

# Imaging of malignancy-suspected pancreatic involvement of extrapulmonary tuberculosis

## Ekstrapulmoner tüberkülozun maligniteyi andıran pankreas tutulumunun görüntülenmesi

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*Extrapulmonary tuberculosis has a poor reputation because of its manifestations. Diagnostic delays or misdiagnosis negatively impact treatment. It has a low incidence and can easily mimic other noninfectious abdominal diseases, which are therefore necessary in the differential diagnosis. We report a 45-year-old male presenting with obstructive jaundice, night fever, and abdominal pain and we describe the repeated interesting imaging findings. Imaging techniques revealed an irregularly bordered retroperitoneal mass. Extrapulmonary tuberculosis involvement was diagnosed after laparotomy biopsies. In the case of retroperitoneal mass on imaging techniques, we believe that intraabdominal tuberculosis should be included in the differential diagnosis, especially in endemic areas, in order to avoid unnecessary serious surgical procedures. In this case, we studied serial phase contrast dynamic magnetic resonance imaging of the pancreatic head mass; the complications of hepatic abscess and cholangitis that developed after surgery have never been reported concomitant with tuberculosis disease.*

**Key words:** Pancreas, tuberculosis, MRI, retroperitoneal mass

### INTRODUCTION

Tuberculosis is an important health problem in endemic countries. More than 5% of patients with tuberculosis have abdominal involvement. Involvement in the abdomen usually presents in the intestine, peritoneum, mesenteric lymph nodes, and other regions of the gastrointestinal tract. The terminal ileum and cecum are the predominantly involved areas of the intestine. Imaging methods including especially dynamic contrast studies help to shed light on the diagnosis. There is less research on magnetic resonance imaging (MRI). We report a rare condition of abdominal involvement of tuberculosis presenting as a pancreatic mass

*Ekstrapulmoner tüberküloz belirtileri nedeniyle kötü bir üne sahiptir. Tanıda gecikme veya yanlış tanının tedavi üzerine olumsuz etkileri vardır. Düşük insidansa sahip olması ve diğer enfeksiyon dışı abdominal hastalıklar ile kolayca benzeşmesi nedeniyle ayırıcı tanıda önemlidir. Bu bildiriye tıkaçıcı sarılık, gece ateşi, karın ağrısı olan 45 yaşında erkek hasta ve tekrarlanan ilginç görüntüleme bulguları sunulmuştur. Görüntüleme yöntemleri ile düzensiz sınırlı retroperitoneal kitle saptandı. Laparotomi ile biyopsi sonucunda ekstrapulmoner tüberküloz tutulumu teşhis edildi. Özellikle endemik ülkelerde görüntüleme yöntemlerinde retroperitoneal kitle saptandığında, gereksiz ciddi cerrahi müdahalelerden kaçınmak için intraabdominal tüberkülozun ayırıcı tanıda yer alması gerektiği kanısındayız. Olgumuzda, daha önce tüberküloz hastalığında birlikteliği tanımlanmayan pankreas başı kitlesi ile cerrahi sonrası komplikasyon olarak gelişen karaciğer apsesi ve kolanjit seri faz kontrastlı dinamik manyetik rezonans görüntüleme ile tetkik edildi.*

