even the mediastinum [1,3]. The first case of intrahepatic pancreatic pseudocyst was published in 1974 [7].

We hereby present the case of a patient with acute-on-chronic pancreatitis who developed a giant pancreatic pseudocyst in an exceptionally rare location: subcapsular in the right hepatic lobe.

The pseudocyst was successfully treated with laparoscopic surgical drainage, with no postoperative complications and no recurrence.

## 2. Case Report

We present a case of a 46-year-old male patient, a chronic alcohol consumer, with medical history in the Gastroenterology Clinic for multiple episodes of toxic acute pancreatitis occurring within the same year, presented to the emergency department with nausea, frequent vomiting at home, and intense, diffuse abdominal pain radiating to the right scapula and the right lumbar region, with symptoms onset approximately 12 hours prior to admission. The patient reported multiple previous hospitalizations, the most recent occurring about three weeks earlier in the Gastroenterology Clinic.

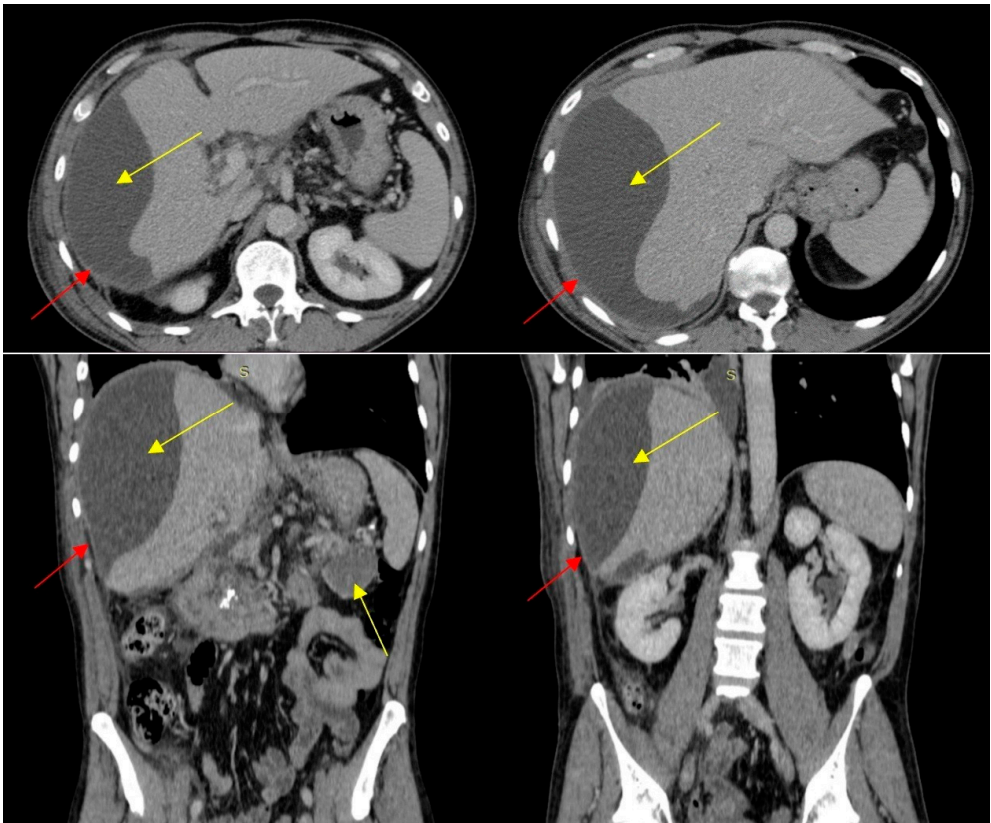
On physical examination, the patient appeared in moderately impaired general condition, afebrile, with a slightly distended, depressible abdomen, spontaneous pain and palpable tenderness, with pain radiating to the right shoulder and right lumbar region. Giordano's sign was negative, and bowel transit was present for both gas and stool. Palpation of the right hypochondrium revealed a firm, poorly defined, immobile mass measuring approximately 8–10 cm, which became markedly painful upon deep palpation.

