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## Accurate Diagnosis After Multidisciplinary Tumor Board: A Case Report of Cholangiocarcinoma

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# Accurate Diagnosis After Multidisciplinary Tumor Board: A Case Report of Cholangiocarcinoma

## Abstract

Multidisciplinary tumor boards (MDTBs) provide a venue for discussion of diagnosis, staging, and treatment of patients with cancer. MDTBs have been shown to improve diagnostic accuracy and staging, exemplified in this patient with a hepatic flexure mass on colonoscopy and initial pathology suggestive of primary colonic adenocarcinoma with surface mucosal involvement. However, subsequent CT imaging revealed a biliary malignancy invading the colon. Discussion at a MDTB facilitated radiology-pathology correlation, with subsequent immunohistochemical stains compatible with a cholangiocarcinoma with transmural colonic invasion. Prompt and accurate diagnosis after the MDTB enabled the oncology team to offer the proper treatment approach.

## Keywords

cholangiocarcinoma, CCA, multidisciplinary tumor board, adenocarcinoma

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## Conflict of Interest Statement

The authors report no conflicts of interest or funding source for this project.

## CASE REPORT

# Accurate Diagnosis After Multidisciplinary Tumor Board: A Case Report of Cholangiocarcinoma

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## Abstract

Multidisciplinary tumor boards (MDTBs) provide a venue for discussion of diagnosis, staging, and treatment of patients with cancer. MDTBs have been shown to improve diagnostic accuracy and staging, exemplified in this patient with a hepatic flexure mass on colonoscopy and initial pathology suggestive of primary colonic adenocarcinoma with surface mucosal involvement. However, subsequent CT imaging revealed a biliary malignancy invading the colon. Discussion at a MDTB facilitated radiology-pathology correlation, with subsequent immunohistochemical stains compatible with a cholangiocarcinoma with transmural colonic invasion. Prompt and accurate diagnosis after the MDTB enabled the oncology team to offer the proper treatment approach.

**Keywords:** Cholangiocarcinoma, CCA, Multidisciplinary tumor board, Adenocarcinoma

## 1. Introduction

A multidisciplinary tumor board (MDTB) is a meeting of patient care providers from different specialties to discuss the diagnosis, staging, and treatment of patients with cancer. At our institution, a weekly MDTB is attended by medical oncology, surgical oncology, radiation oncology, interventional radiology, diagnostic radiology, pathology, and palliative care. MDTBs have been shown to enhance the multidisciplinary management of oncology patients. One benefit in particular is improved diagnostic accuracy and more accurate staging<sup>1</sup>. This case report exemplifies how discussion at an MDTB led to a change in diagnosis from a colon adenocarcinoma to an adenocarcinoma of biliary etiology.

## 2. Case Presentation

An 88-year-old female with a history of resected sigmoid adenocarcinoma was referred to gastroenterology for colonoscopy due to iron deficiency

anemia despite iron supplementation. A recent fecal occult blood smear performed the month prior was positive. Her most recent colonoscopy was 6 years prior, where multiple colonic polyps were identified as adenomatous polyps. Her review of systems is positive for chills, fatigue, shortness of breath, and back pain. Physical exam reveals a firmness and palpable mass in her right upper quadrant.



Fig. 1. Image during colonoscopy showing a large, nearly obstructing mass at the hepatic flexure of the colon.

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A complete blood count showed iron deficiency anemia (declining MCV, ferritin 11 mcg/L) that did not improve with iron supplementation. A general chemistry panel was normal, including normal liver function tests (total bilirubin 0.4 mg/dL, AST 18 U/L, ALT 14 U/L, alkaline phosphatase 87 IU/L). A CEA level was mildly elevated to 12.2 ng/mL. The tumor marker CA 19-9 was mildly elevated to 587 U/mL.

Colonoscopy revealed a large, nearly obstructing mass at the hepatic flexure (Fig. 1). The colonoscope was unable to traverse this region and it was uncertain if this was a primary colonic mass or compression from an extra-colonic mass. Biopsies were taken from the distal edge of the presumed mass.

