Case Report

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Carcinoma of the Cystic Duct Leading to Obstructive Jaundice

A Case Report and Review of the Literature

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Abstract
Only 34 cases of primary cystic duct carcinoma have previously been published in the literature. Most of these cases presented with upper abdominal pain and a palpable mass in the right upper quadrant due to gallbladder hydrops or cholecystitis. We report a case of cystic duct carcinoma with the clinical presentation of obstructive jaundice. The patient was treated by cholecystectomy, resection of the common bile duct and a Roux-en-Y hepaticojejunostomy. An extended lymph node dissection was not performed. Fourteen months after the operation the patient died with local carcinoma recurrence. A literature review comparing clinical signs, surgical treatment, and outcome of 14 Japanese and 21 reported Western cases, including ours, was performed. Extended lymph node dissection in addition to combined resection of the gallbladder and ductus hepaticocholedochus appears to offer a better prognosis and larger survival, including the chance of potential cure.

Introduction

Only carcinomas fulfilling the strict criterias defined by Farrar [1] represent cystic duct cancers. Therefore cancer of the cystic duct includes: (1) restricted tumor growth to the cystic duct; (2) no evidence of tumor in the gallbladder, hepatic or common bile duct, and (3) histological proof or carcinoma [1].

The worldwide incidence of primary carcinoma of the cystic duct is very low, being reported to fall between 2.6 and 3.3% of all bile duct cancers [2, 3].

Cystic duct cancer in most cases presents without clinical signs of obstructive jaundice. Since the first description of cystic duct carcinoma in 1941 [4] only 11 of the 34 described cases caused obstructive jaundice [4–13]. We describe here a cystic duct carcinoma which presented with obstructive jaundice, and we review the literature to identify the surgical procedure with the most favorable outcome. Compared to other malignant biliary tumors the prognosis of cystic duct carcinoma seems more favorable, always depending on the tumor stage and on the surgical procedure.

Patients and Methods

In a retrospective single-center series of 1,759 cholecystectomies performed at our institution between January 1986 to March 1995, only 1 case of carcinoma of the cystic duct was found as defined by Farrar [1], resulting in an extremely rare incidence rate of 0.6‰.

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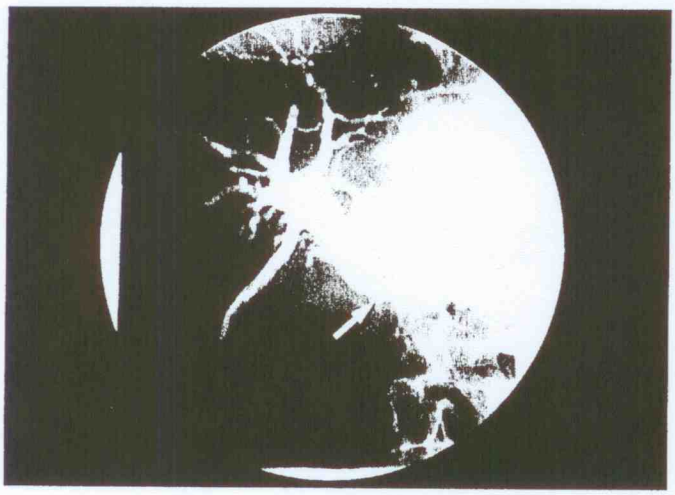

Fig. 1. Percutaneous transhepatic cholangiography revealing pronounced dilatation of the intrahepatic bile ducts with a filiform narrowing down to a complete obstruction of the common hepatic duct (white arrow) caused by cystic duct carcinoma.

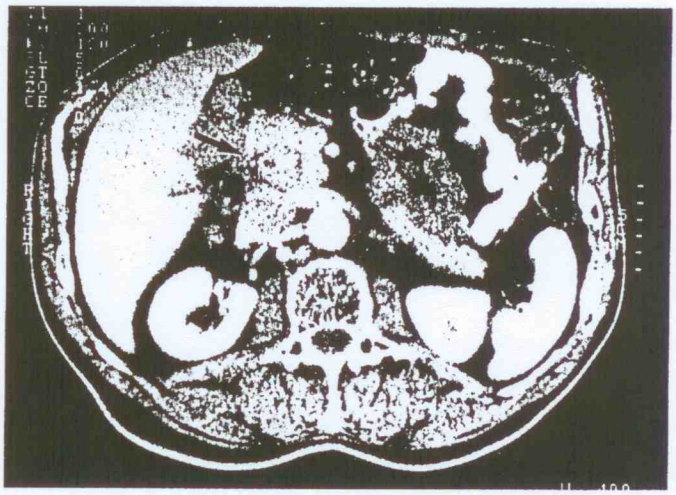

Fig. 2. Computed tomography revealing tumor recurrence and lymph node metastases (black arrow) 11 months postoperatively.