Laboratory tests revealed: anemia (hemoglobin = 10.5 g/dL), inflammatory markers (leukocytes = 14,680/mm<sup>3</sup> with neutrophils = 11,240/mm<sup>3</sup>, C-reactive protein = 14.83 mg/dL), elevated serum lipase = 727 U/L and serum amylase = 415 U/L, and cholestasis with unfavorable progression during the first days of hospitalization, as evidenced by rising alkaline phosphatase (ALP) and gamma-glutamyl transferase (GGT) levels (ALP = 59 → 224 U/L, GGT = 56 → 267 U/L). The patient was monitored with serial ultrasound examinations in the Gastroenterology Clinic. Three to four days after admission, a partially defined 14 cm collection was identified overlying the right hepatic lobe. Consequently, an urgent contrast-enhanced computed tomography (CT) scan was performed. Compared to the CT scan obtained during the previous hospitalization (14 days earlier), a new fluid-density formation was observed, exerting compressive effects on the right hepatic lobe, with an inverted multilocular contour, subcapsular location, and dimensions of 177×90×180 mm. Considering the sudden onset and rapid progression, a subcapsular hepatic pancreatic pseudocyst was suspected. Additionally, a previously described pseudocyst was noted at the pancreatic body, measuring 15×24×24 mm, with no change in size (Figure 1).

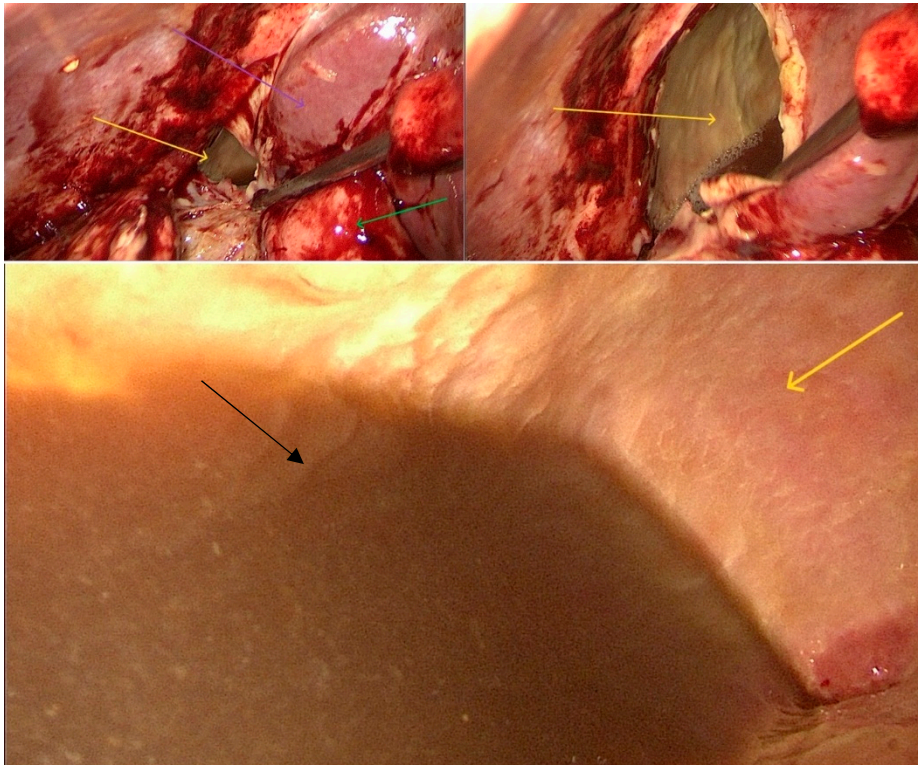
Given the patient's severe pain and the compressive effect on the hepatic pedicle with progression of cholestasis syndrome, the patient was transferred to the surgical department where we decided to do a laparoscopic surgical drainage. Intraoperatively, a pronounced peritoneal inflammatory reaction was observed in the upper abdomen, predominantly in the right hypochondrium, with perihepatic adhesions. During visceral mobilization, a sizable lesion located in segments V–VI was identified; it ruptured upon suction-assisted manipulation and discharged a dark-colored fluid. Samples were collected for biochemical and microbiological analysis. Following aspiration, a giant residual cavity with walls showing granulation tissue and fibrosis was revealed (Figure 2).

A passive intracystic drainage tube was placed, along with a second passive drain adjacent to the gallbladder and a third drain positioned in the Douglas pouch. The patient had a favorable postoperative course, with progressive reduction of drainage, resolution of the inflammatory and cholestatic syndromes, disappearance of symptoms, and discharge on postoperative day 11. Biochemical analysis of the intracystic fluid confirmed the diagnosis of a subcapsular hepatic pancreatic pseudocyst: amylase = 65.221 U/L and lipase >193.000 U/L. Subsequent imaging examinations (multiple ultrasounds and MR cholangiography on postoperative day 7) demonstrated complete regression of the subcapsular hepatic pseudocyst.





**Figure 1.** Yellow arrow = pseudocyst; Red arrow = hepatic capsule; The biconvex lens form is specific for the hepatic subcapsular pseudocyst is observed.



**Figure 2.** Yellow arrow = pseudocyst, intracystic appearance; Purple arrow = right hepatic lobe; Green arrow = gallbladder; Black arrow= intracystic fluid.