The biopsy specimen was sent to pathology for evaluation. Given the suspicion for colon cancer, specimens were stained using an HNPCC screening profile, including MLH1, MSH2, MSH6, PMS2 and microsatellite instability. The H&E stain is demonstrated in Fig. 2. Based on the patient's history of prior colonic adenocarcinoma as well as surface mucosal colonic tumor involvement, an initial diagnosis of intramucosal primary colonic adenocarcinoma was made.

After the colonoscopy, a staging CT abdomen and pelvis was ordered. Imaging revealed a large, approximately 15 cm heterogeneous mass in the region of the gallbladder with invasion of the hepatic flexure of the colon as well as suspected invasion of the liver (Fig. 3a–b). Cholelithiasis was

present within the mass, suggestive of a biliary primary malignancy. Due to the discrepancy between the gallbladder mass on CT imaging and the suspected primary colonic malignancy on pathology, the oncologist referred the case to a multidisciplinary tumor board. The tumor board facilitated discussion between radiology, pathology, and oncology.

With the new information of a predominantly extra-colonic mass with invasion of the hepatic flexure of the colon, pathologists then performed immunohistochemical stains for CK7, CK20, and Cdx-2. These demonstrated two distinct populations of glandular cells. The benign colonic epithelium was positive for CK20 and Cdx-2, but negative for CK7. The malignant epithelium was positive for immunostaining with CK7 and Cdx-2 but negative for CK20 (Fig. 4). This immunohistochemical profile is most compatible with a gastric or pancreaticobiliary malignancy. In conjunction with radiology findings, the final diagnosis was invasive cholangiocarcinoma involving the colon.

The patient was referred to oncology and ultimately diagnosed with stage IV metastatic cholangiocarcinoma with invasion and obstruction at the hepatic flexure of the colon. Oncology started the patient on Gemzar. To address the colonic obstruction, the patient wanted to undergo the least invasive procedure possible and opted for colonic stenting. The patient is currently receiving comfort care measures.

### 3. Discussion

This case provides an excellent example of the importance of a multidisciplinary approach to patient care. Case discussion at a MDTB facilitated radiology–pathology correlation, which then led to more accurate diagnosis and staging. A review of pancreatic cancer patients discussed at MDTB found a change in diagnosis in 22% of cases and a consequent treatment change in 15%<sup>1</sup>. In breast cancer, a single institution study reported a change in diagnosis in 45% of breast cancer patients after discussion in a MDTB<sup>2</sup>.

Cholangiocarcinoma (CCA) is a cancer arising from the bile duct epithelium and is most often characterized histologically as an adenocarcinoma. CCA is the second most common primary hepatobiliary carcinoma, with hepatocellular carcinoma being the most common. Incidence of CCA in the United States is increasing, making it an important differential to consider. The diagnosis of cholangiocarcinoma can present quite the challenge, as there are numerous conditions that can mimic

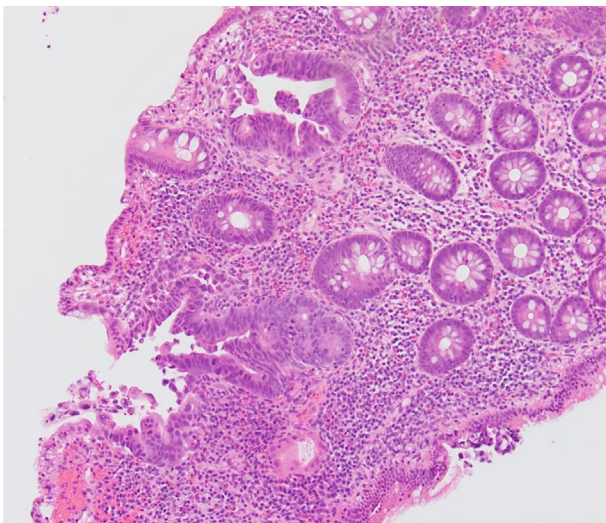


Fig. 2. H&E stain at 100× magnification. Benign colonic crypts are round if cut in cross-section or test-tube shaped if cut longitudinally. Malignant glands are more complex, demonstrate nuclear enlargement (purple color), and have colonized the surface epithelium (mimicking a primary colonic adenocarcinoma).



