Case Report

Renal pelvis cancer with initial symptoms of malignant gastric outlet obstruction

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Abbreviations & Acronyms
CA19-9 = carbohydrate antigen 19-9
CD38 = cluster of differentiation 38
CDH1 = Cadherin-1
CEA = carcinoembryonic antigen
CT = computed tomography
GATA3 = GATA binding protein 3
GC = gemcitabine and cisplatin
GCarbo = gemcitabine and carboplatin
IQR = interquartile range
MGOO = malignant gastric outlet obstruction
MRI = magnetic resonance imaging
PUC = plasmacytoid urothelial carcinoma
QOL = quality of life
SCC = squamous cell carcinoma-associated antigen
UTUC = upper tract urothelial carcinoma

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How to cite this article: Iwamoto N, Oikawa M, Kukimoto T *et al*. Renal pelvis cancer with initial symptoms of malignant gastric outlet obstruction. *IJU Case Rep*. 2023; 6: 475–478.

Received 11 June 2023; accepted 15 September 2023.
Online publication 5 October 2023

Introduction: Gastric outlet obstruction caused by upper tract urothelial carcinoma is rare.

Case presentation: A 78-year-old man presented to the hospital with nausea and vomiting. No hematuria was observed. Computed tomography revealed a tumor in the right renal pelvis and duodenal stenosis. Gastrojejunostomy was performed to treat the symptoms of the gastric outlet obstruction so that the patient could resume oral intake and outpatient chemotherapy. Chemotherapy was unsuccessful, and the patient died 9 months after the gastrojejunostomy. Histological assessment of an autopsy specimen revealed plasmacytoid urothelial carcinoma with direct infiltration of the duodenal wall, which caused the stenosis.

Conclusion: Autopsy revealed a right renal pelvis cancer causing gastric outlet obstruction. Early gastrojejunostomy enabled oral intake and outpatient visits.

Key words: gastric bypass, gastric outlet obstruction, kidney pelvis, neoplasm.

Keynote message

We report a rare case of renal pelvis cancer with gastric outlet obstruction and the potential benefits of early gastrojejunostomy in patients with obstruction caused by this type of carcinoma.

Introduction

MGOO is a complication in which the stomach and/or duodenum is mechanically obstructed by cancer.[1] This obstruction leads to poor oral intake owing to nausea and vomiting. Gastrojejunostomy or duodenal stent placement is often performed to treat these symptoms.[2]

The leading causes of MGOO are gastric and pancreatic cancers[1]; MGOO owing to UTUC is rare. In this report, we present a case of right renal pelvis cancer with initial symptoms of MGOO.

Case presentation

A 78-year-old man presented to our hospital with a 10-day history of poor oral intake owing to nausea and vomiting. No hematuria nor flank pain was observed. The patient was a smoker with no significant medical or family history. Abdominal examination revealed gastric distension, but no palpable mass.

Laboratory examination revealed mildly elevated hepatobiliary enzyme levels and renal failure. The levels of tumor markers (CEA, CA19-9, and SCC) were normal. Hematuria was negative upon microscopic urinalysis and urine cytology did not reveal any atypical cells.

Enhanced CT revealed a soft tissue mass in the right renal pelvis (Fig. 1a). CT showed duodenal wall thickening in the second portion of the duodenum which was judged to be inflammatory (Fig. 1b), but no obvious mass was observed in the duodenum. Esophagogastroduodenoscopy revealed duodenal stenosis without tumors or ulcers (Fig. 2a), and

