ACCSCIENCE PUBLISHING

Tumor Discovery

CASE REPORT

# An unusual case of malignant biliary tract obstruction

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## Abstract

Malignant biliary tract obstruction (MBTO) is most commonly associated with primary hepatobiliary and pancreatic malignancies. Here, we present a rare case of a 65-year-old female who developed obstructive jaundice, which initially raised suspicion for hepatobiliary carcinoma. Cross-sectional imaging, including computed tomography and magnetic resonance imaging, revealed hepatic lesions, and endoscopic retrograde cholangiopancreatography demonstrated a malignant biliary stricture. Histopathological analysis of a liver biopsy unexpectedly confirmed metastatic urothelial carcinoma (UC). Further evaluation with cystoscopy, prompted despite the absence of urinary symptoms, identified a small bladder mass, which was biopsy-proven as the primary UC. UC typically metastasizes to lymph nodes, lungs, or bones, and isolated liver involvement causing MBTO is exceptionally uncommon. This case underscores the importance of maintaining a broad differential diagnosis in patients with malignant biliary obstruction, as atypical metastatic patterns can mimic more common hepatobiliary cancers and delay appropriate management.

***Keywords:*** Malignant biliary tract obstruction; Cholangiocarcinoma; Urothelial carcinoma; Hepato-pancreato-biliary cancer; Bladder cancer

## 1. Background

Malignant biliary tract obstruction (MBTO) is a common condition that could arise from hepato-pancreato-biliary cancer or metastasis from other primary cancers such as pancreatic adenocarcinoma or cholangiocarcinoma. The common metastatic cancers causing MBTO by extrinsic compression include colon, stomach, breast, lung, and

cervical malignancies.[1] Obstruction from metastatic urothelial cancer rarely occurs. Here, we report a case of obstructive jaundice caused by metastatic urothelial carcinoma (UC).

## 2. Case presentation

A 65-year-old female with a past medical history of hypertension, rhabdomyolysis, and alcohol abuse presented with progressive abdominal pain for 4 months with new-onset jaundice and anorexia with self-reported recent significant weight loss. Initial examination showed stable vital signs with marked jaundice and distended abdomen and tenderness in the right upper quadrant. Blood work showed elevated total troponin (23.7 mg/dL), alanine transaminase/aspartate transaminase (70/152 IU/L), alkaline phosphatase (623 IU/L), total bilirubin (25 mg/dL), and direct bilirubin (>10 mg/dL), which was suggestive of cholestasis jaundice.

Computed tomography (CT) showed intrahepatic duct dilatation with narrow common bile duct, suggesting possible sclerosing cholangitis or cholangiocarcinoma. She had elevated cancer antigen 19-9 at 456 U/mL (normal: <37 U/mL) and carcinoembryonic antigen at 5.8 ng/mL (normal: 0 – 2.9 ng/mL) but normal alpha-fetoprotein, which lent further support to the possibility of hepatobiliary carcinoma. Further imaging with magnetic resonance imaging (MRI) showed an 8.5 cm hypoenhancing mass within the central aspect of the liver, resulting in intrahepatic biliary dilatation with multiple other satellite liver lesions, which were suggestive of cholangiocarcinoma (Klatskin tumor) (Figure 1). Endoscopic retrograde cholangiopancreatography (ERCP) found a malignant stricture in the bile duct. Endoscopic ultrasound (EUS) with negative brush biopsy results led to a liver biopsy to confirm the diagnosis. Interventional radiology-guided liver biopsy revealed metastatic carcinoma positive for GATA3, CK903, P40, P63, and thrombomodulin, consistent with metastatic UC (Figures 2-4). The patient denied urinary symptoms, and urinalysis was negative.

