



Case Report

Complete metastasectomy to treat simultaneous metastases of the duodenum and pancreas caused by renal cell carcinoma

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ABSTRACT

Renal cell carcinoma (RCC) metastatic to the pancreas is relatively uncommon, and RCC metastatic to the duodenum is extremely rare, with only a small number of case reports in the literature. We describe a 76-year-old woman with a history of RCC who had been treated by radical left nephrectomy 6 years earlier. The patient presented with anemia, hematochezia, and a bulging mass in the pancreaticoduodenal area, and was treated by pancreaticoduodenectomy. Histopathology confirmed metastatic RCC of the duodenum, the pancreas, and one of the dissected regional lymph nodes. The patient remains healthy to date without recurrence more than 24 months after pancreaticoduodenectomy. Our case report and review of the literature supports the curative surgical treatment in this rare group of patients.

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1. Introduction

Renal cell carcinoma (RCC) most commonly metastasizes to the lung, bone, liver, and brain. RCC metastatic to the pancreas is uncommon, but pancreatic metastases are commonly of renal origin such that RCC accounts for 70% of all patients [1]. RCC metastatic to both the duodenum and pancreas is extremely rare. RCC metastases may occur several years after the initial surgical treatment and have been reported up to 23 years later [2]. Aggressive surgical treatment of isolated RCC metastatic events involving the pancreas has shown promising outcomes with a 66% 5-year survival. However, the prognosis of duodenal involvement after surgery is still unclear due to the very low number of presentations [3]. Here, we report a 76-year-old woman with metastatic RCC of the duodenum and the pancreas who underwent successful metastasectomy by pancreaticoduodenectomy.

2. Case report

A 76-year-old woman has a medical history that was notable for RCC of the left kidney 6 years earlier. She had undergone a radical

left nephrectomy and the pathological staging was T1N0M0. The patient had refused to receive any adjuvant therapy.

In May 2009, she presented with hematochezia for 2 months, moderate anemia with a hemoglobin concentration of 7.8 g/dL, and weight loss of approximately 7 kg within 6 months. The esophagogastroduodenoscopy showed one submucosal mass lesion involving the distal stomach and proximal duodenum with overlying mucosal bleeding (Fig. 1A), but histopathological examination could not identify any malignancy. An abdominal computed tomographic scan (Fig. 1B) revealed that one large soft tissue tumor with hypervascularity occupied the area of gastric antrum, duodenal bulb, and pancreatic head. Surgical resection by pancreaticoduodenectomy was performed in June 2009 with a provisional diagnosis of metastatic RCC after blood transfusion and preoperative general evaluation. The patient had an uneventful postoperative course and was discharged on postoperative day 13. She remains in good health after the operation without any evidence of local recurrence or distant metastases after 24 months of follow-up at outpatient surgery and urology departments.

2.1. Pathology

Gross examination of the specimen showed one 7.0 × 5.5 × 4.0 cm yellowish pedunculated tumor that was protruding into the first portion of the duodenum with a polypoid mucosal surface, and invading the pancreatic head (Fig. 2). In fact, this large mass lesion

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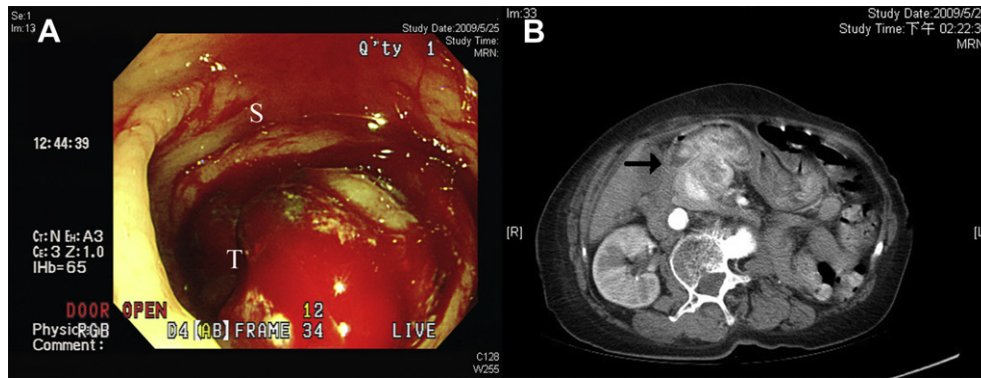


Fig. 1. (A) Esophagogastroduodenal endoscopy: a large submucosal mass lesion (T) with active bleeding was found involving the distal stomach (S) and proximal duodenum. (B) Contrast-enhanced computed tomographic scan: a large hypervascular mass lesion (black arrow) occupies the distal stomach, proximal duodenum, and pancreatic head.

