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CASE REPORT

Benign giant-cell tumor of the common bile duct: A case report

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Abstract

Primary giant-cell tumors rarely arise in the common bile duct. We herein report a case of primary giant-cell tumor of the common bile duct. The patient was an 81-year-old male who was diagnosed with a well-defined 1.2-cm mass projecting into the lumen of the middle common bile duct. Excision of the gallbladder and extrahepatic bile duct and a Roux-en-Y cholangiojejunostomy were performed. Histologically, the tumor had no association with carcinomas of epithelial origin and was similar to giant-cell tumors of the bone. The tumor consisted of a mixture of mononuclear and multinucleated osteoclast-like giant cells. The mononuclear cells showed no atypical features, and their nuclei were similar to those of the multinucleated giant cells. CD68 was expressed on the mononuclear and multinucleated osteoclast-like giant cells, whereas CD163 immunoreactivity was restricted to the mononuclear cells. Six months after the operation, the patient was still alive and had no recurrence. The interest of this case lies in the rarity of this entity, the difficulty of preoperative diagnosis, and this tumor's possible confusion with other malignant tumors.

Key words: Giant-cell tumor; Common bile duct; CD163; Surgical resection

Core tip: In visceral organs, different types of carcinomas, such as anaplastic spindle- and giant-cell carcinomas of the gallbladder and extrahepatic bile duct, may contain a variable number of osteoclast-like giant cells. It is crucial to separate those carcinomas with osteoclast-like giant cells from giant-cell tumors because of their striking differences in prognosis. This case report represents the fifth case of a primary giant-cell tumor of the common bile duct in the English-language literature. We also review several reported cases to summarize clinical information about this rare tumor.

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INTRODUCTION

Giant-cell tumors of the bone are a relatively common type of proliferative neoplasm. Extraosseous giant-cell tumors with histological features similar to those occurring in the bone are rare, and these tumors have been described at several sites including the soft tissues,

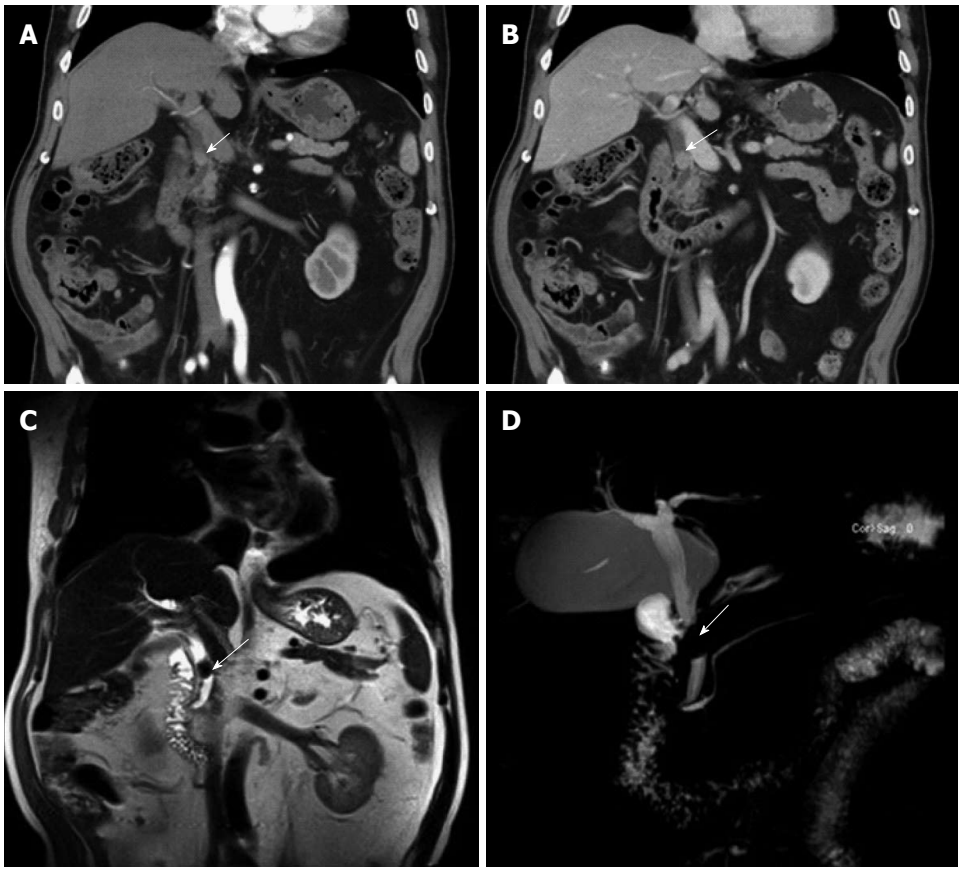

Figure 1 Preoperative images showing the tumor (arrows). A: Non-enhanced upper-abdominal coronal computed tomography demonstrating a 1.2-cm mass in the middle of the common bile duct; B: Intravenous administration of contrast medium showing mild enhancement of the tumor; C: T2–weighted magnetic resonance image showed that the tumor had a relatively well-defined border; D: Magnetic resonance cholangiopancreatography image revealed stenosis of the common bile duct.