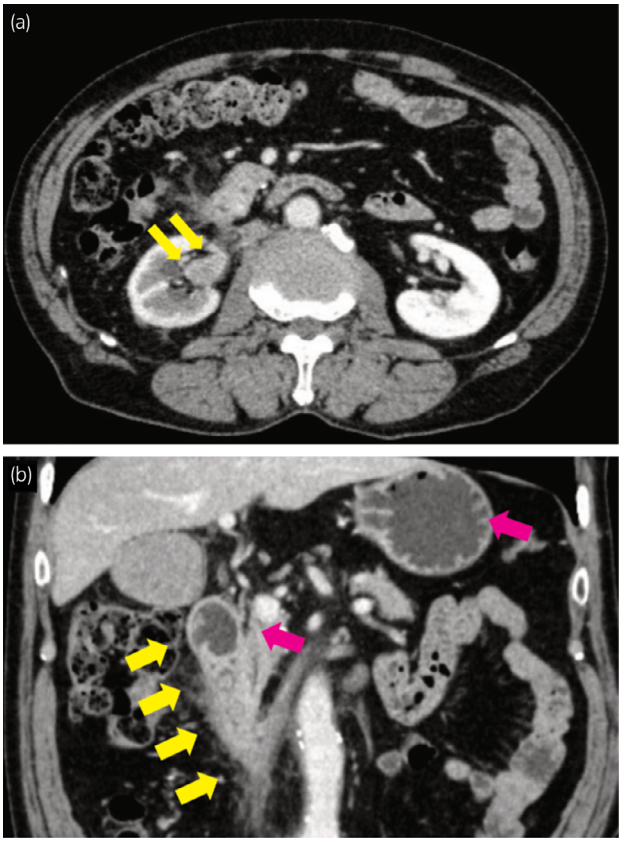

Fig. 1 Computed tomography findings of the current case. (a) A soft tissue mass in the right renal pelvis (yellow arrows). (b) Wall thickening of the second portion of the duodenum and suspected inflammation in the paraduodenum (yellow arrows), and dilatation of the stomach and the first portion of the duodenum (pink arrows).

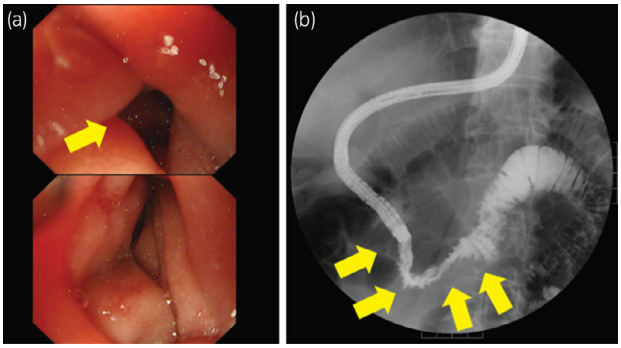

Fig. 2 (a) Esophagogastroduodenoscopy revealed duodenal stenosis (yellow arrow), without lesions of the mucous membrane, for example, tumors or ulcerations. (b) Duodenography revealed stenosis in the second and third portions of the duodenum (yellow arrows).

duodenography revealed stenoses in the second and third portions of the duodenum (Fig. 2b). Retrograde pyelography indicated a defect in the right renal pelvis and dilatation of the upper and middle calyces.

As a priority, the patient underwent gastrojejunostomy as a treatment for the gastric outlet obstruction symptoms, although a causal relationship between the right renal pelvis tumor and the duodenal stenosis had not been determined at this point. Biopsy was attempted during the gastrojejunostomy but could not be performed because of the presence of hard tissue without a nodule around the duodenum and the risk of perforation. Instead, peritoneal washing cytology around the duodenum was performed; however, there were insufficient cells for diagnosis.

Ureteroscopy was attempted 2 weeks after the gastrojejunostomy; however, the ureteroscope could not pass through the ureter owing to the stenosis. However, endoscopic brush cytology of the right renal pelvis revealed a high-grade urothelial carcinoma. Therefore, the patient was diagnosed as having urothelial carcinoma of the right renal pelvis.

After diagnosis, chemotherapy was initiated with (GC; gemcitabine 1000 mg/m^2 on days 1, 8, and 15 and cisplatin 70 mg/m^2 on day 2). Owing to the deterioration of renal function after 1 cycle of GC, treatment was changed to (GCarbo; gemcitabine 1000 mg/m^2 on days 1 and 8 and carboplatin 150 mg/m^2 on day 2). After 7 cycles of GCarbo therapy, the patient developed obstructive jaundice due to disease progression. Although 2 cycles of pembrolizumab (200 mg once every 3 weeks) were administered, the tumor extended. The patient died 287 days after the gastrojejunostomy. Gastrojejunostomy and outpatient chemotherapy enabled oral intake for 271 days and allowed the patient to spend 140 days at home.

Autopsy findings revealed carcinoma of the right renal pelvis with thickening of the renal pelvis wall and proliferation beyond the wall (Fig. 3a). Histopathological findings revealed PUC and involvement of the duodenum, jejunum, mesentery, and common bile duct (Fig. 3b).

We concluded that the PUC in the renal pelvis directly infiltrated the duodenal wall, causing the stenosis.