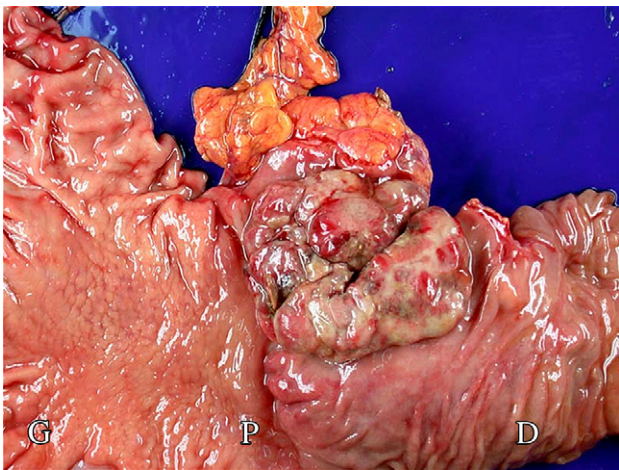


Fig. 2. Gross specimen showing a single 7.0 × 5.5 × 4.0 cm yellowish pedunculated tumor protruding into first portion of the duodenum (D), just distal to the pylorus (P). The distal stomach (G) is to the left of the figure.

consisted of three similar well-encapsulated tumors located within the duodenal submucosa layer, the pancreatic head, and one enlarged regional lymph node. Microscopically, after hematoxylin and eosin staining these tumors showed nests of epithelial cells with clear cytoplasm and a distinct cell membrane; these were

separated by the delicate branching network of vascular tissue and arranged in trabecular and alveolar patterns (Figs. 3A and 3B). Thirteen lymph nodes were dissected and identified in the specimen, but only one of those nodes showed metastasis.

3. Discussion

RCC is characterized by the appearance of metastases several years after nephrectomy [4,5]. Late recurrence has been reported in 6.4–11% of patients who have survived for over 10 years after nephrectomy [4,6]. Metastatic RCC may spread to any organ, with the most common sites of metastases being the lymph nodes, lung, bone, liver, opposite kidney, and the brain [5]. Surgery as a method of managing limited pancreas metastases from RCC has been shown to improve survival [7–9]. Duodenal metastasis from RCC is seen much less frequently than pancreatic metastasis, and the prognosis and benefit from surgical resection are still unclear. In fact, only 17 cases can be identified in the literature in which patients had undergone complete surgical resection for duodenal metastasis, including the present patient (Table 1). The gender proportion is nearly equal and the mean age is 67.7 years. The mean period from nephrectomy to diagnosis of metastases was 9.65 years. In contrast to the less symptomatic presentation of pancreatic metastasis, almost all patients with duodenal metastasis from RCC have symptoms, mainly (71%) in the form of upper gastrointestinal tract bleeding. Duodenal metastases are most frequently located in the periampullary region, followed by the duodenal

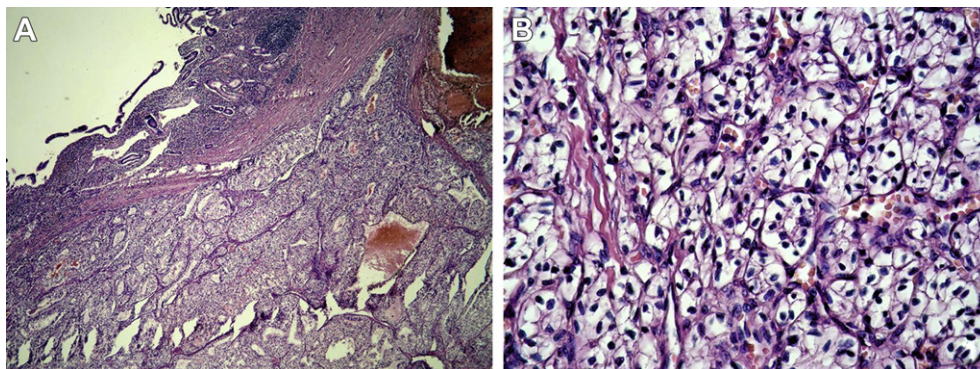


Fig. 3. (A) Metastatic renal cell carcinoma within the submucosal layer of the duodenum (hematoxylin–eosin, ×100 magnification). (B) Conventional clear cell carcinoma: the clear cells are arranged in trabecular and alveolar patterns and are surrounded by a prominent vascular network (hematoxylin–eosin, ×400 magnification).

Table 1
Published case reports of duodenal metastasis from renal cell carcinoma with complete metastatectomy.