mediastinum, larynx, thyroid, and skin[1-6]. Benign giant cell tumors of the extrahepatic biliary tree are extremely rare and under-recognized. A primary giant-cell tumor of the extrahepatic biliary tree was first recognized as a biologically benign neoplasm by Albores-Saavedra *et al*[7] in 2006. To our knowledge, the case that we are reporting is the fifth case of a primary giant-cell tumor of the common bile duct in the English-language literature. We also review several reported cases to summarize clinical information about this rare tumor.

CASE REPORT

An 81-year-old male presented at our hospital with a complaint of general fatigue and abdominal dull pain for a month. His medical history included high blood pressure and cerebrovascular disease. Physical examination revealed slight jaundice and scleral icterus. His abdomen was flat and soft, and percussion pain was found in the hepatic region. The results of laboratory tests, including a complete blood count and measurements of serum amylase, glucose, electrolytes and liver and kidney function, were normal. The level of the tumor marker carbohydrate antigen 19-9 (CA19-9) was normal (13.87 U/mL). The level of alanine aminotransferase was 34 IU/L; total bilirubin, 14.76 μmol/L; direct bilirubin, 5.41 μmol/L; γ-glutamate transaminase, 56 IU/L; and carcinoembryonic antigen, 1.89 ng/mL. A computed tomography (CT) scan of the abdomen revealed a dilated common bile duct, with a 1.2-cm mass projecting into the lumen of the middle common bile duct, causing nearly complete obstruction (Figure 1A). Intravenous administration of contrast medium showing mild enhancement of the tumor (Figure 1B). Magnetic resonance imaging (MRI, Figure 1C) and magnetic resonance cholangiopancreatography (MRCP, Figure 1D) revealed stenosis of the common bile duct. The tumor had a relatively well-defined border. Additionally, the gallbladder was markedly distended. A clinical diagnosis of carcinoma was suspected.

After a multidisciplinary review, the patient was offered surgical resection of the lesion. Excision of the gallbladder and extrahepatic bile duct and a Roux-en-Y cholangiojejunostomy were performed. At laparotomy, gallbladder enlargement and widened proximal bile duct were found, and there was no evidence of an extraductal tumor or lymphadenopathy.

Postoperative gross pathology revealed a 1.5 cm × 0.6 cm × 0.6 cm polypoid lesion in the middle of the common bile duct. The tumor tissue was characterized as hemorrhage (Figure 2).

Microscopically, the tumor was polypoid, showed

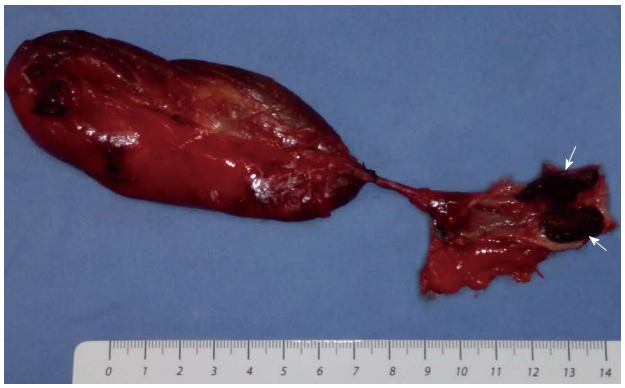

Figure 2 Resected specimen revealed a polypoid lesion (arrows) in the middle of the common bile duct.

a vaguely nodular pattern and infiltrated into the wall (Figure 3A). The nodules consisted of conspicuous proliferation of two morphological components, including an abundance of multinucleated osteoclast-like giant cells and a relatively homogeneous population of round to polygonal mononuclear cells (Figure 3A and B). The quantity and quality of the giant cell component were similar to those identified in primary giant cell tumors of the bone. The mononuclear cells had oval or round vesicular nuclei with small and medium-sized nucleoli. No mitotic figures were found. The nuclei of the giant cells were similar to those of the mononuclear cells. The cytoplasm was slightly basophilic. Areas of red-cell extravasation were common, but there was no cystic degeneration, osteoid, or bone formation. Vascular invasion was not identified. A small amount of pancreatic tissue was found around the common bile duct.