Discussion

Neoplasm progression in the pylorus or duodenum can give rise to MGOO, causing symptoms such as nausea, vomiting.[1] The main causes of MGOO are gastric and pancreatic cancers, which are unresectable due to progression.[1] Without intervention, lack of nutrition and electrolyte imbalance can be fatal for MGOO patients, requiring gastrojejunostomy or duodenal stenting.[2]

In our case, the UTUC infiltrating and compressing the duodenal wall led to the first MGOO symptoms of nausea and vomiting, without hematuria. The European Association of Urology Guidelines state hematuria is one of the initial symptoms of UTUC in 70%–80% of cases.[3] The guideline does not mention nausea or vomiting.[3]

UTUC causing MGOO is a rare cause. To our knowledge, only 12 cases of MGOO caused by UTUC, including 8 case reports (Table S1) and 4 cases from cohort studies (Table 1 and Fig. S1), have been reported in the literature.[4–11] Based on the analysis of 73 cohort studies, only 4 of 5046 patients with MGOO were caused by UTUC (0.08%) (Table 1 and Fig. S1).

In our case, CT did not detect duodenal invasion, and the causal relationship between the renal pelvis tumor and MGOO was not confirmed until the autopsy. PUC is a rare aggressive variant accounting for 1%–4.9% of invasive

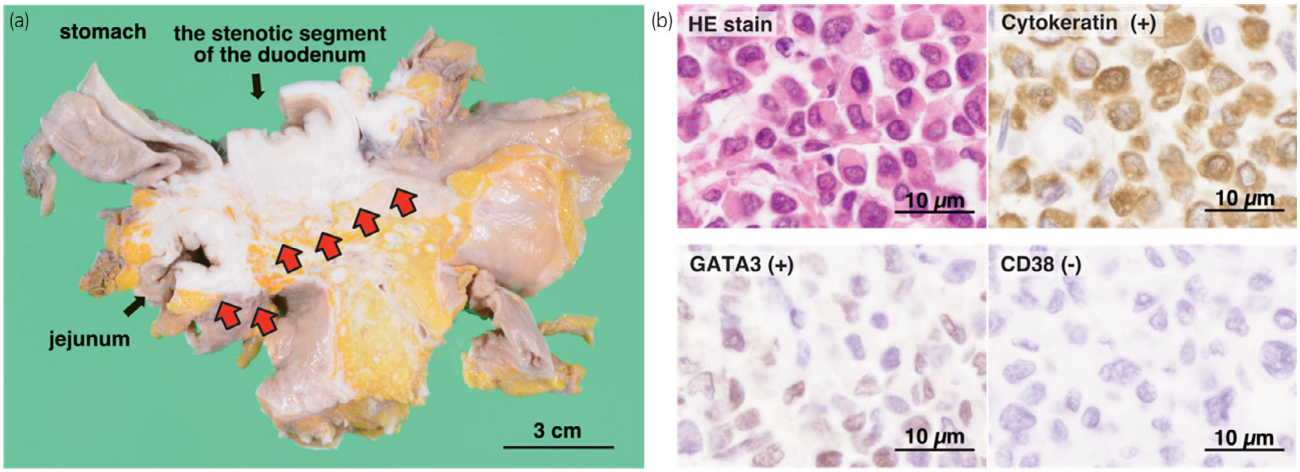

Fig. 3 Autopsy findings revealed (a) proliferation of the carcinoma (red arrows) involving the duodenum, which caused the duodenal stenosis, and (b) carcinoma cells with eosinophilic cytoplasm with eccentric nuclei and immunobiologically typical of urothelial carcinoma—cytokeratin (+), GATA3 (+), and CD38 (−).

Table 1 Characteristics of patients and primary tumors of MGOO in 73 cohort studies