Author	Year	Age	Gender	Years post-nephrectomy	Presentation	Other organs involved	Treatment	LN status	Outcome
Lawson et al [15]	1966	69	F	0	GI bleeding	—	PD	N/A	Alive (8 mo FU)
Robertson et al [16]	1990	70	M	13	GI bleeding	Pancreas	PD	N/A	N/A
Freedman et al [17]	1992	65	M	12	GI bleeding	—	PD	N/A	66 mo
Gastaca Mateo et al [18]	1996	N/A	N/A	8	N/A	—	Duodenectomy	N/A	N/A
Toh et al [19]	1996	59	F	10	Abdominal pain, anorexia	—	Duodenotomy & metastatectomy	N/A	Alive (6 mo FU)
Leslie et al [20]	1996	53	M	8	GI bleeding, BW loss	Ampulla	PPPD	0/5	78 mo
		78	F	10	GI bleeding, abdominal discomfort	Ampulla	PPPD	0	30 mo
Janzen et al [21]	1998	75	M	17	GI bleeding	Ampulla	Duodenectomy, total pancreatectomy	N/A	N/A
Le Borgne et al [22]	2000	72	F	7	GI bleeding	—	PD	0	18 mo
		48	M	13	GI bleeding	—	PD, SMV resection	0	53 mo
Hashimoto et al [23]	2001	57	M	11	GI bleeding	Pancreas	PPPD	N/A	N/A
Sohn et al [9]	2001	N/A	N/A	6	N/A	—	PD	0	22 mo
Pavlakakis et al [24]	2004	65	M	2	Obstruction	Omentum, ileum	Intestinal resection	N/A	9 mo
Chang et al [25]	2004	63	F	9	GI bleeding	—	Subtotal gastrectomy	0/6	10 mo
Merino et al [26]	2005	79	F	19	GI bleeding	—	Local excision	N/A	23 mo
Adamo et al [27]	2008	86	F	13	Anemia	Pancreas	PD	0/8	7 mo
Chen et al (current)	2010	76	F	6	GI bleeding, anemia	Pancreas	PD	1/13	Alive (24 mo FU)

FU = follow-up; GI = gastrointestinal; LN = lymph nodes; N/A = not available; PD = pancreaticoduodenectomy; PPPD = pylorus-preserving pancreaticoduodenectomy; POD = postoperative day; SMV = superior mesenteric vein.

bulb [10], and the surgical procedure used has been pancreaticoduodenectomy in 11 patients (including our patient). In 13 of 17 patients, the median survival time has been at least 27 months [11].

The route of RCC spread could be hematogenous and/or lymphatic. It is very unusual that duodenum, pancreas, and regional lymph node metastases appeared simultaneously, as was the situation in our patient based on histopathological examination. To our knowledge, this is the third patient to undergo *en bloc* resection of metastases located in different organs by pancreaticoduodenectomy. Microscopic examination of the resection specimen revealed that the duodenal submucosal tumor protruded into the lumen and arose in the muscular layer of the duodenum. Organ-specific metastasis is not easily elucidated, especially at an unusual site. Cases of pancreas metastasis from RCC patients who were undergoing metastatectomy have included over 150 individuals, and these have shown favorable results [3]. Duodenal metastasis of RCC is extremely rare, and half of the patients who underwent metastatectomy had duodenal metastasis combined with pancreas metastasis. From the embryological viewpoint, the pancreas arises from the ventral and dorsal bud, which initially separates into the pancreas and duodenum; thus, ectopic pancreatic tissue might be present in the proximal duodenal wall and the gastric submucosal layer. Duodenal metastasis arises from a migrated pancreatic cell in the duodenal wall and thus may be part of the pancreatic metastasis [12]. As in the case of patients with gastrinomas, tumors may develop in the Passaro's triangle, which includes the pancreatic head and the duodenum [13]. In addition, the duodenum and the pancreatic head share the same arterial supply and venous/lymphatic drainage. Therefore, they might have similar tissue characteristics, allowing them to be metastasized easily by the RCC.

The history of RCC is variable and unpredictable. Radical nephrectomy to cure RCC is the standard operation, but a long

period of disease latency is possible, and recurrence may happen at an unsuspected location. Therefore, it is necessary to investigate RCC post-nephrectomy patients carefully if they present with new symptoms. The presenting symptoms for duodenal metastasis of RCC include gastrointestinal bleeding, anemia, obstruction, and/or jaundice. A full diagnostic evaluation involving endoscopic and radiological studies is mandatory for these patients if they present with gastrointestinal symptoms [14].

Treatment of duodenal metastasis due to RCC is only available in the literature as case reports, and the procedures have included pancreaticoduodenectomy with or without pylorus preservation total pancreatectomy, interventional embolization, and radiotherapy. According to our reviewed case reports, complete surgical metastatectomy seem to have a favorable prognosis if the metastases are limited and resectable. Our patient presented with upper gastrointestinal bleeding and then underwent radical resection involving pancreaticoduodenectomy. The resection specimen revealed duodenal, pancreatic, and lymph node metastases, and this is the first case of lymph node involvement in the duodenal metastasis of RCC to our knowledge. Based on the above, curative resection should be considered and encouraged in patients with limited metastatic RCC to the duodenum if medically and technically feasible because this seems to provide a good chance of disease-free and overall survival.

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