Immunohistochemically, all cells except for the remaining epithelium of the bile duct were cytokeratin negative. No epithelial elements were observed in association with the mononuclear and multinucleated giant cells, as confirmed by negative immunostaining for epithelial markers, such as cytokeratins (including CK, CK7, CK20, and CK19) (Figure 3C) and EMA. CD68 (Figure 3D) and Vimentin showed strong granular immunoreactivity in both mononuclear and multinucleated osteoclast-like giant cells. In contrast, strong CD163 immunoreactivity was restricted to the mononuclear cells, not in the multinucleated giant cells (Figure 3E). Moreover, the mononuclear cells had an average Ki67 index of 10%-20% (Figure 3F). No vascular invasion was observed in the specimen. There were no adenoma-like structures. Based on these findings, the lesion was consistent with a diagnosis of a benign giant-cell tumor of the common bile duct. All margins were free of tumor.

There were no postoperative complications. The patient recovered smoothly and was discharged on postoperative day 8. No adjuvant chemotherapy was required. The tumor exhibited no signs of recurrence or metastatic spread after six months of follow-up.

DISCUSSION

Giant-cell tumors of the bone are distinct neoplasms with a characteristic histological appearance of mononuclear stromal cells and a varying number of multinucleated giant cells. Although uncertainty still exists as to the origin of the tumors, several authors have suggested a mesenchymal origin and have considered mononuclear cells to be the principal cell in these tumors. Multinucleated cells are thought to always be benign, whereas the presence of mononuclear giant cells is used to separate benign giant-cell tumors from malignant ones.

Extraosseous tumors containing osteoclast-like giant cells have been described at several sites in the body. Giant-cell tumors of the extrahepatic biliary tree are extremely rare and were first described by Albores-Saavedra *et al*[7] as biologically benign neoplasms. To the best of our knowledge, only six cases have been reported to date, among which four were located at the common bile duct, and the other two were located at the cystic duct and gallbladder, respectively[7-9]. In the extrahepatic bile duct, giant-cell tumors usually lead to obstruction and can be confused with carcinoma preoperatively based on clinical and imaging studies. In our case, carcinoma of the common bile duct was also suspected preoperatively. The vast majority of giant cell tumors of soft tissues have a benign clinical course[10], and the previous articles describing 4 patients with giant-cell tumors of the common bile duct suggested that they were benign tumors. None of the patients developed recurrence or metastatic disease. Thus, the best therapeutic option should be a conservative surgical resection with free surgical margins whenever possible.

Among those four previously reported giant-cell tumors of the common bile duct, three were treated using Whipple procedure, and the other one was treated by pylorus-preserving pancreas-head resection and pancreaticogastrostomy. In our case, the tumor was located in the middle of the common bile duct, and it had a relatively well-defined border, thus excision of the gallbladder and extrahepatic bile duct and a Roux-en-Y cholangiojejunostomy were adopted. Pathology analysis revealed that all margins were free of tumor, suggesting that the surgical treatment was enough for the patient. The clinical and pathological features of the cases of giant-cell tumors of the common bile duct published in the literature are shown in Table 1.

The differential diagnosis of giant-cell tumor of the common bile duct includes metastatic giant cell tumor of the bone, anaplastic spindle- and giant-cell carcinomas with osteoclast-like giant cells, and malignant fibrous histiocytoma.

Grossly as well as histologically and immunohistochemically, giant cell tumor seems identical to its bony counterpart. Its characteristic brown color is described frequently in reports dealing with macroscopic features