**Anahtar kelimeler:** Pankreas, tüberküloz, MRG, retroperitoneal kitle

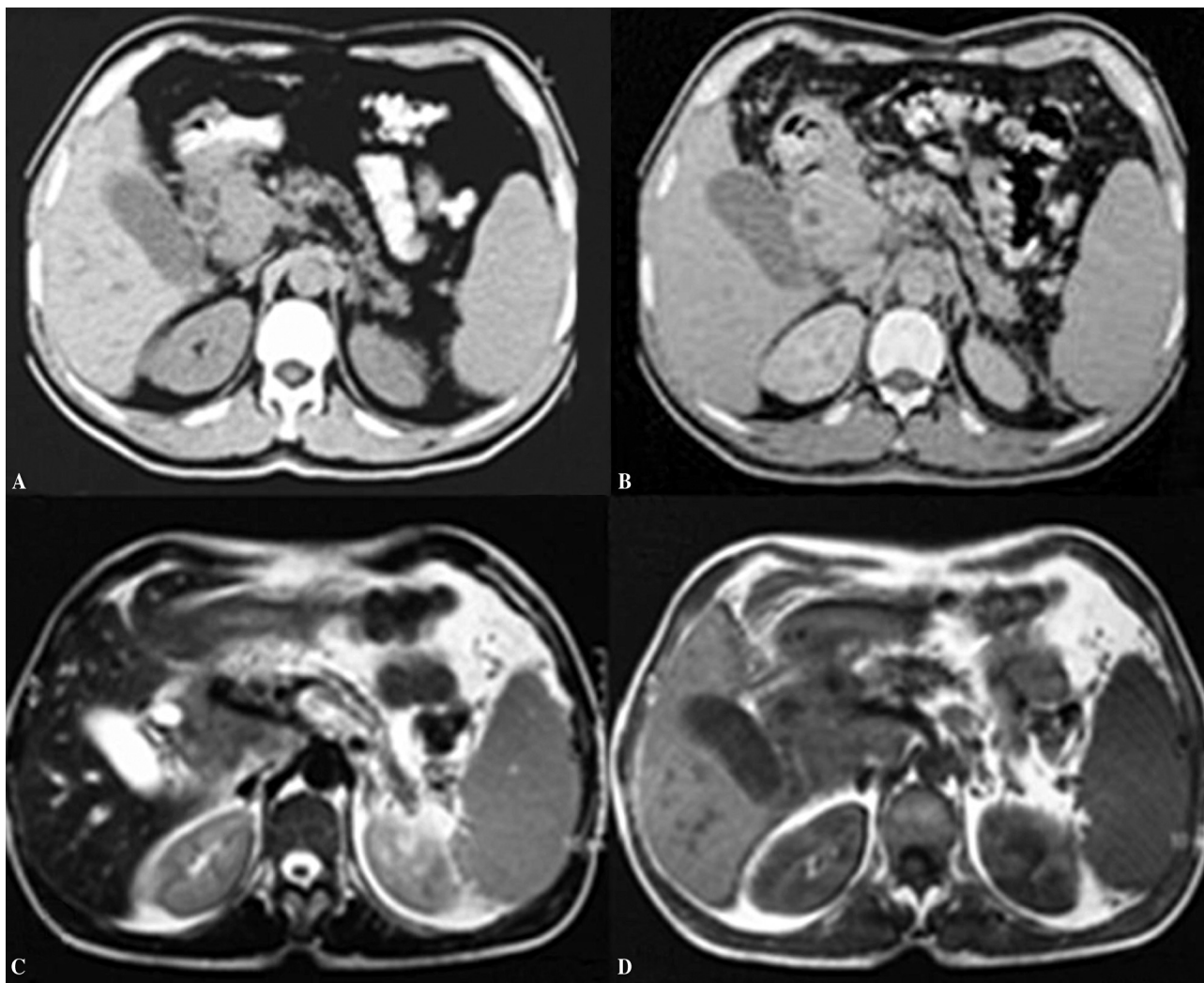
mimicking pancreatic carcinoma. This work reveals the importance of follow-up studies on radiodiagnosis including computed tomography (CT), MRI and dynamic phase contrast imaging during therapy.

### CASE REPORT

A 45-year-old male presented with sudden onset jaundice, weight loss, fever, night sweats, dark urine, abdominal pain, and upper abdominal sensitivity. He had no immunosuppressive diseases such as human immunodeficiency virus (HIV) and never consumed alcohol. His laboratory investiga-

tions were as follows: total bilirubin: 3.4 mg/dl, direct bilirubin 1.8 mg/dl, alkaline phosphatase (ALP): 897 U/L,  $\gamma$ -glutamyl transferase (GGT): 67 U/L, alanine aminotransferase (ALT): 70 U/L, aspartate aminotransferase (AST): 54 U/L, and globulin 4.3 g/dl. Hematology demonstrated a leukocyte count (WBC) of 6100/mm<sup>3</sup>, erythrocyte sedimentation rate (ESR) of 87 mm/h, and cancer antigen 15-3 (CA 15-3) of 32.7 U/ml. The chest X-ray was reported as normal. Abdominal ultrasound revealed left nephrolithiasis and splenomegaly, and a bi-lobed heterogeneous hypoechogenic solid mass without any cystic components was found in the region of the pancreatic head. The patient was referred for abdominal CT examination, which demonstrated the pancreas head, obliterated peripancreatic fatty tissues and several lymphadeno-