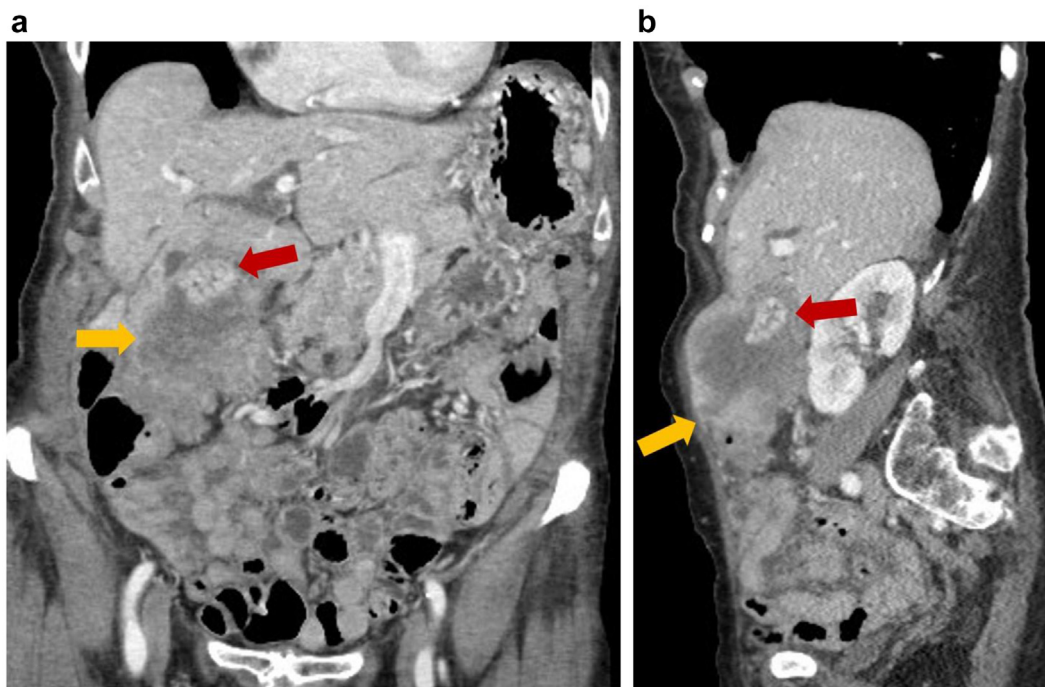


Fig. 3a–b. Contrast-enhanced CT coronal (a) and sagittal (b) images demonstrating a hypo-enhancing mass invading the colon (yellow arrows). The mass engulfs gallstones (red arrow), suggesting biliary etiology of the mass.

cholangiocarcinoma including primary sclerosing cholangitis, recurrent pyogenic cholangitis, autoimmune pancreatitis, sarcoidosis, hepatocellular carcinoma, metastasis, among others<sup>3</sup>.

Cholangiocarcinoma displays a wide spectrum of imaging features. Most CCAs cause biliary ductal obstruction, although this may be hard to detect in peripheral intrahepatic CCA. Sonography can show