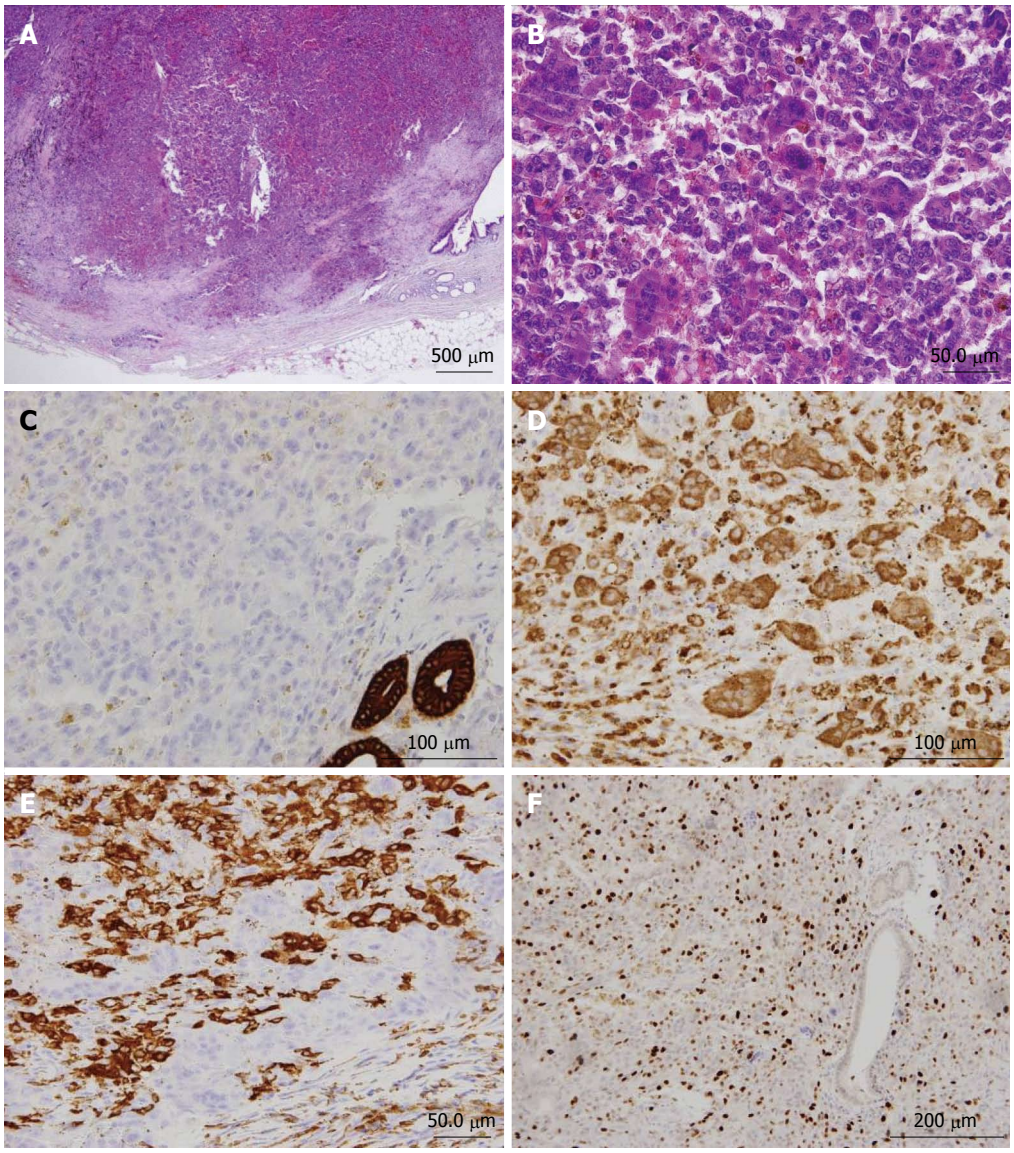

Figure 3 Photomicrographs showing the general appearance of the tumor. A: Hematoxylin and eosin (HE) staining. A vague nodular pattern in the tumor and the normal surface epithelium of the common bile duct are observable. Note the infiltration into the wall; B: Mononuclear cells were mixed with multinucleated osteoclast-like giant cells. There was no cytologic atypia or mitotic figures, red-cell extravasation was present; HE staining; C: Tumor cells showing negative staining for CK19 compared with the remaining normal bile duct; D: Mononuclear cells and multinucleated giant cells showing strong cytoplasmic immunoreactivity for CD68; E: Granular cytoplasmic immunoreactivity for CD163 was restricted to the mononuclear cells; F: The mononuclear cells had an average Ki67 index of 10%-20%.

of giant cell tumor of the bone. Giant cell tumor of the soft tissue is devoid of atypia, pleomorphism, and atypical mitosis. This diagnosis of a giant-cell tumor of the common bile duct was considered primarily because no sign of another tumor could be found. In the reported cases of benign giant-cell tumors of the extrahepatic biliary tree, mononuclear cells have been described as uniform, with no atypia and a low mitosis rate, cytokeratin negativity, and CD163 expression[7]. In our patient, we found similar pathological findings. All of the tumor cells were completely negative for epithelial markers compared with the remaining normal bile duct while being positive for CD68 and CD163.