pathies less than 1 cm localized around the pancreas. There were no calcifications or necrosis in the lymph nodes. The gallbladder was hydropic, and intra- and extrahepatic bile ducts and the distal part of choledochus were dilated (16 mm) and ended abruptly. CT scan showed post-inflammatory alterations of peripancreatic fatty tissue. Abdominal MRI, with the confirmation of magnetic resonance cholangiopancreatography (MRCP), revealed a lobule mass obliterating the choledochus and displaced the vena porta and hepatic artery in the area of the pancreatic head, with associated peripancreatic metastatic lymphadenopathies. The pancreatic lesion had low signal intensity on both T1- and T2-weighted images. The lesion was hypointense on fat-suppressed T1-weighted images and showed heterogeneous enhancement after

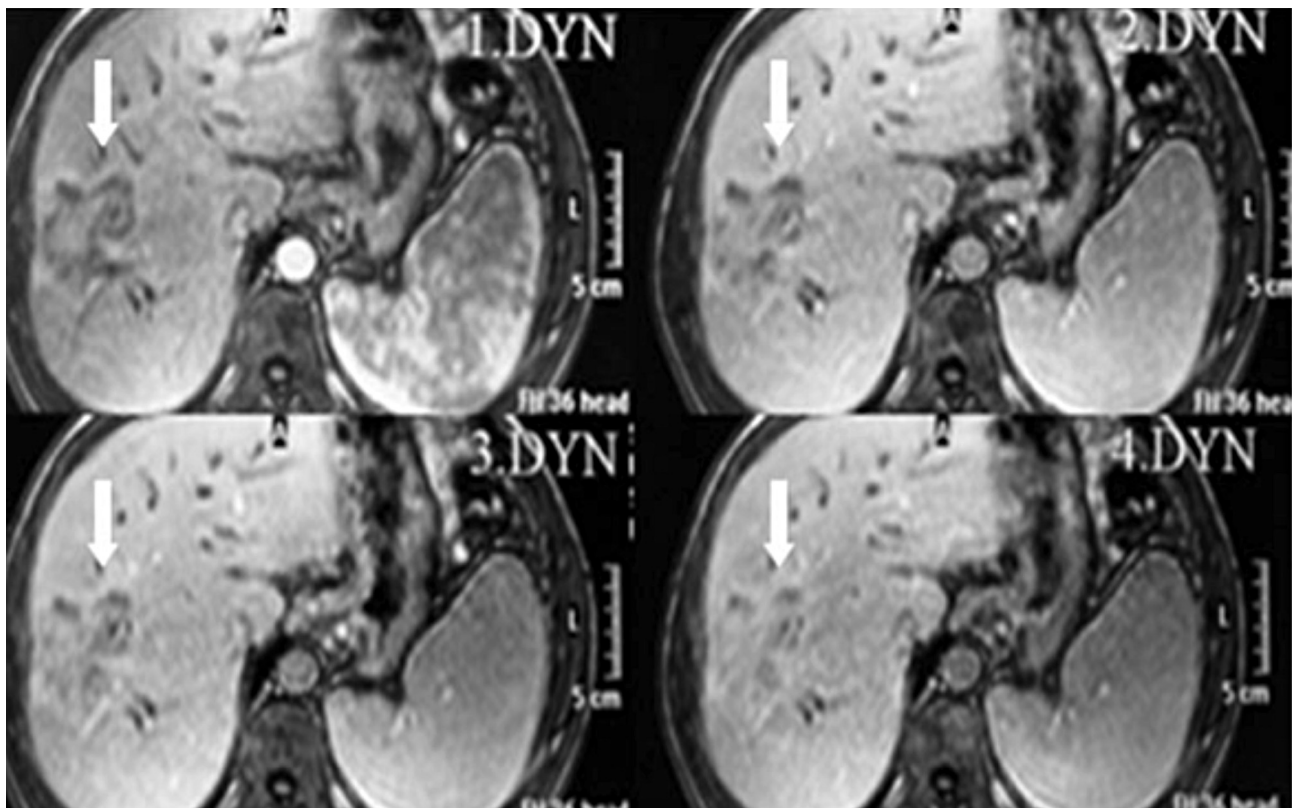


**Figure 1.** (A, B). Abdominal CT scans with and without contrast enhancement show a mass lesion in the head of the pancreas. The inflamed peripancreatic tissues are enhanced. The choledochus is dilated and has an abrupt ending; (C, D). Axial T2- and T1-weighted MR images demonstrate an expansive mass displacing the hepatic artery superiorly.

