

Choledochoduodenostomy for the treatment of extrahepatic bile duct carcinoma in a cat

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Abstract

This paper reports a case of feline cholangiocarcinoma, a relatively rare condition in veterinary clinical practice. A 4-year-old female British Shorthair cat was presented with a 10-day history of anorexia and lethargy. An irregularly shaped mass was palpable on abdominal palpation. Diagnostic imaging and serum biochemical findings indicated extrahepatic biliary obstruction, and the diagnosis of cholangiocarcinoma was confirmed by histopathology and immunohistochemistry. Preoperative imaging in this cat indicated that the mass had not invaded major blood vessels such as the portal vein, and no evidence of distant metastasis was detected. The mass was surgically resected, followed by choledochoduodenostomy. The cat regained appetite on postoperative day 1, jaundice resolved within 48 hours, and biochemical parameters returned to normal by postoperative day 4. The cat was discharged 10 days after surgery, and no recurrence or metastasis was identified during the 3-month follow-up. This case documents the diagnostic and surgical management of feline extrahepatic cholangiocarcinoma and the short-term outcome following mass resection and biliary reconstruction.

Keywords: cholangiocarcinoma, diagnostic imaging, histopathology, immunohistochemistry

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Introduction

Cholangiocarcinoma refers to a category of hepatobiliary tumors characterized by cholangiocyte differentiation. Anatomically, it can be classified into three types: intrahepatic, hilar, and distal cholangiocarcinoma. These tumors may be solid or cystic, exhibiting diverse morphological features and a relatively high metastatic rate. Although primary hepatic tumors in cats are rarely reported in the veterinary literature, biliary tract tumors occur more frequently than hepatocellular tumors among feline primary hepatic neoplasms. Because feline cholangiocarcinoma may exhibit invasive growth and metastatic behavior, early diagnosis and appropriate clinical management are important (Buote *et al.* 2006).

Cholangiocarcinoma commonly causes biliary obstruction. Typical clinical signs of extrahepatic biliary obstruction in cats include jaundice and complete anorexia (Speelman *et al.* 2024). Because these clinical signs are nonspecific, clinical and imaging findings alone are insufficient to establish a definitive diagnosis. Definitive diagnosis generally relies on histopathological examination, with immunohistochemistry used when necessary to support tumor origin. For management, early surgical biliary decompression is recommended; commonly performed procedures include cholecystojejunostomy, cholecystectomy, and choledochotomy. (Low and Williams 2023).

Case Description

A 4-year-old female British Shorthair cat with a complete vaccination and deworming history and no previous illnesses was referred for evaluation due to recent clinical signs including complete anorexia, vomiting, and weight loss. Following a lack of response to palliative treatment at a primary care veterinary hospital, the cat was transferred to the Teaching Animal Hospital of Heilongjiang Bayi Agricultural University for further diagnostic workup and treatment.

Physical examination findings: The cat was in poor nutritional condition, with a body condition score (BCS) of 1/9 and 5%–8% dehydration. Systemic vital signs were as follows: blood pressure, 118/82 mmHg; body temperature, 38.2 °C; capillary refill time (CRT) of < 2 seconds. Jaundice was evident on the skin and mucous membranes, and a mass was palpable in the cranial abdomen on abdominal palpation. Serum biochemistry revealed elevated total bilirubin (TBIL) and serum amyloid A (SAA) concentrations, whereas complete blood count (CBC) findings were consistent with moderate dehydration.

Imaging examination findings: Abdominal radiographs revealed an empty gastric cavity and a high-density mass of undetermined nature in the mid-abdomen, adjacent to the stomach. The intestinal serosal margin was clear, and the size and contour of both kidneys were unremarkable (Fig. 1A). Additional findings included intestinal displacement secondary to

mass compression, splenomegaly, and a distended urinary bladder with small calculi (Fig. 1B). Abdominal ultrasonography showed marked filling and severe dilatation of the intrahepatic bile ducts (Fig. 2). Based on combined laboratory and imaging findings, surgical treatment consisting of mass resection combined with choledochoduodenostomy was planned for the patient.

Preoperative anesthetic evaluation confirmed that the cat met the criteria for surgery. Intravenous access was established, and prophylactic antibiotics were administered. Following sedation and induction of anesthesia, endotracheal intubation was performed for inhalant anesthesia. Anesthetic depth was monitored routinely throughout surgery, with additional local infiltration anesthesia administered. The patient was positioned in dorsal recumbency, and a ventral midline abdominal incision was performed. The common bile duct was dissected, and the pathological tissue was completely resected while preserving the local vascular supply. Following mass resection, the bile duct was irrigated, and choledochoduodenostomy was performed by creating an anastomosis between the common bile duct and the duodenum, followed by routine abdominal closure. The resected mass was grossly smooth, dark red, and firm in texture, measuring approximately 3 cm × 3 cm × 2 cm. Postoperatively, the excised tissue was submitted for histopathological examination.