## 4. Discussion

Pancreatic pseudocyst is a complication that occurs in up to 10% of patients diagnosed with acute pancreatitis [8]. It is a collection of pancreatic fluid surrounded by a non-epithelialized wall composed of granulation tissue and fibrosis [2,6]. A pancreatic pseudocyst requires between 4 and 6 weeks to form the well-defined wall [2]. Casado et al suggest that the development time of an intrahepatic pancreatic pseudocyst may be much shorter than that of an intraabdominal pancreatic pseudocyst [2]. The lack of data in the literature cannot support this observational data.

Most pseudocysts are located in the cephalic and body region of the pancreas, or in the peripancreatic tissues; however, atypical locations have also been reported, including intrahepatic, perisplenic, perirenal, retroperitoneal, pleural, and even mediastinal sites [8,9].

Intrahepatic pancreatic pseudocysts are an extremely rare location, with few cases described in the literature [2]. Most of them are located in the left hepatic lobe and much less frequently in the right hepatic lobe. These can be single or with multiple hepatic locations [2]. The maximum number of multiple intrahepatic pseudocysts reported in a single patient, from the data we know, is 8 [9].

Between 1970 and 2016, only 54 cases of intrahepatic pancreatic pseudocyst were published in the literature [10]. Demeusy et al observed that most cases were described in men, and the average size of the pseudocysts was 9.5 cm diameter, most of them in the left hepatic lobe [10]. Guesmi et al, also observed that intrahepatic pancreatic pseudocyst is more frequent in men than women, with a sex ratio 3:1 [5].

The pathophysiological mechanism involves the proteolytic effect of pancreatic enzymes, which dissect anatomical planes [1,8]. Two mechanisms have been proposed for the intrahepatic extension of a pancreatic pseudocyst [7,11]. The first involves the accumulation of pancreatic fluid in the prerenal space, which subsequently erodes the posterior parietal peritoneum into the omental bursa [2,9,11]. From the omental bursa, pancreatic fluid ascends along the gastrohepatic ligament to the liver, resulting in a subcapsular pseudocyst in the left hepatic lobe [3,11]. This explains the affinity for localization in the left hepatic lobe. The second mechanism involves the dispersion of pancreatic fluid along the hepatoduodenal ligament, leading, as in our patient, to a subcapsular hepatic pseudocyst in the right lobe, or even penetrating the porta hepatis, resulting in intraparenchymal pseudocysts [1,2,9,11]. The precise mechanism of intrahepatic pancreatic pseudocyst development is not fully understood. Small pseudocysts often resolve spontaneously, whereas larger ones may have a highly variable course over time, with periods ranging from six days to two months [2,7]. These collections have distinct imaging characteristics on CT: subcapsular pseudocysts are biconvex in shape, whereas intraparenchymal pseudocysts are located away from the hepatic capsule, adjacent to the branches of the porta hepatis [3,10,11].

In our case, the preoperative differential diagnosis was guided by the rapid development of this large collection (177×80×190 mm) over two weeks (documented on serial CT scans and ultrasound exams), in the context of a recent acute pancreatitis episode approximately 2–3 weeks prior, as well as by the imaging characteristics of the lesion. The choice of treatment depends on cyst location, size, patient impact, and the presence of communication with the main pancreatic duct [3,10]. The communication of the pseudocyst with the main pancreatic duct can be demonstrated by MRCP, which delineates the anatomy of the main pancreatic duct and biliary tree [3]. Treatment options include main pancreatic duct stenting, endoscopic drainage, and occasionally surgical management [3,4,7,12,13]. The decision for surgical intervention in this case was made due to severe pain, the progressive cholestatic syndrome and the big volume of the pseudocyst. A definitive diagnosis was established after biochemical analysis of the intracystic fluid, which revealed markedly elevated amylase and lipase levels excluding the possibility of malignancy or infection [3].

The differential diagnosis of an intrahepatic pancreatic pseudocyst should be made with simple cysts, hydatid cyst, liver abscess, or other liver formations [3,7].

Due to the rarity of such cases, there is no treatment guideline for pancreatic pseudocysts with subhepatic location [8,11]. Therefore, clinicians will judge the case and decide on treatment based on the patient's symptoms, the location of the pseudocyst, its size and associated comorbidities [10].