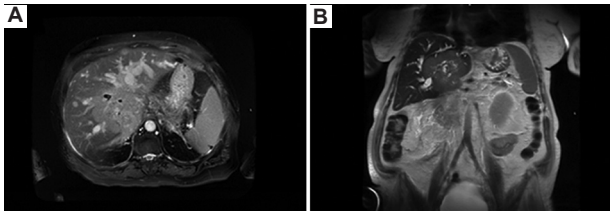


**Figure 1.** T1-weighted axial view image (A) and T2-weighted coronal view image (B) from the abdominal magnetic resonance imaging scan show an 8.5 cm hypoenhancing mass within the central aspect of the liver, which results in intrahepatic biliary dilatation. Findings are suggestive of cholangiocarcinoma (Klatskin tumor). Smaller satellite lesions are noted in both lobes of the liver.

Cystoscopy performed by the urologist showed a small bladder mass. The mass was resected, and further histopathological test confirmed squamous cell carcinoma invading the bladder wall. Eventually, the oncology team was consulted for appropriate treatment of metastatic bladder cancer.

## 3. Discussion

MBTO predominantly arises from primary hepatic biliary cancers. Our case illustrates MBTO arising from uncommon metastatic UC that originated from bladder cancer. UC of the bladder commonly metastasizes to various anatomical sites, with lymph nodes being the most prevalent site at 25%, followed by bone metastasis at 24%, involvement of the urinary tract at 23%, pulmonary metastases at 19%, hepatic involvement at 18%, and brain

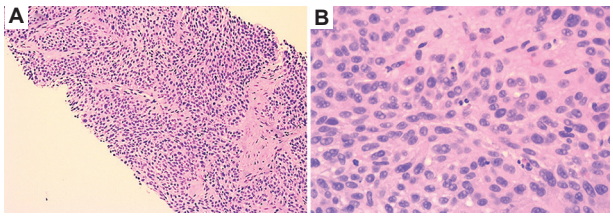


**Figure 2.** Histopathological images of liver biopsy specimens visualized with hematoxylin and eosin staining. Observations under 20× (A) and 40× (B) magnification show irregularly distributed nests of urothelial cells, which are surrounded by fibrotic stroma. Scale bar: (A) 100 µm. (B) 50 µm.

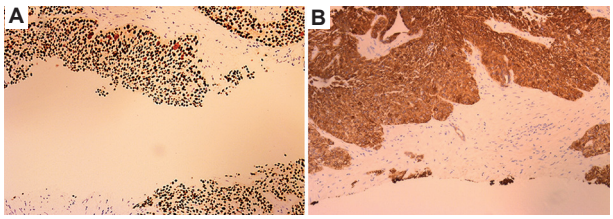


**Figure 3.** Histopathological images of liver biopsy specimens visualized with immunohistochemical staining for P40 and high-molecular-weight keratin (HMWK). Observations under 2.5× (A) and 10× (B) magnification show cells positive for P40 and HMWK, respectively. Scale bar: (A) 1 mm. (B) 500 µm.

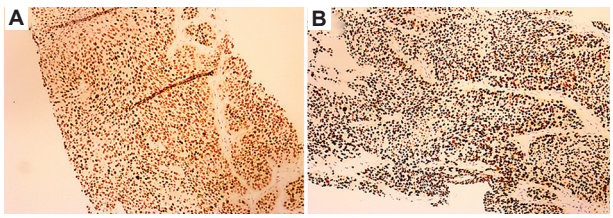


**Figure 4.** Histopathological observation of liver specimens visualized with immunohistochemistry at ×10 magnification. The images show urothelial cells positive for GATA-3. (A) and p63. (B), respectively. Scale bar: 500 µm for both panels.

metastasis occurring in 3% of cases.[2] Case reports and small case series suggest that MBTO secondary to UC accounts for <1% of all MBTOs, which are most commonly caused by pancreatic, cholangiocarcinoma, or metastatic colorectal cancers.[3]

