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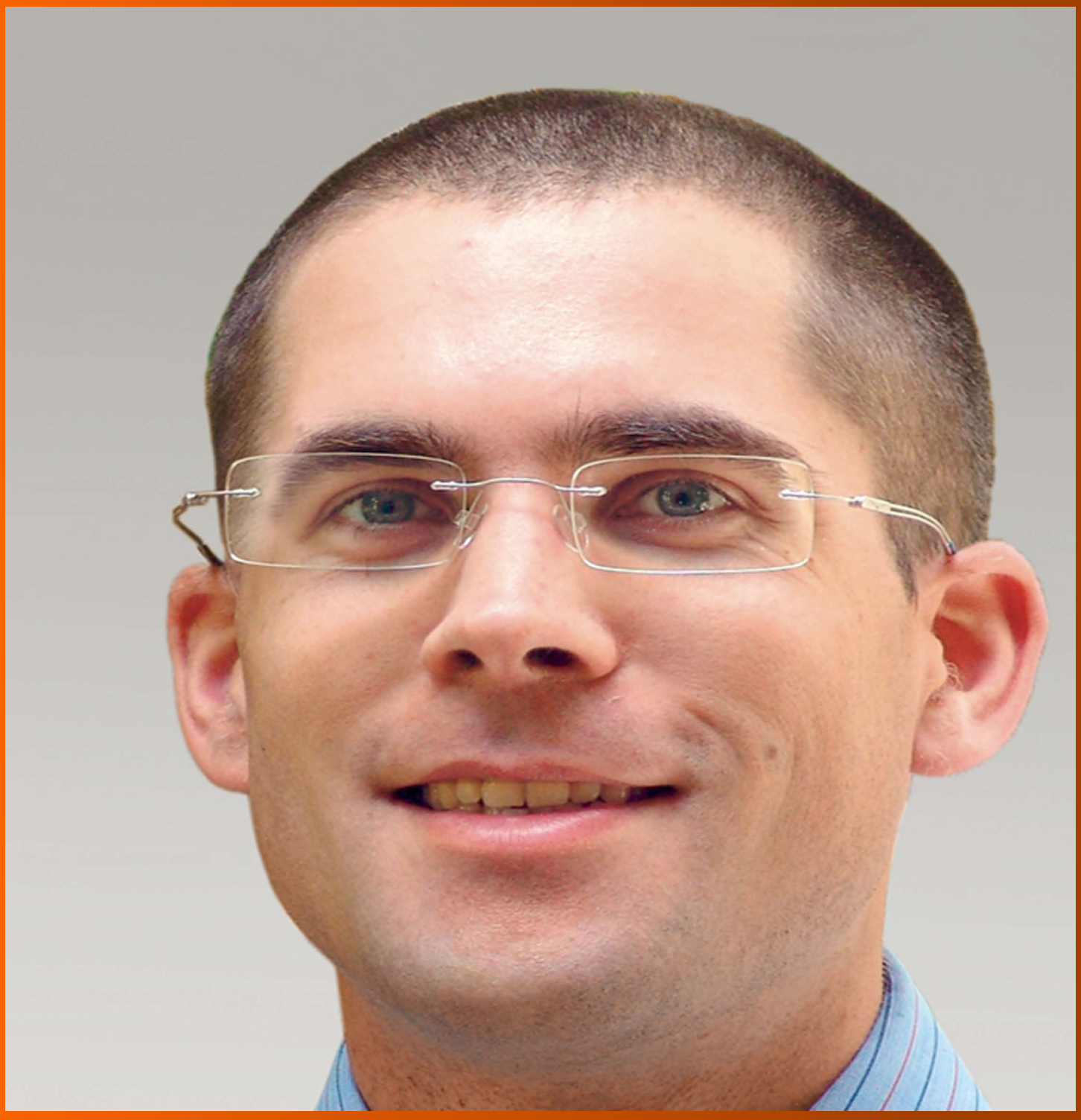

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CASE REPORT

# Simultaneous Courvoisier's and double duct signs

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## Abstract

Presence of Courvoisier's or double duct signs in a jaundiced patient is suggestive of malignant obstruction of the pancreaticobiliary ductal system. The oncologic impact of the simultaneous occurrence of these signs on the survival of patients with periampullary cancer is unknown. We report a case of obstructive jaundice secondary to an ampullary cancer demonstrating the Courvoisier's sign on clinical examination and a double duct sign on imaging. The patient underwent a pancreaticoduodenectomy which confirmed an ampullary adenocarcinoma.