contrast material administration. Enhancement of the lesion was less than that of normal pancreatic parenchyma. Dynamic MR images were obtained before and after gadopentetate dimeglumine contrast agent injection at 1, 2, 3 and 5 minutes. On dynamic MRI, peripheral rim enhancement was observed on 5-min delayed images. The pancreatic mass showed increased contrast enhancement in time, which suggested malignancy. MRI and MRCP disclosed a lobule mass that displaced vascular structures, and caused dilatation or strictures of intrahepatic bile ducts and liver abscess. MRI clearly demonstrated peri-lesion complications such as infiltration of porta hepatis and hepatic abscess. Dynamic MRI studies demonstrating surrounding enhancement of the main hepatic bile ducts shed light on cholangitis. Dynamic MRI study may not distinguish malignancy, but may reveal effective findings of the lesion. MRCP displayed the amputation of the choledochus in the region of the pancreatic mass and dilatation of the main pancreatic duct as well as the strictures of branches of the main hepatic bile ducts, which are evidence of cholangitis. Fat-suppressed with and

without contrast-enhanced T1- and T2-weighted images demonstrated clearly the inflammation of the peripancreatic area. Whole imaging methods were useful in the follow-up studies and in evaluating complications of the main disease and therapy such as surgery. The diagnosis was based on CT-guided biopsies.

The hepatobiliary surgery council concluded the patient was inoperable. Endoscopic retrograde cholangiopancreatography (ERCP) showed an extrinsic impression on the duodenum. A sphincterotomy was performed, and the choledochus was explored. CT-guided percutaneous fine needle aspiration biopsy for cytology with accompaniment of the pathologist showed a nonspecific suppurative inflammatory process. Due to the presence of jaundice, the patient underwent exploratory laparotomy for drainage. The pancreas was found edematous. Peripancreatic fatty tissues were fragile and inflamed. After several biopsies, frozen results revealed a granulomatous inflammatory process. Specific antituberculous therapy including isoniazid, rifampin, ethambutol, and pyrazinamide was started as therapy.



**Figure 2.** Axial four-phase dynamic studies demonstrate peripheral linear gadolinium enhancement of hepatic abscess in time. On delayed phase, hepatic abscess became isointense against the liver.



On the 20<sup>th</sup> postoperative day, the patient suffered from fever, chills and jaundice. Early and delayed phase dynamic imaging technique on MRI disclosed an inflammatory condition explained as hepatic abscess, and linear type contrast-enhancement of the walls of the intrahepatic bile ducts and MRCP revealed strictures at the intrahepatic bile ducts (cholangitis).