Variables	Overall *n* = 5046
Male	2680 (57)
Treatment for MGOO	
Duodenal stent	3449 (73)
Gastrojejunostomy†	1286 (27)
Primary tumor characteristics	
Urologic	
Renal cell carcinoma	10 (0.2)
Renal pelvis cancer	1 (0)
Ureter cancer	3 (0.1)
Bladder cancer	6 (0.1)
Urinary tract cancer‡	10 (0.2)
Retroperitoneal sarcoma	2 (0)
Retroperitoneal liposarcoma	2 (0)
Urologic malignancy‡	4 (0.1)
Gastrointestinal	
Esophageal cancer	14 (0.3)
Gastric cancer	1936 (38)
Gastrointestinal stromal tumor	2 (0)
Duodenal cancer	294 (5.8)
Duodenal neuroendocrine tumor	2 (0)
Small bowel cancer	7 (0.1)
Colorectal cancer	109 (2.2)
Colon neuroendocrine tumor	1 (0)
Hepato-biliary-pancreatic	
Liver cancer	4 (0.1)
Liver sarcoma	1 (0)
Gallbladder cancer	164 (3.3)
Biliary tract cancer	319 (6.3)
Pancreatic cancer	1929 (38)
Pancreatic neuroendocrine tumor	7 (0.1)
Breast cancer	22 (0.4)
Gynecologic	
Gynecologic cancer‡	34 (0.7)
Ovarian cancer	15 (0.3)
Uterus cancer	2 (0)
Endometrial carcinoma	2 (0)
Endometrial stromal sarcoma	1 (0)
Uterine sarcoma	1 (0)
Uterine cervical cancer	2 (0)
Lung cancer	3 (0.1)
Hematologic	
Lymphoma	3 (0.1)
Multiple myeloma	1 (0)
B cell lymphoma	3 (0.1)
Non-Hodgkin's lymphoma	3 (0.1)
Dermatologic	
Melanoma	1 (0)
Merkel cell carcinoma	1 (0)
Mesothelioma	1 (0)
Metastasis of unknown primary	124 (2.5)

Numbers in parentheses are percentages. †Endoscopic ultrasound-guided gastrojejunostomy is included. ‡Expressed this way in the original paper (no part is specified).

urothelial carcinomas, first identified by Sahin in 1991.[12,13] PUC is characterized by somatic mutations in CDH1 and hypermethylation of its promoter, leading to reduced E-cadherin expression.[14] The decreased E-cadherin expression enables PUC to easily invade the surrounding soft tissue.[15,16] PUC often infiltrates deep into the tissue and has minimal surface exfoliation, which can make it undetectable in urine cytology.[13] PUC appears sheet-like on CT and MRI.[17] In our case, urine cytology was negative due to the high infiltration of PUC and CT showed suspected periduodenitis, which was later confirmed to be duodenal invasion by the PUC. PUC accounted for two of eight cases of UTUC causing MGOO reported (Table S1), suggesting that PUC may be more likely to cause MGOO than conventional urothelial carcinoma. However, more cases will be needed to confirm this.

Palliative options for MGOO include Gastrojejunostomy and duodenal stenting. In a previous study, the median

survival period for Gastrojejunostomy in cases of gastric and pancreatic malignancy-induced MGOO was 129.0 days (IQR: 66.8–302.0), and for duodenal stenting, it was 79.0 days (IQR: 42.5–196.0).[18] In our case, gastrojejunostomy was chosen, because we thought an intraoperative biopsy could be taken to reveal the cause of the duodenal stenosis. Although a biopsy could not be performed, early gastrojejunostomy enabled the patient to survive for 287 days. This is not inferior to the comparison of gastrojejunostomy and duodenal stenting for the other malignancy-induced MGOO. However, further studies are needed to evaluate whether gastrojejunostomy or duodenal stenting is more appropriate for MGOO caused by renal pelvis and ureteral cancer.

Conclusion

We report a rare case of renal pelvis cancer (histological type: PUC) causing MGOO. The early gastrojejunostomy for MGOO caused by UTUC, improved the patient's QOL by enabling oral intake.

Acknowledgments

Not applicable.

Author contributions

Nao Iwamoto: Data curation; formal analysis; methodology; project administration; visualization; writing – original draft. Masaaki Oikawa: Data curation; visualization; writing – review and editing. Takashi Kukimoto: Data curation; visualization. Jun Ito: Data curation; investigation; resources; writing – review and editing. Kazuhiro Murakami: Resources; supervision; visualization; writing – review and editing. Yasuhiro Kaiho: Data curation; methodology; supervision; writing – review and editing.

Conflict of interest

The authors declare no conflict of interest.

Approval of the research protocol by an Institutional Reviewer Board

Not applicable.

Informed consent

All informed consent was obtained from the subject and guardians.

Registry and the Registration No. of the study/trial

Not applicable.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Fig. S1 Flowchart of literature search for data presented in Table 1.

Table S1 Case reports of malignant gastric outlet obstruction owing to upper tract urothelial carcinoma.