Initial diagnosis involves distinguishing between benign and malignant conditions, often achieved through magnetic resonance cholangiopancreatography (MRCP) or ERCP. Both MRCP and ERCP are preferred over CT scans due to their higher sensitivity and specificity, with 85% and 71% for MRCP and sensitivity of 75% for ERCP, respectively.[3,4] Recent studies have shown that MRCP's sensitivity exceeds 96% and specificity reaches 85% for differentiating between benign and MBTOs.[2,4] In addition, ERCP's diagnostic accuracy is enhanced by adjunct techniques such as EUS and intraductal ultrasound.[5]

Metastatic UC to the liver typically demonstrates hypovascularity on contrast-enhanced CT, with minimal arterial enhancement and progressive enhancement during the portal venous and delayed phases. On MRI, lesions appear hypointense on T1-weighted images, mildly hyperintense on T2-weighted images, and exhibit restricted diffusion on diffusion-weighted imaging sequences, with delayed progressive contrast enhancement. Unlike hypervascular metastases from neuroendocrine tumors or renal cell carcinoma, urothelial metastases lack early arterial phase enhancement. On EUS, they present as hypoechoic, stiff, and hypovascular lesions, consistent with other adenocarcinoma metastases.[6-9]

When malignancy is suspected, tissue sampling becomes crucial to refine the diagnosis. Brush cytology coupled with forceps or needle biopsy is recommended over brush cytology alone due to its increased sensitivity and specificity. While brush cytology typically exhibits sensitivity rates around or below 50%, its specificity remains notably high at 95%.[10] Forceps or needle biopsy can further elevate sensitivity to 70% and specificity to 100%, respectively.[10] Percutaneous transhepatic cholangiography serves as a secondary diagnostic option when ERCP is unsuccessful or infeasible and the patient has potential bleeding complications.[2] In our case, while the EUS and brush biopsy yielded negative results, the clinical presentation strongly suggested cancer, necessitating a pathology diagnosis to guide appropriate treatment. Consequently, a liver biopsy was performed as the next step.

In addition, positive tumor markers can help diagnose UC. Some tumor markers with high sensitivities (>75%) for UC include uroplakin II, p40, p63, GATA 3, and CK903.[11-13] In addition, there are a variety of histological variants, subtypes, and immunophenotypes of urothelial cancer that determine its risk of progression.[12] In this case, although the patient did not report urinary symptoms, the positive staining for p40, p63, high-molecular-weight keratin, and GATA-3 in the tissues strongly indicates a urothelial origin. Therefore, further investigation for primary urothelial cancer should be the next step.

The most prevalent bladder tumor histologies include UC, characterized by invasion into the muscularis propria and representing the majority of cases in the US and Europe. Squamous cell carcinomas, originating from the urothelium, constitute a small percentage of cases, while adenocarcinomas, exhibiting a glandular phenotype, are rarer still, typically arising from the bladder's urothelium or remnants of the urachus.[13,14]

This case underscores the importance of considering distant metastases, particularly from bladder cancer, in the differential diagnosis of MBTO and emphasizes the significance of comprehensive diagnostic approaches and multidisciplinary collaboration for optimal patient management.

## 4. Conclusion

MBTO is a common presentation of hepato-pancreato-biliary cancer. However, a distant metastasis could mimic the presentation. Gastrointestinal workup with ERCP and EUS for tissue sampling or cytology has low yield in terms of diagnosing MBTO. Even if the result is negative, further workup of tissue biopsy should be done for the definitive diagnosis. If metastasis is suspected, investigations for primary cancer based on pathology results should be the next step.

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## Conflict of interest

The authors declare they have no competing interests.

## Author contributions

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## Ethics approval and consent to participate

No institutional review board (IRB) approval was required for this single-patient case report in accordance with local guidelines. Written informed consent was obtained from the patient prior to participation. The consent included permission to use relevant clinical information and images for the purpose of this case report.

## Consent for publication

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

## Availability of data

The data that support the findings of this study are available from the corresponding author upon reasonable request. However, access to the data is restricted due to patient privacy and ethical considerations.

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