

# Massive Intrahepatic Duct Invasion Caused by a Fatal Progression of Colonic Adenocarcinoma: Abdominal Computed Tomography Findings and Cholangiography Correlation

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## ABSTRACT

In this report, we present an unusual case of jaundice in a patient with advanced colorectal cancer due to intraductal tumour invasion of the intra- and extrahepatic biliary tree. This complication proved to be fatal despite aggressive therapeutic management. A correct diagnosis of this type of involvement was achieved by a combination of diagnostic and therapeutic cholangiography. Despite adequate biliary decompression, the patient died from liver failure and biliary sepsis.

**Keywords:** Contrast enhanced computed tomography, Colorectal cancer, Intrahepatic metastases

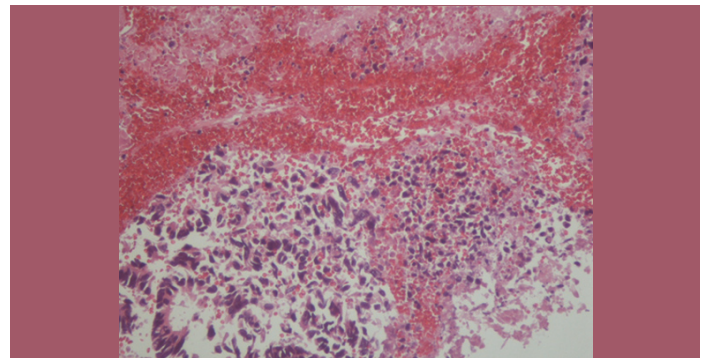
## CASE REPORT

A 62-year-old Caucasian male was referred to Medical Oncology Department with an 18 month history of colon cancer complicated by liver and lung metastasis at diagnosis, being treated in active second-line chemotherapy with FOLFIRI plus Bevacizumab. Ten days after his last chemotherapy administration, the patient complained of insidious and progressive abdominal pain localized in the right upper abdominal quadrant. He also noted dark urine and chalky stools. The patient had no chills or fever. He presented with mucocutaneous jaundice, consistent with elevated serum bilirubin levels (direct bilirubin 4.5 g/dL). Other laboratory tests were normal, including WBC.

Abdominal CT scan demonstrated multiple hypodense hepatic lesions compatible with the diagnosis of liver metastasis but without increase in size or number when compared to the prior CT scan. However, we identified interval multifocal dilatation of intra- and extrahepatic bile ducts. At this time the differential diagnosis was established to include extrinsic obstruction due to hepatic tumour progression, solid endoluminal occupation by infection or biliary microlithiasis or haemobilia secondary to Bevacizumab.

Percutaneous transhepatic cholangiography was then performed after ciprofloxacin prophylaxis. Internal-external drainage was placed during the intervention. During the procedure, solid

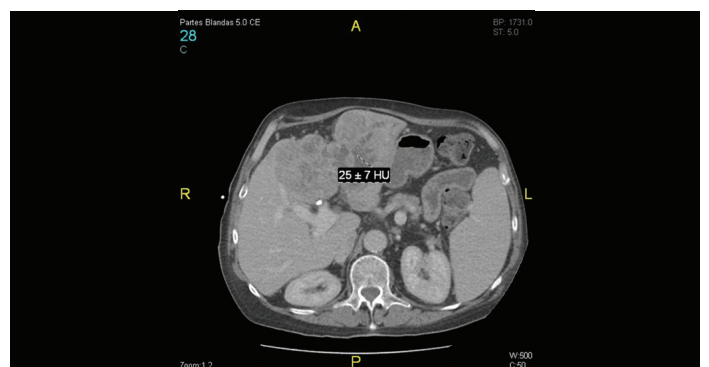
material occupying the bile duct was unexpectedly identified [Table/Fig-1]. Pathological analysis demonstrated the presence of solid tumour fragments of adenocarcinoma [Table/Fig-2]. At this time, microbiological study of biliary fluid did not detect bacterial cholangitis. Given these findings, abdominal CT images were reviewed which revealed increased iodinated contrast uptake within the dilated bile duct, suggestive of bile duct tumour invasion [Table/Fig-3].



**[Table/Fig-2]:** Histologic findings of the isolated biliary drainage solid fragments (HE stain). The histologic features were indicative of an adenocarcinoma. The liver and intrahepatic duct tumours resembled the colon carcinoma.



**[Table/Fig-1]:** Cholangiography. Dilated biliary tract. Distal duct was not opacified due to solid material occupying the bile duct.