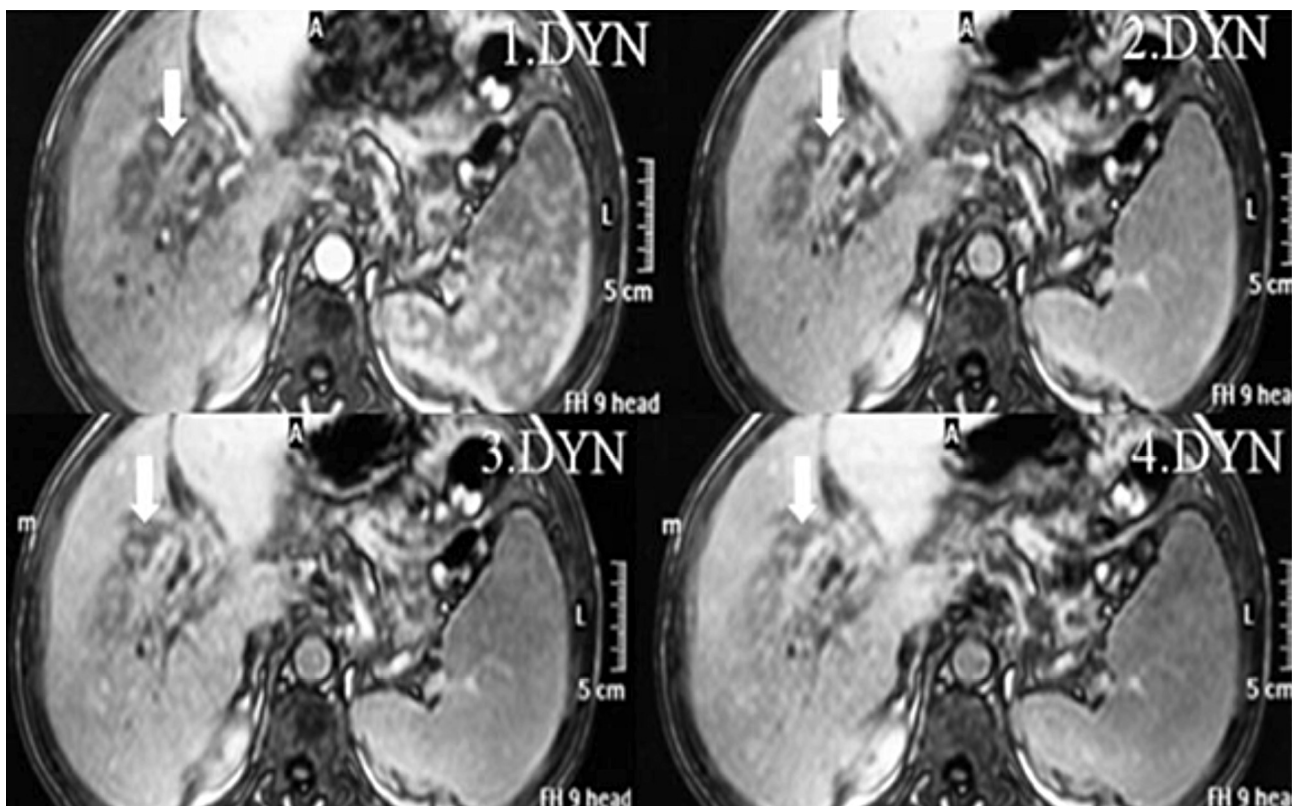
Computed tomography-guided drainage was performed. Bacteriological examination of the drainage material demonstrated the presence of purulent material with pleomorphic leukocytes. No bacteria could be obtained from its culture. We therefore considered this condition due to a complication of surgery. After the completion of wide spectrum therapy, repeat CT scan confirmed considerable shrinkage in the size of the pancreatic head mass. Further, hepatic abscess had regressed.