**Key words:** Ampullary cancer; Obstructive jaundice; Double duct sign; Courvoisier's law; Prognosis



**Core tip:** Presence of Courvoisier's or double duct signs in a jaundiced patient is indicative of obstruction of the pancreaticobiliary ductal system most likely of malignant etiology. This study reports classic clinical and radiologic findings in ampullary adenocarcinoma. The oncologic impact of the simultaneous occurrence of these signs on the survival of patients with ampullary cancer is unknown.

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## INTRODUCTION

Recent studies validate Courvoisier's observation that gallbladder distension seldom occurs in stone obstruction of the bile duct and is usually seen with other causes of biliary obstruction[1,2]. The radiographic double duct sign comprising of the simultaneous dilation of the common bile duct (CBD) and main pancreatic duct (MPD) se-

condary to biductal obstruction is highly suggestive but not diagnostic of pancreatic cancer[3,4]. Despite a common etiology there is little data on the simultaneous occurrence of the two signs.

## CASE REPORT

A 52-year-old male presented to the clinic with complaints of yellow discoloration of eyes and generalized pruritis since one month. He denied fever, chills or weight loss and maintained a normal appetite. He denied abdominal pain or backache. He quit smoking 15 years ago and denied consumption of alcohol. His past medical, surgical or family history were noncontributory. On examination he was icteric with no supraclavicular lymphadenopathy. Abdominal examination revealed a palpable liver edge 3 cm below the costal margin and a distended gall bladder consistent with a Courvoisier's sign. Laboratory tests were remarkable for elevated liver function tests- total bilirubin 5.4 mg/dL, direct bilirubin 4.4 mg/dL, glutamic-oxalacetic transaminase (AST) 107 IU/L, alanine aminotransferase (ALT) 189 IU/L, alkaline phosphatase 489 U/L with a normal tumor marker CA 19-9.

Abdominal ultrasound (US) demonstrated hepatomegaly, distended gallbladder with sludge, dilated MPD, CBD and intrahepatic biliary radicles. Pancreatic protocol computed tomography (CT) demonstrated a sessile enhancing mass in the medial wall of the second portion of the duodenum in the region of the ampulla with upstream dilation of the CBD, MPD, IHBR and a distended gallbladder. CBD and MPD measured 16 mm and 7 mm respectively and pancreatic parenchyma was normal (Figure 1). MR cholangiopancreatography confirmed an ampullary mass, a double duct sign with MPD dilated in its entire course and a prominent cystic duct (Figure 2). Upper gastrointestinal endoscopy demonstrated a periampullary tumor with surface ulceration and biopsy confirmed an adenocarcinoma (Figure 2, inset). The patient underwent a classic pancreaticoduodenectomy or Whipple operation. Postoperative course was unremarkable and the patient was discharged home on postoperative day six. Surgical pathology demonstrated a $pT_1N_1M_0$ ampullary adenocarcinoma with vascular invasion. Adjuvant chemotherapy was administered and the patient remains without evidence of tumor recurrence at 18 mo following surgery.

## DISCUSSION

The lack of gallbladder distension in 80.4% patients with calculous obstruction of the CBD was first reported by Courvoisier and is typically explained by fibrotic or atrophic changes in the gallbladder wall secondary to repeated inflammatory episodes however, recent data suggests that gallbladders are equally distensible regardless of the underlying pathology and it is the markedly higher and sustained elevation in ductal pressure in malignant obstruction that results in a distended gallbladder in contrast to the intermittent obstruction produced by gallstones[1,5,6]. The double duct sign initially described on endoscopic retrograde cholangiopancreatography (ERCP) has also been seen with US, CT or MRCP and is usually caused by cancer of the pancreatic head or ampulla of Vater and less commonly, chronic pancreatitis or ampullary stenosis[3]. Other malignant causes include cholangiocarcinoma, metastatic lymphadenopathy, lymphoma and rare causes include primary retroperitoneal fibrosis, Kaposi sarcoma or parasitic infestation of the bile ducts[3]. The prevalence of malignancy in patients with the double duct sign varies from 58%-85% particularly, in association with obstructive jaundice[4,7,8]. However, the MPD caliber is normal in 20% patients with pancreatic cancer and isolated dilation of the MPD (single duct dilation) is due to chronic pancreatitis in the majority of the patients[9,10].