Routine anti-inflammatory, analgesic, and symptomatic treatments were administered daily postoperatively. The patient regained appetite on postoperative day 1, jaundice resolved within 48 hours, and biochemical parameters returned to normal by postoperative day 4. The cat was discharged uneventfully 10 days after surgery.

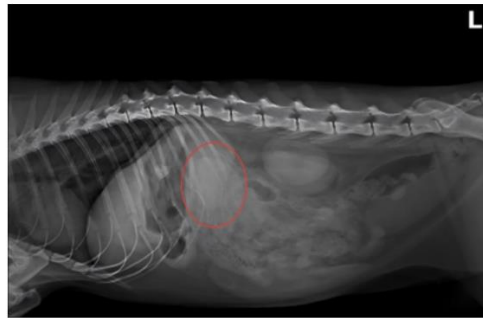
Histopathological examination revealed multifocal infiltration of neoplastic epithelial cells replacing the normal biliary architecture, with focal to multifocal areas of necrosis. Both tissue samples showed consistent morphological features, characterized by high cellularity, architectural disorganization, marked cellular atypia, and multifocal invasive growth. The lesions consisted of numerous variably shaped tubules, cords, and nodules, with scant fibrous stroma separating the tumor foci. The tubular structures were lined by 1–5 layers of highly atypical cells containing abundant amphophilic secretory material. Tumor cells were polygonal to fusiform, with amphophilic cytoplasm and round to reniform nuclei. On high-power examination, mitotic figures were frequently observed, averaging 23 mitoses per 10 high-power fields (HPF). Multifocal vascular invasion and focal lymphatic tumor emboli were also observed microscopically (Fig. 3).

Given the tumor's high metastatic potential and poor differentiation, immunohistochemical analysis was performed to support the diagnosis. Cytokeratin 7 (CK7) immunohistochemistry was used as a qualitative diagnostic marker of biliary epithelial differentiation. Positive immunoreactivity was defined as brown cytoplasmic staining in neoplastic epithelial cells, with hematoxylin counterstaining of the nuclei.

Four representative microscopic fields from the same tumor specimen are shown in Fig. 4. Neoplastic epithelial cells exhibited multifocal to diffuse cytoplasmic CK7 positivity. Based on the combined

histopathological features and CK7 immunoreactivity, a final diagnosis of cholangiocarcinoma was confirmed (Fig. 4).

(A)



(B)

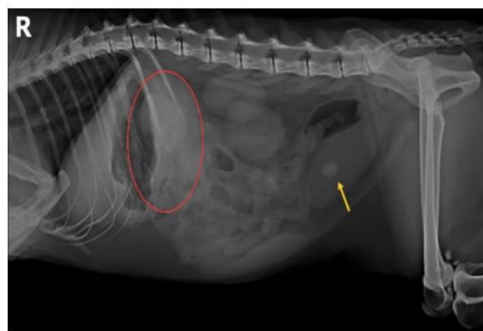
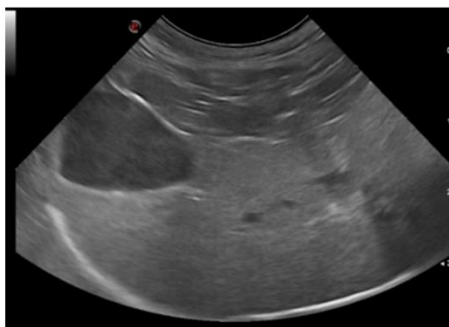
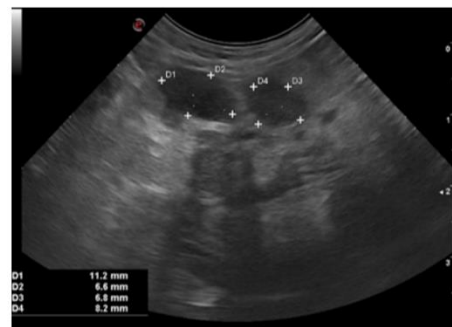


Figure 1 (A) Left lateral view: A radiopaque mass is present in the abdomen adjacent to the stomach (red circle). (B) Right lateral view: A small calculus is visible in the urinary bladder (yellow arrow).