## DISCUSSION

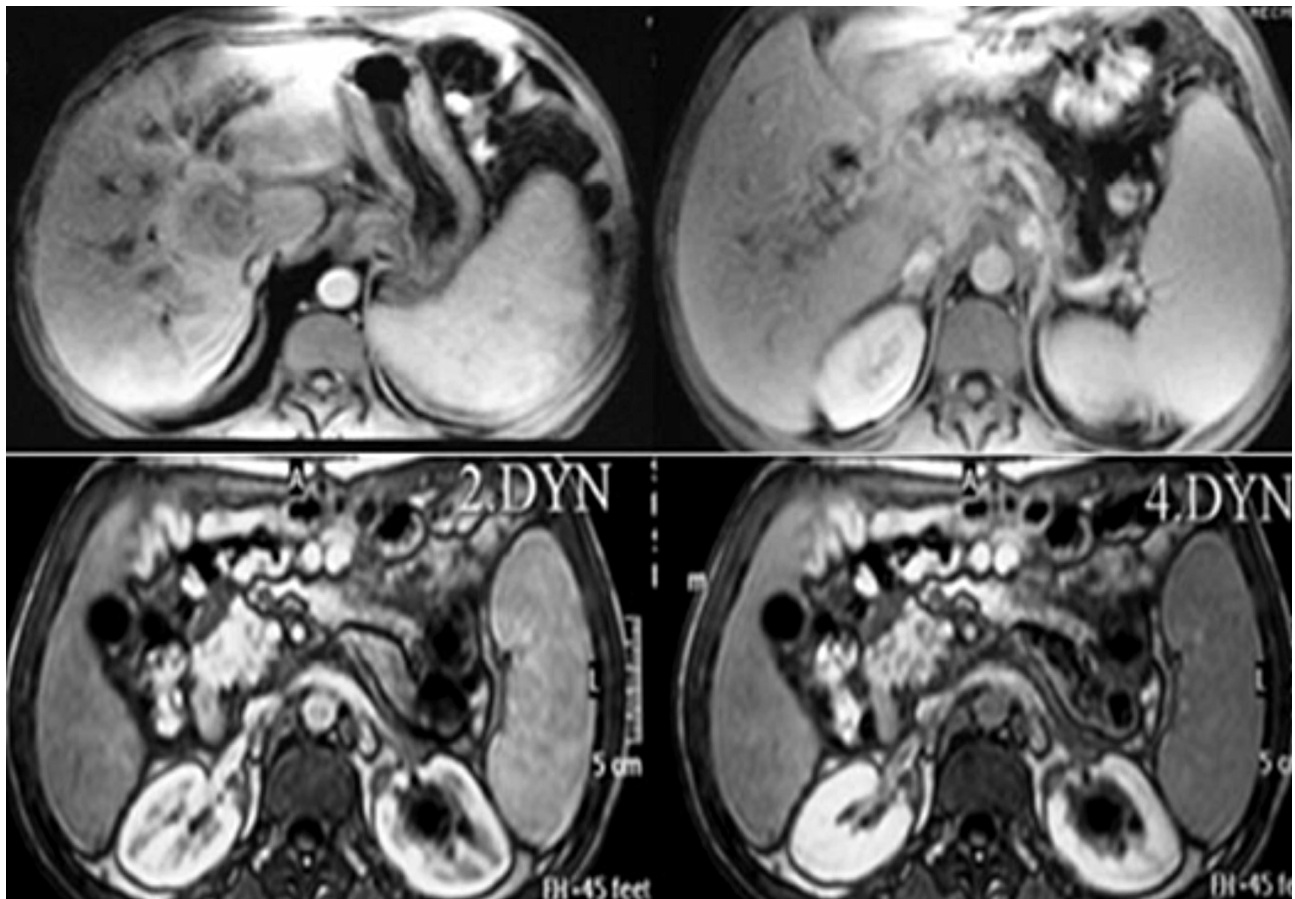
Tuberculosis of the pancreas is a rare condition even in countries where tuberculosis is endemic. The main symptoms at presentation of pancreatic

tuberculosis were reported as abdominal pain, weight loss, fever, recurrent vomiting, and jaundice. The diagnosis is difficult in the absence of a primary focus in the other parts of the body such as the lungs and depends on clinical manifestations like biliary obstruction, massive gastrointestinal bleeding, pancreatic abscess, and acute-chronic pancreatitis (1, 2).

Isolated pancreatic involvement primarily depends on lympho-hematogenous dissemination from an occult focus in the lungs (3). Incidence of isolated pancreatic tuberculosis is similar between sexes, occurring at a mean age of around 40 years. Most reported cases are from endemic countries (4). Immunocompetent patients and those with HIV infection have a greater incidence of typical and extrapulmonary tuberculosis (5-7). Our case was a nonimmunocompetent patient, and we observed that pancreatic tuberculosis may have caused liver involvement manifesting as hepatic abscess and cholangitis. The presenting signs and symptoms of the disease, as well as the physical findings, may be nonspecific and nondiagnostic; therefore, diagnosis can be significantly delayed. Additional involvement, such as cholangitis and li-



**Figure 3.** Phase contrast dynamic studies demonstrate surrounding enhancement of main hepatic bile ducts, shedding light on cholangitis.



**Figure 4.** Contrast-enhanced axial T1-weighted imaging before treatment and axial dynamic MRI studies after treatment. MR images demonstrate well the decrease in size and contrast enhancing pattern of the pancreatic lesion and regressed peripancreatic inflammation after antituberculosis therapy.

ver abscess, may develop because of this delay. These complications were mostly due to surgery. In our case, CT-guided aspiration of purulent material with pleomorphic leukocytes on postoperative day 20 was considered to be a surgical complication (8-10).