Case Report

A 74-year-old male was admitted to our department with a 3-week history of jaundice and pruritus. During the previous 2 months, he reported a weight loss of 8 kg and intermittent episodes of epigastric colicky pain. On clinical examination the patient appeared deeply jaundiced, but otherwise in good general condition and afebrile. Abdominal palpation revealed a light tenderness in the right upper quadrant. The liver was not enlarged, nontender, with a smooth surface. On laboratory blood tests the following parameters were pathologic (normal values in parentheses): total bilirubin 696 µmol/l (<20); direct bilirubin 346 µmol/l (<5.1); SGOT 26 U/l (<18); SGPT 46 U/l (<22), and alkaline phosphatase 620 U/l (<170). Tumor markers were also elevated with 3.9 ng/ml (<1.5) CEA and 210 kU/l (<33) CA 19-9.

Ultrasonography of the upper abdomen showed a 2.5 × 1 cm solid mass in the region of the distal bile duct with proximal bile duct dilatation, cystic duct obstruction and a moderately dilated gallbladder. Duplex sonography (DS) showed intact vascularity without tumor involvement of the portal vein and hepatic artery. Percutaneous transhepatic cholangiography revealed a marked dilatation of the intrahepatic bile ducts with a filiform narrowing down to a complete obstruction of the common hepatic duct (fig. 1). Cholestasis was treated preoperatively by percutaneous biliary drainage for 6 days. With the presumptive diagnosis of obstructive jaundice due to a bile duct tumor in the region of the confluence of the cystic duct, a laparotomy was performed. At surgery, a 2-cm mass was palpable at the junction of the cystic duct with the common bile duct, extending to the portal vein. Lymph nodes in the hepatoduodenal ligament were suspicious for tumor metastases. The liver was free of tumors on inspection and bimanual palpation, and confirmed by liver biopsy results. A cholecystectomy was performed with en-bloc resection of the cystic duct and the hepaticocholedochus, followed by Roux-en-Y hepaticojejunostomy reconstruction. The gallbladder was filled with thick bile, but without gallstones. At the distal margin of the gallbladder a 2.5-cm-long stenosis was found. The cystic duct itself could not be identified. Histological examination showed a moderately to well-differentiated papilliform adenocarcinoma in the cystic duct with infiltration through the cystic wall to the subserosa and periductal fatty tissue. The final histological preparation of the specimen showed no evidence of adenocarcinoma in the gallbladder, hepatic duct and common bile duct, thus fulfilling all the cystic duct tumor criteria defined by Farrar [1]. Two lymph nodes in the hepatoduodenal ligament were infiltrated by tumor cells confirming a tumor stage pT3pN1pM0 according to the UICC classification [14]. The postoperative course was uneventful, and the laboratory parameters returned to normal. The patient was readmitted 11 months postoperatively, again with epigastric pain and increased tumor markers (5.6 ng/ml CEA, 312 kU/l CA 19-9). At ultrasonography, there was an indication of local tumor recurrence with multiple lymph node metastases at the biliary anastomosis which was confirmed by computed tomography (fig. 2). Three months later the patient died. At autopsy, local tumor recurrence with lymph node metastases was found.

Discussion

Common bile duct and hepatic duct tumors account for more than 95% of extrahepatic bile duct tumors [15]. Cystic duct tumors that fit Farrar's [1] strict definition are exceedingly rare, accounting for only 2.6–3.3% of all bile duct cancers [2, 3]. Twenty-one of 35 cases including ours have been treated surgically in Western countries, and 14 patients were treated in Japan [16] (table 1). Comparing these 2 groups the following remarks can be made. The mean age was similar in both groups (63.2 years, range 38–80 years). The male to female ratio was 2.5:1 and 1:1

Table 1. Clinical findings of 35 reported cases with surgical treated cystic duct carcinoma