Considering that some pseudocysts may regress spontaneously, imaging monitoring and conservative treatment may be one of the therapeutic options [11]. In up to 50% of cases, pancreatic pseudocysts may disappear spontaneously [5]. In the absence of response to conservative treatment, percutaneous drainage of the pseudocyst, endoscopic drainage or surgical treatment, remain the last treatment options [8,11]. The percutaneous or surgical drainage is usually well tolerated [10]. However, to date, there are no clear criteria that require cyst drainage [1,5]. There is no data in the literature regarding the recurrence of extrapancreatic pseudocysts after endoscopic, percutaneous, or surgical drainage.

In the absence of treatment, pseudocysts can become complicated by bleeding, infection, fistula, compression, or rupture of the pseudocyst [8,10,13]. One of the causes of infection of a pseudocyst can be following endoscopic retrograde cholangiopancreatography [13].

Up to 10% of cases of chronic pancreatitis associate pancreatic pseudocysts with arterial pseudoaneurysms [11]. Intracystic bleeding can cause severe pain on patients who associate pancreatic pseudocyst with pseudoaneurysms [11].

Pseudocysts with perirenal localization may be complicated by perirenal abscess, obstructive hydronephrosis, pseudoaneurysm, or renin mediated hypertension [8].

Zhu et al reported a case of an extremely rare complication, a patient with secondary Budd-Chiari syndrome caused by a giant intrahepatic pancreatic pseudocyst compressing the hepatic vein. In this case, the treatment was percutaneous drainage [7]. The choice of percutaneous drainage was aimed at obtaining slow drainage of the pseudocyst, in order to prevent the circulatory system disturbance caused by the sudden decrease of intra-abdominal hypertension [7]. Zhu et al recommend percutaneous drainage when there are signs of huge intra-abdominal hypertension [7].

Another extremely rare complication was reported by Patidar et al, an extremely rare vascular complication of intrahepatic pancreatic pseudocyst rupturing into the inferior vena cava. In this case, the pancreatic pseudocyst was located to caudate lobe [6].

The particularity of our case consists in the rapid development of a giant pancreatic pseudocyst (18 cm in diameter) with a rare extra pancreatic location - subcapsular right hepatic lobe. From the data we have from the published literature, this is one of the largest pancreatic pseudocysts located subcapsular right hepatic. Also, the case is fully explored, we have a diagnosis of certainty, with specific history and symptoms, clear, complete imaging, typical appearance of CT images, intraoperative images edifying for diagnosis and a diagnosis of certainty supported by extremely high values of amylase in the intracystic fluid.

In our opinion, it is necessary to develop a diagnostic and treatment guideline for extra pancreatic pseudocysts.

An extensive electronic search of PubMed, from the 1970s to the present, with the keywords "intrahepatic pancreatic pseudocyst", found 65 relevant results. From these, case reports similar to ours, or reports of limited case series, were selected. Guesmi et al found 22 cases of pancreatic pseudocyst located intrahepatic or subcapsularly in the liver published between 1990 and 2009 [5]. The etiology identified in these cases was predominantly chronic pancreatitis, followed by alcohol and gallstones.

The symptoms identified in published case reports were either nonspecific, absent, or abdominal pain associated with nausea or diarrhea. In a few cases, patients noted a palpable abdominal mass [5]. Of these, the most common symptom was abdominal pain.

Hepatic pancreatic pseudocysts can be single or multiple. Those located subcapsularly are mainly single, while those located intrahepatic are often multiple, located either in a single hepatic lobe or in both hepatic lobes.

Of the 22 cases analyzed by Guesmi et al, 15 cases benefited from percutaneous ultrasound or CT drainage, 4 from surgical treatment and 3 without specific treatment. Death was recorded in 3 patients, the others having a favorable evolution.

Demeusy et al found 41 conclusive articles from 1970 to 2016, presenting 54 similar cases. In this systematic review, the mean size of hepatic pancreatic pseudocysts was 9.5 cm. The treatment chosen



was also percutaneous drainage of the pseudocyst, surgical treatment or endoscopic treatment, with ERCP (endoscopic retrograde pancreatography) and stenting of the pancreatic duct [10].

From our point of view, future research directions concern treatment methods depending on the intrahepatic location (intraparenchymal versus subcapsular) and the size of the pseudocyst. It is necessary to establish clear criteria for which conservative treatment, percutaneous drainage or when surgical treatment is recommended.

## 5. Conclusions

Subcapsular hepatic pancreatic pseudocysts is an extremely rare complication of pancreatitis. Intrahepatic pseudocysts are often overlooked when evaluating hepatic lesions, but the appearance of a collection in the subcapsular hepatic region in a patient with known chronic pancreatitis or following an acute pancreatitis episode should be considered. Although the clinical presentation is nonspecific, computed tomography and analysis of intracystic fluid play a key role in diagnosing this condition. Therapeutic management varies depending on case-specific factors, and the approach should be multidisciplinary.

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