Ultrasonography findings included enlarged pancreas with focal hypoechoic lesions with or without any cystic components. Abdominal sonography revealed lobule heterogeneous hypoechogenic solid mass in the head of the pancreas region. Peripancreatic or mesenteric lymphadenopathy, ascites, thickening of the gastrointestinal tract wall or mesentery, and other accompanying lesions affecting the liver or spleen have to be kept in mind. In our case, liver involvement was a complication of surgery. A mass lacking any cystic components may cast doubt about malignancy. CT scans mostly revealed the mass lesion in the pancreatic head ob-

literating peripancreatic fatty tissues, several peripancreatic millimetric lymphadenopathies, hydropic gallbladder, and dilated bile ducts and choledochus, which had an abrupt ending that mistakenly suggested malignancy. The cystic lesion and multiloculated pancreatic lesions also had direct tuberculous origin. Peripheral ring-enhanced peripancreatic and periportal lymphadenopathies were ancillary findings. Several millimetric peripancreatic lymphadenopathies may also point to lymphoma in the differential diagnosis, although in this case, the localized lymph nodes of less than 1 cm in diameter prevented us from considering this diagnosis (6).

Computed tomography is not a reliable method in the distinction of malignancy. MRI is helpful and reveals characteristic findings. Tuberculosis appears hypointense on both T1- and T2-weighted images. Neoplastic and inflammatory lesions are ob-

served as hyperintense on T2-weighted images, although calcification, fibrosis and free radicals from phagocytosis of macrophages are seen as hypointense on T2-weighted images. Fibromatous tumor, scar tissue, calcified lesions, old hemorrhage, and tuberculosis should be kept in mind, as they acquire similar imaging characteristics as hypointensity on T1- and T2-weighted images. Pancreas enhancement showed rapid fixation of contrast material and remained enhanced on portal venous and first delayed phase, although it peaked on the arterial dominant or portal venous phase. Fast multiplanar MRI showed altered enhancement on chronic pancreatitis and cancer according to the unaffected pancreas parenchyma. Both conditions have gradual progressive enhancement in the affected area in the pancreatic tis-

sue. Enhancement of the lesion was less than in normal pancreatic parenchyma.

The differential diagnosis depends on imaging modalities. Many conditions have similar appearances at ultrasound and on CT. MRI, especially dynamic MRI may weke a difference. Ultrasound and CT, although conventional MRI sequences are not always sufficient; additive imaging modalities such as dynamic MRI requirement. Enhancement patterns are necessary in the preliminary diagnosis, although definitive diagnosis depends on fine needle aspiration biopsies. In conclusion, intraabdominal tuberculosis should be included in the differential diagnosis in patients with unexplained abdominal pathology if they belong to a risk group, especially in those from endemic countries with high tuberculosis rates.

## REFERENCES

1. Woodfield JC, Windsor JA, Godfrey CC, et al. Diagnosis and management of isolated pancreatic tuberculosis: recent experience and literature review. *ANZ J Surg* 2004; 74: 368-71.
2. Franco-Paredes Leonard M, Jurado R, Blumberg HM, Smith RM. Tuberculosis of the pancreas: report of two cases and review of the literature. *Am J Med Sci* 2002; 323: 54-8.
3. Ladas SD, Vaidakis E, Lariou C, et al. Pancreatic tuberculosis in non-immunocompromised patients: reports of two cases, and a literature review. *Eur J Gastroenterol Hepatol* 1998; 10: 973-6.
4. Rezeig MA, Fasmir BM, Al-Suhaibani H, et al. Pancreatic tuberculosis mimicking pancreatic carcinoma - four case reports and review of the literature. *Dig Dis Sci* 1998; 43: 329-31.
5. Kouraklis G, Glinavou A, Karayiannakis A, Karatzas G. Primary tuberculosis of the pancreas mimicking a pancreatic tumor. *Int J Pancreatol* 2001; 29: 151-3.
6. Vanhoenacker FM, De Backer AI, Op de Beeck B, et al. Imaging of gastrointestinal and abdominal tuberculosis. *Eur Radiol* 2004; 14: 103-5.
7. Andronikou S, Wieselthaler N. Modern imaging of tuberculosis in children: thoracic, central nervous system and abdominal tuberculosis. *Pediatr Radiol* 2004; 34: 861-75.
8. Uzunkoy A, Harma M, Harma M. Diagnosis of abdominal tuberculosis: experience from 11 cases and review of the literature. *World J Gastroenterol* 2004; 10: 3647-9.
9. De Backer AI, Mortelet KJ, Bomans P, et al. Tuberculosis of the pancreas: MRI features. *AJR* 2005; 184: 50-4.
10. Hassan I, Brilakis ES, Thompson RL, Que FG. Surgical management of abdominal tuberculosis. *J Gastrointest Surg* 2002; 6: 862-7.