Anaplastic spindle and giant-cell carcinomas with osteoclast-like giant cells in the bile duct can also show numerous giant cells that may simulate giant-cell tumors[7]. However, anaplastic spindle and giant-cell carcinomas with osteoclast-like giant cells display marked atypia and mitotic figures and these carcinomas are focally cytokeratin positive and CD163 negative. The separation of giant-cell tumors from other malignant tumors is clinically relevant. To date, the tumor described here has shown no signs of recurrence or metastatic spread after 6 mo of follow-up.

The origin and nature of these giant cells are subjects of controversy. Three possibilities are usually considered: (1) the lesion is a carcinoma in which the tumor cells undergo a peculiar metaplasia; (2) the tumor arises from the mesenchyme with the capacity to differentiate into osseous tissues; or (3) the cells represent a host reaction to a primary tumor. That is, histiocytes may be recruited into the tumor by certain factors produced by the tumor

Table 1 Clinical and pathological features of giant-cell tumors of the common bile duct

Patient No.	Ref.	Clinical presentation	Patient age (yr) /sex	Gross features	Treatment	Follow-up
1	Albores-Saavedra *et al*[7]	Jaundice, abdominal pain, CBD obstruction detected by CT and ERCP	56/M	1.6 cm polypoid nodule with invasion of the bile duct wall and obstruction of the lumen	Whipple procedure	Alive and disease-free 4 yr and 2 mo after surgery
2	Albores-Saavedra *et al*[7]	Obstructive jaundice, dilatation of CBD detected by CT	60/M	1 cm polypoid nodule without infiltration of the bile duct wall	Whipple procedure	No follow-up
3	Griglione *et al*[8]	Asymptomatic	60/M	1.5 cm polypoid lesion	Whipple procedure	Alive and disease-free 16 mo postoperatively
4	Kolokotronis *et al*[9]	Abdominal pain, high-grade stenosis of the distal bile duct, suspected distal common bile duct malignancy by ERCP	73/F	2.5 cm × 0.7 cm	Pylorus-preserving pancreas-head resection and pancreaticogastrostomy	No follow-up
5	Wang *et al* (this study)	Slight jaundice and scleral icterus	81/M	1.5 cm × 0.6 cm × 0.6 cm polypoid lesion	Excision of the gallbladder and extrahepatic bile duct and a Roux-en-Y cholangiojejunostomy	Alive and disease-free 6 mo after surgery

and then may fuse to form multinucleated giant cells. In accordance with previous reports, the giant cells present in our patient showed immunohistochemical evidence of histiocytic derivation and lacked evidence of epithelial differentiation. These findings imply that the multinucleated giant cells and mononuclear stromal cells are a specialized form of macrophages.

In conclusion, giant-cell tumors of the common bile duct are rare but distinctive benign entities. It is crucial to differentiate benign giant-cell tumors of the common bile duct from other malignant tumors because of their different treatments and prognoses. Detailed cytologic analysis and immunohistochemical staining can help to clarify the diagnosis.

COMMENTS

Case characteristics

An 81-year-old male with an unremarkable medical history.

Clinical diagnosis

Slight jaundice and scleral icterus.

Differential diagnosis

Carcinoma of the bile duct.

Laboratory diagnosis

carbohydrate antigen 19-9, 13.87 U/mL; carcinoembryonic antigen, 1.89 ng/mL; alanine aminotransferase, 34 IU/L; total bilirubin, 14.76 μmol/L; direct bilirubin, 5.41 μmol/L; γ-glutamate transaminase, 56 IU/L.

Imaging diagnosis

A CT scan of the abdomen revealed a dilated common bile duct, with a 1.2-cm mass projecting into the lumen of the middle common bile duct, causing nearly complete obstruction.

Pathological diagnosis

Benign giant-cell tumor of the common bile duct, CD68/CD163 positive, CK/CK7/CK20/CK19 negative.

Treatment

Excision of the gallbladder and extrahepatic bile duct and a Roux-en-Y cholangiojejunostomy were performed.

Related reports

The giant cells present in our patient showed immunohistochemical evidence of histiocytic derivation and lacked evidence of epithelial differentiation.

Experiences and lessons

This case report represents the fifth case of primary giant-cell tumor of the common bile duct in the English-language literature. It is crucial to differentiate this benign tumor from other carcinomas to avoid overtreatment.

Peer review

This article reports a rare case of a benign giant-cell tumor of the common bile duct.

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