Postrenal Azotemia in a Gastric Cancer Patient Revealed the Coincidence of Ureteral Metastasis and Contralateral Ureteral Stone: A Case Report

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Abstract
Metastatic ureteral masses are not rare, but isolated ureteral metastasis from the origin of gastric cancer is rare. Ureteral metastasis is usually unilateral and does not lead to postrenal azotemia unless in single kidney patients. Herein, we describe an 80-year-old man with a history of nonmetastatic gastric cancer who presented with postrenal azotemia due to the coincidence of right distal ureteral metastasis and left distal ureteral stone.

Introduction
Malignant ureteral obstruction (MUO) is considered a challenging issue to be tackled due to a variety in its presentations. Intrinsic and nonintrinsic factors could be behind MUO. It can be originated from nongenitourinary cancers including, but not limited to, colorectal, breast, and ovarian cancer. Also, gastric cancer as the primary source of metastasis to the ureter has been reported in several studies [1], but isolated ureteral metastasis in gastric cancer patients is extremely rare. Three mechanisms are attributed to ureteral obstruction originating from
gastric cancer: (1) direct extension from gastric cancer, (2) peritoneal deposit, and (3) involvement of the lymph node. This diagnosis is a rare profound condition primarily found in patients with advanced gastric cancer or postmortem examinations. Gastric cancer cells can prompt sclerotic reaction by attacking the periureteral area, which leads to indirect ureteral obstruction. Herein, we describe a gastric cancer patient with postrenal azotemia, which to the best of our knowledge, is the first report of bilateral ureteral obstruction due to the coincidence of isolated ureteral metastasis from the gastric cancer origin and the contralateral distal ureteral stone.

**Case Presentation**

An 80-year-old man with a history of nonmetastatic gastric cancer had refused to undergo gastrectomy and received chemoradiation therapy instead. He agreed to report his case by signing the written informed consent. This case is a report based on the CAse REport (CARE) guidelines checklist. A year after, he was referred to the emergency department of Sina hospital with the presentation of low-grade fever and bilateral flank pain. The physical examination other than some degree of cachexia and low-grade fever (T: 38°C) was normal. He had a history of long-time obstructive LUTS, but no history of hematuria or colic pain was reported. In laboratory tests, a rise in serum creatinine (Cr = 3.77 mg/dL), a slight rise in serum potassium (K: 5.5 mmol/L), and a decrease in hemoglobin (Hb = 11.7 g/dL) were detected.

We had no urine sample for urine analysis and urine culture due to the anuria even after urethral catheter placement. The electrocardiography showed no pathologic finding. In the abdominopelvic CT scan, bilateral hydronephrosis left distal ureteral stone and the right distal ureteral 3-cm mass lesion were found (Fig. 1). After administration of empiric antibiotic therapy (ciprofloxacin), the patient underwent bilateral nephrostomy placement. After placing the nephrectomies, the urine sample (cloudy, dark yellow) from both sides was sent for urine analysis, and urine culture was both positive for *E. coli* sensitive to quinolones. Gradually, the serum creatinine level decreased to 1.26 mg/dL, and the fever was discontinued. After a week of antibiotic therapy, he was scheduled to undergo cystourethroscopy. The bladder wall had severe trabeculation and multiple diverticula in cystoscopy examination, making it challenging to find a ureteral orifice. Even using methylene blue injected through nephrostomies did not help.

Since we need histologic confirmation for the right side ureteral tumor, he was scheduled for antegrade ureteral stent/guidewire placement to help retrograde ureteroscopy and taking

![Fig. 1. Bilateral hydronephrosis (a); bilateral ureteral tortuosity and hydrourteronephrosis (b); left distal ureteral stone (c).](image-url)
biopsies. Unfortunately, the attempt was not successful. He was discharged with bilateral nephrectomies and referred to an oncologist. As he could not tolerate nephrectomies and also had an episode of pyelonephritis, resulting in administration, we decided to plan an open palliative surgery to omit the need for nephrostomy. After recovery from pyelonephritis, we performed a bilateral distal ureteral resection and re-implant. The operation was done under spinal anesthesia by a low midline incision. The right distal ureter was resected to the level that the tumor was not palpable. No gross involvement in the periureteral area and the retroperitoneal region was found. The re-implantation was performed using the modified Lich technique on the bilateral ureteral stent (JJ stent).

Nephrostomies were clamped for a couple of days and then removed after a satisfactory amount of urine output from the urethral catheter and steady serum creatinine levels. A renal ultrasound exam revealed no hydronephrosis after a week from surgery.