(A)



(B)



(C)

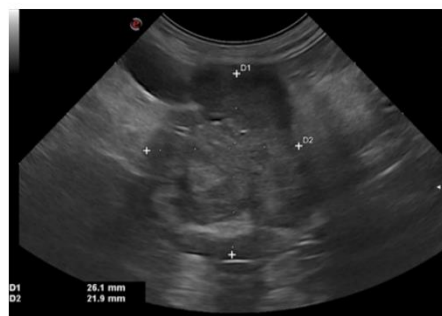


Figure 2 Abdominal ultrasound images of the affected cat. Findings include gallbladder distension, common bile duct dilatation, marked extrahepatic bile duct dilatation (11.2 × 6.6 mm and 6.8 × 7.2 mm, respectively), and a mass measuring 26.1 × 21.9 mm.

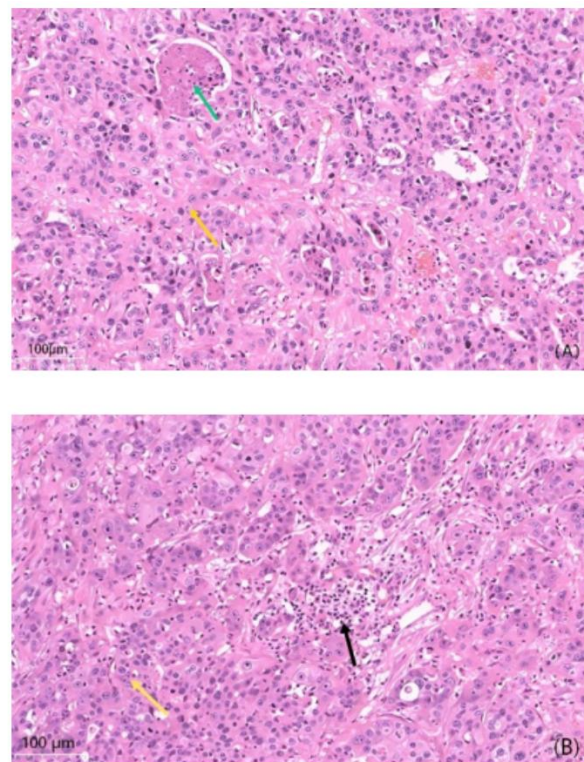


Figure 3 HE staining of cholangiocarcinoma tissue (×100). (A) The biliary glandular epithelium shows irregular arrangement and architectural disorganization. Heterogeneous proliferation of neoplastic epithelial cells with marked cellular atypia is observed (yellow arrow). Partial bile duct dilatation with bile retention is visible (green arrow). (B) The tumor tissue shows disordered biliary glandular structures, heterogeneous proliferation of neoplastic epithelial cells, and marked cellular atypia (yellow arrow). Mild inflammatory cell infiltration is present in the stroma (black arrow). These histological features are consistent with an invasive cholangiocarcinoma.