Case No.	Ref. No.	Age, years	Sex	Abdominal pain	Abdominal mass	Jaundice
Western patients						
1	1	66	m	+	–	–
2	4	63	m	–	–	+
3	5	57	m	–	+	+
4	6	54	f	+	+	+
5	6	60	f	+	+	–
6	7	57	m	+	–	+
7	8	38	m	+	–	–
8	8	62	m	+	–	+
9	8	66	m	–	–	+
10	8	70	m	+	–	–
11	9	66	m	+	+	+
12	10	65	m	–	+	+
13	11	55	f	+	+	+
14	22	48	f	–	+	–
15	26	78	m	+	–	–
16	27	68	m	+	–	–
17	28	70	m	+	–	–
18	29	61	m	–	+	–
19	30	59	f	+	+	–
20	31	80	f	+	+	–
21	present	74	m	+	+	+
Mean		62.7	m:f = 2.5:1	71.4% +	52.4% +	47.6% +
Japanese patients						
22	12	66	m	+	+	+
23	13	70	m	+	–	+
24	16	61	m	+	+	–
25	18	55	f	+	+	–
26	21	52	f	+	+	–
27	32	58	f	+	–	–
28	33	47	f	+	+	–
29	34	51	f	–	+	–
30	35	68	m	+	–	–
31	36	70	m	–	+	–
32	37	69	f	–	+	–
33	38	78	m	–	+	–
34	39	77	f	+	–	–
35	40	73	m	–	+	–
Mean		63.9	m:f = 1:1	64.3% +	71.4% +	14.3% +
Total		63.2	m:f = 1.7:1	68.6% +	60.0% +	34.3% +

for Western and Japanese patients, respectively. In contrast to gallbladder carcinoma, the sex distribution of cystic duct carcinoma does not mirror that of cholecystolithiasis, indicating that cholecystolithiasis does not play the same role in carcinogenesis of cystic duct cancer as it does in gallbladder cancer development [16, 17]. Indeed, underlying cholecystolithiasis was reported only in 25.7% of all patients. Abdominal pain occurred in 68.6% of all patients. Upper abdominal pain usually results from gallbladder hydrops or cholecystitis caused by cystic duct stenosis [18, 19]. An abdominal mass in the right upper quadrant was found in 60.0% and obstructive jaundice was detectable in 34.3% of all reported cases (table 1). The main difference between the 2 groups (in patients with

Table 2. Surgical treatment, lymph node metastases, and outcome of 35 cases of carcinoma of the cystic duct

Case No.	Ref. No.	Surgery	Lymph node metastases	Follow-up	Outcome
Western patients					
1	1	C	–	6 months	Alive
2	4	C+R	–	22 days	Dead
3	5	C+R+L	+	11 months	Dead
4	6	C	–	1 day	Dead
5	6	C	–	?	?
6	7	C+L	+	?	?
7	8	C	–	84 months	Alive
8	8	C	–	1 months	Dead
9	8	CD	–	4 days	Dead
10	8	C	–	4 months	Dead
11	9	C	–	?	?
12	10	C+R+HJ	–	11 months	Alive
13	11	C+R+HJ	?	9 months	Alive
14	22	C+R+L	+	54 months	Alive
15	26	C+R	–	5 months	Alive
16	27	C+L	+	39 months	Dead
17	28	C	–	30 months	Alive
18	29	C+L	–	5 months	Alive
19	30	C	–	12 months	Alive
20	31	C	+	7 months	Dead
21	present	C+R+HJ	+	14 months	Dead
Mean		R in 33.3% L in 23.8% HJ in 14.3%	+ in 30%	16.3 months	Dead 42.9% Alive 42.9%
Japanese patients					
22	12	C	?	3 months	Dead
23	13	C+R+L	–	18 months	Alive
24	16	C+R+L+HJ	–	17 months	Alive
25	18	C+L	–	30 months	Alive
26	21	C+R+L+HJ	–	11 months	Dead
27	32	C+R	?	?	?
28	33	C+R+L+HJ	–	12 months	Alive
29	34	C	?	22 months	Alive
30	35	C+R+L	–	8 months	Alive
31	36	C+R+L+HJ	–	12 months	Alive
32	37	C+L	–	18 months	Alive
33	38	C+R+L	–	43 months	Alive
34	39	C+R+L+HJ	–	12 months	Alive
35	40	C+L	–	72 months	Alive
Mean		R in 64.3% L in 78.6% HJ in 35.7%	+ in 0%	21.4 months	Dead 14.3% Alive 78.6%

C = Cholecystectomy; R = resection ductus hepaticocholedochus; L = lymph node dissection; HJ = hepaticojejunostomy; CD = choledochoduodenostomy.

clinical signs of cystic duct carcinoma) is obstructive jaundice, which appeared in 47.6% of all cases in the Western group, but only in 14.3% in the Japanese group. Obstructive jaundice is due to the proximity of the cystic duct to the common bile duct and external compression from the tumor mass or an enlarged gallbladder [10]. In 2 cases obstructive jaundice and percutaneous transhepatic cholangiography findings mimicked a Mirizzi syndrome [9, 11].