The histopathology of the right ureter revealed metastasis of mucinous adenocarcinoma. Tumoral infiltration in the serosal layer composed of malignant epithelial cells in mucinous pools was observed in microscopic examination (Fig. 2).

Discussion

Metastasis to the ureter from distant organs is a rare phenomenon regardless of the primary site of the tumor [2]. Previously, identifying if the ureteral metastasis is a true distant metastasis or an extension from adjacent tissues was challenging until Persman and Ehrlich [3] introduced criteria, which are now accepted worldwide. The criteria declared that in the circumstances the malignant cells exist in a portion of the ureteral wall and there is no malignancy in adjacent tissues, the ureteral tumor is a distant metastasis. Approximately 400 patients with ureteral metastasis have been explored, of whom most have been diagnosed in postmortem examinations [2]. Radiology examinations have led to a substantial increase in the diagnosis of spontaneous ureteral metastasis. Primary sites with the highest incidence of metastasis to the ureter are the breast, prostate, colon, and cervix [4, 5], followed by gastric and lung cancer.

To the best of our knowledge, ureteral metastasis with the origin of gastric cancer has been reported in only a few case reports. The first case of ureteral metastasis from gastric cancer was introduced by Schlagintweit et al. [6]. Interestingly, many reported cases are from the Japanese population, and a small proportion of reports are from the other populations. Shimoyama et al. reviewed 27 Japanese patients with ureteral metastasis from gastric cancer. The patients were aged 34–74 years with the median age of 52 years, 48% of the patients were men, and 56% had unilateral ureteral metastasis.

Ureteral metastasis can be presented with various symptoms such as lumbar or flank pain, urinary obstruction, hematuria, and oliguria or anuria. Flank pain, considered the most
common symptom of ureteral metastasis, is a result of hydronephrosis and was observed in most (81%) cases, reviewed by Shimoyama et al.

So, although gastric cancer metastasis to the ureter has been reported earlier, isolated ureteral metastasis in gastric cancer patients is extremely rare. Bilateral flank pain in our patient is attributed to pyelonephritis and hydronephrosis (pyonephrosis) caused by a ureteral stone in the left side and ureteral metastasis in the right side.

**Conclusion**

There are some cases of ureteral metastasis from gastric cancer reported by far. Here, we report a patient who presented with postrenal azotemia due to bilateral distal ureteral obstruction with different pathologies at each side: ureteral metastasis at the right side and ureteral stone at the left side. We suggest physicians always be aware of both primary and metastatic ureteral tumors in patients with the manifestations of ureteral obstruction, especially patients with a known history of cancer.

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**Statement of Ethics**

The patient agreed to publish the case anonymously by signing the written informed consent. This case is a report based on the CAse REport (CARE) guidelines checklist. The Tehran University of Medical Sciences Ethics Committee supervised the study but because the study was a case report, it did not allocate code.

**Conflict of Interest Statement**

All authors have no conflicts of interest to declare.

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**Author Contributions**

S.M.K.A. designed the idea, F.G. collected the data, S.S.T.Z. wrote the manuscript, M.M.R. analyzed the data, and A.E.J. edited the manuscript.

**Data Availability Statement**

Information, data, and photos will be provided on request.
References

1. Bisof V, Juretic A, Pasini J, Coric M, Grgic M, Gamulin M, et al. Ureteral metastasis as the first and sole manifestation of gastric cancer dissemination. Radiol Oncol. 2010;44(4):262.

2. Otta RJ, Gordillo C, Fernández I. Ureteral metastasis of a prostatic adenocarcinoma. Can Urol Assoc J. 2015;9(3–4):E153.

3. Presman D, Ehrlich L. Metastatic tumors of the ureter. J Urol. 1948;59(3):312–25.

4. Chung SY, Stein RJ, Landsittel D, Davies BJ, Cuellar DC, Hrebinko RL, et al. 15-Year experience with the management of extrinsic ureteral obstruction with indwelling ureteral stents. J Urol. 2004;172(2):592–5.

5. Cordeiro MD, Coelho RF, Chade DC, Pessoa RR, Chaib MS, Colombo-Júnior JR, et al. A prognostic model for survival after palliative urinary diversion for malignant ureteric obstruction: a prospective study of 208 patients. BJU Int. 2016;117(2):266–71.

6. Schlagintweit FF. Metastatische karzinose der ureteren mit anurie bei gleichzeitiger nephritis. Zsch Urol. 1911;5:665–671.