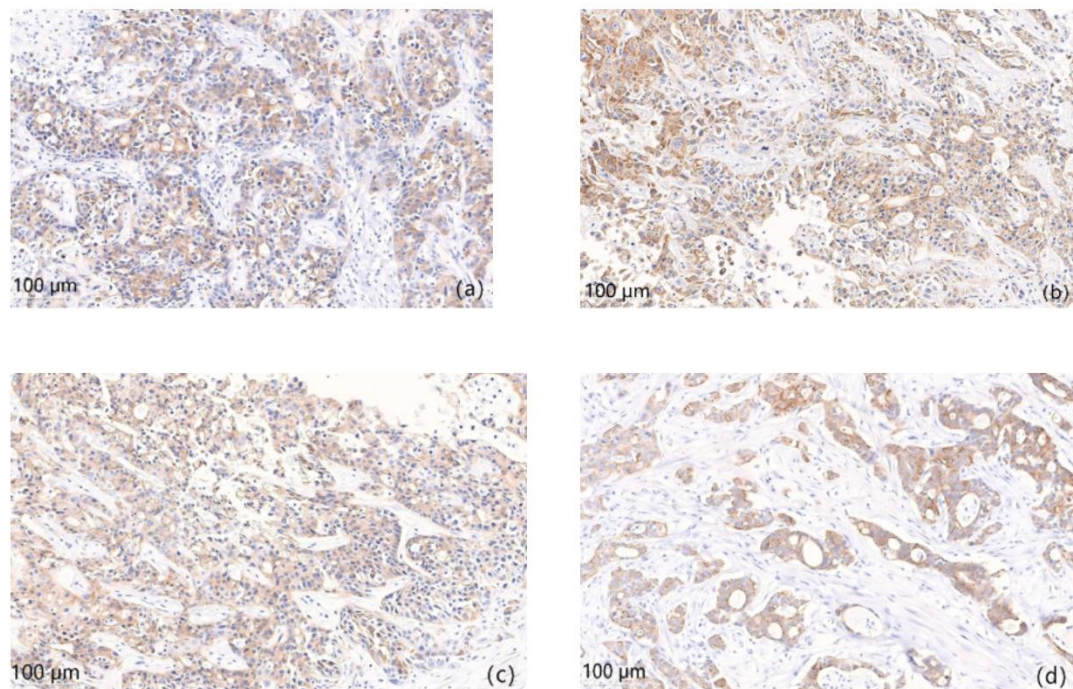


Figure 4 Immunohistochemical staining for cytokeratin 7 (CK7) in cholangiocarcinoma tissue. Panels (a)–(d) show representative fields from the same tumor specimen. Tumor cells show cytoplasmic CK7 positivity, supporting biliary epithelial differentiation.

Results and Discussion

Cholangiocarcinoma has been described in the veterinary literature, but published data on extrahepatic cholangiocarcinoma and its surgical management in cats remain limited. Biliary tract tumors are among the more frequently reported primary hepatic neoplasms in cats, and biliary cystadenoma has been reported approximately twice as frequently as cholangiocarcinoma (Bentley *et al.* 2024). The present case is notable because the mass was considered surgically resectable, and the cat showed an uneventful short-term recovery after mass excision and choledochoduodenostomy.

The etiology of cholangiocarcinoma remains unclear, but the disease is frequently associated with biliary tract inflammation (Lee *et al.* 2025). Biliary inflammation is typically induced by factors including biliary obstruction, cholestasis, and bacterial infection. These insults can trigger gene mutations and DNA damage in cholangiocytes, thereby increasing the risk of cholangiocarcinoma (Otte *et al.* 2017). Under inflammatory conditions, various cytokines and growth factors can also promote phenotypic and biological alterations in cholangiocytes, ultimately driving carcinogenesis. Additionally, chronic biliary inflammation secondary to intrahepatic bile duct stones and cholestatic liver disease is recognized as a risk factor for cholangiocarcinoma. Bacterial infection and cholestasis may establish a vicious cycle that exacerbates persistent biliary inflammation (Boland and Beatty 2017). Neither parasitic infection nor cholelithiasis was identified in the cat of this report. We hypothesize that biliary dysbiosis may be closely associated with the development of cholangiocarcinoma in this case. Bacteria may invade the biliary tract via routes such as the portal venous system and enterohepatic bile reflux, thereby inducing chronic biliary inflammation. The precise molecular and cellular mechanisms underlying this pathogenesis warrant further investigation.

Clinical signs of feline cholangiocarcinoma are generally nonspecific and may include inappetence, lethargy, vomiting, weight loss, and jaundice, which can delay diagnosis until the disease has progressed (Otte *et al.* 2017). Notably, neither ascites nor cutaneous manifestations were observed in the cat of this report. The most common sites of cholangiocarcinoma metastasis include the peritoneum, lungs, and regional lymph nodes; however, no metastatic lesions were identified in the present case. Histopathological examination is considered the gold standard for the diagnosis of feline hepatobiliary neoplasms owing to its high diagnostic accuracy (Otte *et al.* 2017). In this case, histopathology demonstrated an invasive biliary epithelial neoplasm with vascular and lymphatic invasion, while CK7 immunoreactivity supported biliary epithelial differentiation. Together with the clinical and imaging findings, these features supported the definitive diagnosis of extrahepatic cholangiocarcinoma. This study has certain limitations: as the owner declined bile testing for etiological agents, the potential contribution of biliary microbial infection to pathogenesis could not be definitively excluded.

In traditional therapeutic protocols, biliary shunting without tumor resection is associated with a poor prognosis. Accordingly, a surgical strategy combining resection of the biliary mass and choledochoduodenostomy was performed in the present case. This approach re-established biliary drainage and relieved the obstruction and dilatation of the biliary system. Moreover, given the close anatomical relationship between the common bile duct and duodenum, the procedure is relatively straightforward, supporting its potential clinical utility (Low and Williams 2023). However, postoperative complications such as ascending infection and biliary stricture may occur. Postoperative management included placement of an Elizabethan collar, analgesic administration, intravenous antibiotic prophylaxis, and intensive wound care.

This case report describes the short-term outcome of a 4-year-old cat with extrahepatic cholangiocarcinoma treated by mass resection and choledochoduodenostomy. The cat recovered uneventfully after surgery, and no recurrence or metastasis was identified during the 3-month postoperative follow-up. Because the follow-up period was limited, the long-term outcome remains undetermined. Continued monitoring is warranted to assess tumor recurrence, metastasis, and late postoperative complications.

Acknowledgments

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Conflict of interest: All authors had no conflicts of interest to declare.

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