These symptoms may allow an earlier diagnosis and they may in part explain the slightly improved prognosis of cystic duct carcinomas as compared to other extrahepatic bile duct tumors or gallbladder cancer. The median survival with cystic duct carcinoma is reported to be 20.2 months, compared to 3.2 to 11.4 months in other extrahepatic bile duct tumors [18] and to 5.8 months in primary gallbladder carcinoma [20]. Generally, there are no other pathognomonic signs and the tumors are either discovered at laparatomy or on histopathological examination of the specimen. A preoperative diagnosis of cystic duct carcinoma was made only in 2 of the reported cases [11, 21]. All cases except 1 [22] were adenocarcinoma. The depth of cancer invasion is only available from the Japanese literature: in more than half of the patients subserosal and serosal invasion is present [16].

It remains unclear whether the increased utilization of endoscopic retrograde cholangiopancreaticography and percutaneous transhepatic cholangiography in diagnosing biliary disease allows better detection at an earlier tumor stage and permits a better preoperative planning of a more extensive resection than a conventional or even laparoscopic cholecystectomy. There is general agreement that a laparoscopic approach is not the appropriate operative procedure in these patients. In patients suspected of having bile duct tumors and/or cystic duct tumors a preoperative radiological assessment of bile duct resectability is required. Both conventional ultrasonography and DS should be performed to determine the extent of tumor infiltration and vascular involvement of the portal vein and hepatic artery, an uncommon but important factor to determine resectability [15]. In a study conducted in our department it was found that vascular involvement was accurately predicted by DS in 86% of patients with proximal bile duct tumors [23]. Therefore, it appears that DS is equal to angiography for the identification of vascular involvement [23]. Even though our study population included only patients with proximal bile duct tumors, we believe that the results can be transferred to patients with cystic duct tumors as the preoperative assessment of resectability and vascular involvement was correct in our case. Therefore, clear criteria for unresectability are tumor occlusion of the main portal vein or hepatic artery. Those patients with clearly unresectable bile duct or cystic duct tumors could then be considered for palliative treatment [15, 24]. However, in those cases where this criteria remains unclear, final assessment of resectability should always be performed intraoperatively. Surprisingly, Japanese patients show a better survival and overall outcome than Western patients (table 2). Three factors might explain this important difference. First, in the Western group, the patients seem to be operated at a later tumor stage as evidenced by a higher percentage of tumor-associated obstructive jaundice (47.6 versus 14.3%). In addition, in the Western group lymph node metastases were found in 6 of 21 patients (30% of all cases), whereas in the Japanese group no lymph node metastases was found in 11 of 14 well-documented patients [16]. Second, in the Japanese group, in 11 patients (78.6%) the operation included lymph node dissection extending from the lymph nodes in the hilus to the common hepatic artery, below the pancreatic head, and to the para-aortic lymph nodes, in accordance to the rules proposed by the Japanese Society of Biliary Surgery [25], whereas in the Western group the surgical procedure included lymph node dissection only in 5 patients (23.8%). There is also a difference in the resection rate of the hepaticocholedochal duct between the 2 groups. The Japanese surgeons performed a resection of the extrahepatic bile duct in 9 (64.3%) cases, whereas in the Western group this was performed in 7 (33.3%) cases only.

As a consequence, the calculated survival rate in the Japanese group is 78.6% with a median follow-up time of 21.4 months, whereas in the Western group survival was only 42.9% in 16.3 months (table 2). However, the difference is not statistical significant and isolated case report data lack statistical evidence.

The available data suggest that prognosis of cystic duct cancer could be improved by: (1) tumor detection at an early tumor stage, and (2) combined excision of the gallbladder and extrahepatic bile ducts with extended lymph node dissection including hepatoduodenal, parapancreatic and para-aortal lymph nodes as the standard surgical procedure. This procedure is therefore considered to be the best choice for treatment of primary carcinoma of the cystic duct.

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