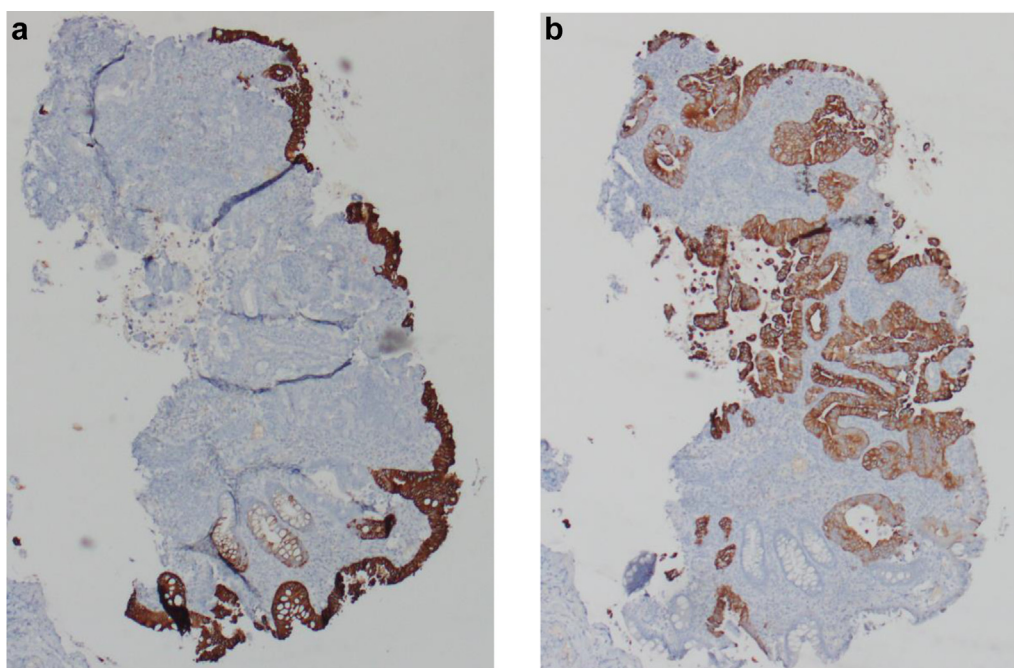


Fig. 4a–b. (a) Malignant cells from colonic biopsy are negative for CK20, with benign colonic epithelium demonstrating CK20 positivity and staining brown. (b) Malignant cells are strongly positive for CK7 (brown areas). This profile is compatible with a gastric or pancreaticobiliary primary.

variable echogenicity of the mass. CT often shows ill-defined, hypoattenuating liver masses; contrast-enhanced CT may show findings such as arterial rim enhancement and characteristic persistent enhancement of the tumor on delayed venous phase. Late enhancement of the tumor can be seen with the late-phase scans, correlating to the amount of fibrous stroma within the tumor. If the tumor is necrotic or composed of mucin-containing cells, this delayed enhancement may be absent<sup>4,5</sup>.

Histopathology is often needed for a definitive diagnosis in cholangiocarcinoma. Approximately 95% of cholangiocarcinomas are identified as adenocarcinoma. As seen in this case, adenocarcinomas of the biliary tract are positive for CK7 and Cdx-2 and negative for CK20, whereas those of colonic origin are positive for CK20 and Cdx-2 and negative for CK7.

The coordination between radiology, pathology, and primary care physicians is imperative for a prompt and accurate diagnosis. Without the proper history and physical, cholangiocarcinoma may go undetected. Even with this, cases can often go undetected until they are quite advanced due to the nature of the disease. Once patients are sent for further testing, anatomical information and imaging findings from radiology are essential for pathologists to select the proper stains and immunohistochemistry to accurately pinpoint the appropriate diagnosis. Without the imaging findings, this case was presumed to be colonic in origin. Likewise, without the pathologic findings, proper treatment cannot be selected by the oncology team.

#### 4. Conclusion

Cholangiocarcinoma presentation varies widely, and a multidisciplinary approach is often necessary for accurate and definitive diagnosis. Discussion of cases at MDTBs facilitates incorporation of radiology, pathology, and clinical findings imperative for a prompt and accurate diagnosis. An accurate diagnosis enables the oncology team to select the proper treatment approach.

#### Conflict of interest

The authors report no conflicts of interest or funding source for this project.

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