**[Table/Fig-3]:** Abdominal computed tomography (CT). A contrast enhanced CT scan demonstrated dilatation of the intra- and extrahepatic bile duct and increased uptake of iodinated contrast within the dilated bile duct, suggestive of bile duct tumour invasion.

Despite an adequate biliary drainage, serum bilirubin levels were gradually increased. This was likely refractory to transhepatic drainage due to a mechanical limitation caused by the tumoural mold. Repeat cholangiography and new left biliary duct drain placement were achieved, but this measure failed to stabilize the situation. The patient subsequently developed a severe secondary biliary infection which evolved into septic shock. Despite antibiotic treatment, the patient died on the twentieth day of hospitalization.

## DISCUSSION

It is well known that intrabiliary invasion and growth is one of the developmental patterns of primary liver tumours. In Hepatocellular Carcinoma (HCC) this invasion potential is thought to be an indicator of a poor prognosis [1]. With respect to Intrahepatic Cholangiocarcinoma (ICC), bile duct invasion is a common characteristic [2]. Bile duct invasion by metastatic colorectal cancer has been previously reported in rare cases mimicking an intraductal papillary neoplasm of the extrahepatic bile duct [3], presenting intrapancreatic duct metastases [4] or specifically in pathological examination after surgical treatment of isolated liver metastasis [5-7,11]. In a study by Kubo et al., microscopic bile duct invasion was found in 89 of 217 cases (41%), and 23 of 217 cases of macroscopic intrabiliary extension (10.5%) [8]. Curiously, in their study, macroscopic intrabiliary extension seems to define a unique subgroup of colorectal cancers showing less aggressive features (well-differentiated adenocarcinoma, decreased primary tumour size, and less frequent venous invasion). Takamatsu et al., described a case report of a surgically resected liver metastasis with prominent intrabiliary growth derived from rectal cancer [9]. A partial hepatectomy, partial resection of segment VI, and an extrahepatic bile duct resection with reconstruction of the biliary tract were performed. Ghittoni et al., described a case of a metastasis from colorectal cancer involving the common hepatic biliary duct without invasion of contiguous liver parenchyma [10]. A contrast enhanced ultrasound and ultrasound-guided fine needle aspiration biopsy was used for a confirmed diagnosis. As in the previous cases, liver surgery and bile duct reconstruction could solve the clinical problem. Finally, Estrella et al., reported a recent study that estimated the prevalence of intrabiliary growth in liver metastases by both prospective and retrospective analyses [3]. By retrospective review of 1144 surgical pathology reports, they found intrabiliary growth in 3.6% of metastatic CRCs. Prospective evaluation of 170 liver resections yielded a 3-fold increase in prevalence (10.5%), again evenly divided between major (5.3%) and minor (5.3%) duct involvement. These findings suggest that intrabiliary growth is easily overlooked, even when it involves large or multiple bile ducts.

To our knowledge this patient is the first case of fatal diffuse biliary involvement due to colon cancer progression. Secondary to pre-existing bilobar liver metastasis, lung metastasis and failure with second line chemotherapy, there was no clear hepatic surgical indication. Thus, percutaneous transhepatic drainage seemed to

be a reasonable palliative option. Unfortunately, drainage proved to be ineffective in this case. Solid tumour occupation of the entire bile duct prevented improvement in jaundice despite a second drainage. Biliary sepsis was the final event of a terminal situation.

Peungjesada et al., presented the spectrum of CT findings of biliary involvement of metastatic colorectal liver metastasis [12]. Various patterns of radiologic presentation were described in this article. In some cases, biliary invasion was detected only by recognizing the cross-section of a dilated duct usually seen along the corresponding opacified portal venule. However, abdominal CT finding of iodinated contrast enhancement of the dilated bile duct in our study seemed to be an interesting and useful radiological feature. This finding should be confirmed in other cases, and may clarify the discrepancy between the frequency of macroscopic bile duct invasion in liver metastasis of colon cancer in previous cited studies (around 10%) and the absence of clinical data in routine clinical practice. Notably, unlike abdominal ultrasound or magnetic resonance imaging, CT scan is a part of the routine monitoring of patients with advanced colon cancer.

## CONCLUSION

Diffuse biliary involvement due to colon cancer metastasis is a rare and fatal clinical entity with specific abdominal CT findings. Percutaneous transhepatic drainage is an ineffective option in this setting.

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Date of Submission: **Sep 22, 2015**  
Date of Peer Review: **Dec 16, 2015**  
Date of Acceptance: **Dec 31, 2015**  
Date of Publishing: **Apr 01, 2016**

FINANCIAL OR OTHER COMPETING INTERESTS: None.