Biductal obstruction of the CBD and MPD may result in the Courvoisier's and/or double duct signs and the diagnostic value of these signs in the evaluation of a patient with obstructive jaundice is widely accepted. Despite extensive evaluation of the etiology,

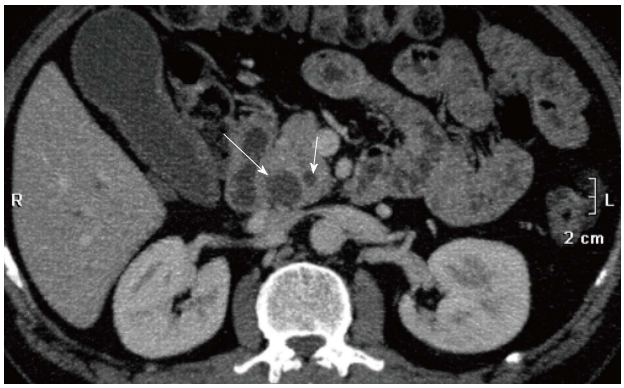


**Figure 1 Double duct sign in a 52-year-old male with ampullary adenocarcinoma.** Contrast-enhanced CT scan shows dilatation of the main pancreatic duct (short arrow) and common bile duct (long arrow).

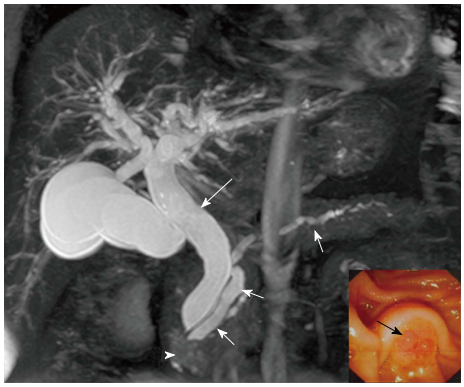

**Figure 2 MR cholangiopancreatography shows a distended gallbladder, dilatation of the common bile duct (long arrow) and main pancreatic duct (short arrows) consistent with a double duct sign.** A mass is noted in the region of the ampulla of Vater (arrowhead) and a periampullary tumor (black arrow) is confirmed on upper gastrointestinal endoscopy (inset).

pathogenesis and mechanism of these signs no study has reported the incidence or prognostic significance of the simultaneous occurrence of these signs in a patient with an ampullary cancer. The impact of the simultaneous occurrence of the Courvoisier's and double duct signs on survival outcome is unknown and an area for future investigation.

## COMMENTS

### Case characteristics

A 52-year-old male presented to the clinic with obstructive jaundice and abdominal examination revealed a palpable liver edge and a distended gall bladder consistent with the Courvoisier's sign. Abdominal imaging revealed an ampullary mass and a double duct sign. Upper endoscopy and biopsy confirmed ampullary adenocarcinoma. A classic pancreaticoduodenectomy was performed. Postoperative recovery was uneventful and adjuvant chemotherapy was administered. The patient remains without evidence of tumor recurrence at 18 mo following surgery.

### Clinical diagnosis

Obstructive jaundice with ampullary tumor.

### Differential diagnosis

Ampullary adenoma.

### Laboratory diagnosis

Blood investigations confirmed obstructive jaundice.

### Imaging diagnosis

Triphasic computed tomography and magnetic resonance cholangiopancreatography confirmed an ampullary mass, a double duct sign with the common bile and main pancreatic ducts dilated in thier entire course.

### Pathological diagnosis

Ampullary adenocarcinoma on esophagogastroduodenoscopy and biopsy.

### Treatment

A classic pancreaticoduodenectomy (Whipple Operation).

### Experiences and lessons

A double duct sign in a patient with obstructive jaundice is indicative of an ampullary tumor. A pancreaticoduodenectomy is potentially curative for ampullary adenocarcinoma.

### Peer-review

This is a good clinical case report with good quality imaging studies to support the case.

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