

Single Case

A Double Metachronous Ureter Metastasis following Curative Resection of Rectal Cancer

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Keywords

Metastasis · Ureter · Hydronephrosis · Rectal cancer · Nephroureterectomy

Abstract

A malignant ureteral obstruction is most often due to primary tumors of the ureter. However, it can occur secondary due to external tumor compression or metastatic infiltration. Distant metastases to the ureter are extremely rare. We present a case of a rare double distant metachronous metastasis to the right ureter as well as to the right renal pelvis in a 58-year-old female with a history of anterior resection for rectal cancer 2 years earlier. She presented with recurrent urinary tract infection and right hydronephrosis caused by an ureteral mass. The patient underwent a right nephroureterectomy via laparotomy. Two metastases of the rectal cancer in the ureteral mucosa were verified at histology. On account of the infiltration of the right ureteral orifice, a completion transurethral resection of the tumor was performed. A follow-up 3 and 6 months later showed no signs of tumor relapse and the patient was doing well. The differential diagnosis of malignant ureteral obstruction in patients with history of colorectal cancer should include the rare possibility of distant metastasis from the primary tumor.

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Published by S. Karger AG, Basel

Introduction

Distant metastases to the ureter are very rare. Approximately 400 cases have been reported in the literature [1, 2]. Referring to autopsy data, the incidence of ureteral metastasis is reported to be 0.3–8.3% in patients with a history of cancer [3]. Half of the ureteral metastases are caused by urogenital cancer. Gastrointestinal tumors represent the second most common source of ureteral metastasis. Actual metastases of the ureter exclude the common cases of its direct cancerous infiltration by advanced colorectal cancer. The most typical clinical presentation of ureteral metastasis is hydronephrosis and its diagnosis usually requires the use of CT and urography. Prognosis of patients strongly depends on the choice of therapy. A nephroureterectomy allows a complete surgical resection of the metastatic lesion and improves patient's prognosis [1]. In this paper, we present a rare case of double distant metachronous metastasis of a curatively resected rectal cancer to the right ureter as well as to the right renal pelvis.

Case Presentation

In February 2017, a 58-year-old female patient underwent anterior resection for rectal cancer staged as a pT3 pN1 (3/30, LNR 0,1) M0 G2 adenocarcinoma. Six cycles of adjuvant FOLFOX chemotherapy followed. In May 2018, a follow-up CT scan revealed a suspiciously enlarged aortocaval lymph node. The staging was completed by colonoscopy and measurement of CEA and CA 19–9, which showed normal findings. A laparotomy with lymph node dissection of the aortocaval region was performed. Histology confirmed lymph node metastasis of the rectal cancer and the tumor was restaged as M1a (LYM). The following chemotherapy with capecitabine had to be discontinued due to neutropenia and polyneuropathy. At follow-up, a complete remission was observed till February 2019. Then, a hydronephrosis grade 2 on the right side caused by a ureteral mass of the middle third was found at CT (Fig. 1a–d). The patient complained of recurrent urinary tract infections. A radioisotope renography revealed a reduced right renal function to 13.6% (normal value $50 \pm 5\%$) with 86.4% of compensatory increase on the left side. A retrograde ureteral stent placement failed, thus antegrade ureteroscopy with biopsy and percutaneous nephrostomy was performed. A biopsy verified ureteral metastasis of the above mentioned rectal cancer. At surgery, induration of the middle third of the right ureter was found and a right nephroureterectomy was performed (Fig. 2a, b). Operative time was prolonged and the resection technically demanding due to massive intra-abdominal adhesions following previous surgery as well as the strong perirenal inflammation caused by the existent nephrostoma. At immunohistochemistry, a double metastasis of the known rectal cancer both to the right ureter and to the right renal pelvis was confirmed by a positive CDX2 expression in the neoplasm, whereas a positive GATA3 expression was found only in the urothelium (Fig. 3a, b). Histology revealed only mucosal infiltration by the tumor without involvement of the periureteral tissue resulting in a tumor-free circumferential resection margin (Fig. 3c). However, the distal resection margin of the ureter remained R1 even after re-resection extending close to the right ureteral orifice. After uneventful recovery from surgery, the patient was referred to the department of urology, where a cystoscopy with transurethral completion resection of the tumor was carried out (10 weeks later after nephroureterectomy). Histological examination confirmed a metastasis of the rectal cancer with R0 resection margins. Postoperatively, the case was discussed at a

multidisciplinary tumor board, which recommended a watch-and-wait strategy. Follow-up examinations were performed 3 and 6 months later with no signs of tumor relapse.

Discussion

Approximately half of the cases of distant metastasis to the ureter originate from primary colorectal or breast cancer followed by prostate and uterine cervical cancer (30–40% of cases). Stomach and lung cancers are responsible for the remaining cases [4, 5]. The first description of a distant ureteral metastasis in the literature was made by Stow in 1909 [6]. Criteria for ureteral metastasis were first developed by MacKenzie and Ratner in 1931 [7] and later modified by Presman and Ehrlich [8] who stated that “demonstration of malignant cells in a portion of the ureteral wall along with the absence of any neoplasm in adjacent tissues” is the most important finding to postulate an ureteral metastasis. Thus, true metastases grow within the ureteral wall and/or within the immediate periureteral tissues without any external infiltration of the ureter per continuitatem.

There are three different types of metastatic involvement of the ureter. Type I is a periureteral adventitial layer involvement or infiltration by metastatic tumor cells and represents the most common of all types. This involvement usually results in compression of the ureteral wall. Type II describes the involvement of a portion of the layers of the ureter or transmural involvement along with presence of tumor cells in the muscular coat, perilymphatic, and/or vascular layers of the ureter. Type III is quite uncommon and is related to the involvement of local mucosa of the ureter with or without muscularis layer and submucosal nodules [9].

To the best of our knowledge, only 25 cases of distant ureteral metastases originating from colorectal cancer have been described so far [10, 11]. Among 7 primary cases of rectal cancer, a mucosal involvement was revealed only twice [4, 10–15].

Thus, we presented here a very rare case of type III double distant metachronous metastasis of a rectal cancer to the right ureter as well as to the right renal pelvis.

Despite of its rarity, distant ureteral metastasis should be kept in mind as a possible cause of a hydronephrotic renal transformation after curative colorectal surgery for cancer. Early diagnosis and multidisciplinary surgical approach may allow curative metastasectomy, improve the quality of life and increase the survival rate of these patients.

Acknowledgements

We acknowledge support in article processing charge by the German Research Foundation (DFG) and the Open Access Publication Funds of the Ruhr University Bochum.

Statement of Ethics

The patient gave her written informed consent to publish the case and the images. In agreement with the German legislation, no separate approval by the local ethics committee is necessary in such cases.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

The article processing charge was funded by the German Research Foundation (DFG) and the Open Access Publication Funds of the Ruhr University Bochum.

Author Contributions

Ilgar Aghalarov: conception, design, analysis and interpretation of data, drafting and revising the article, final approval. Sarah Förster: analysis and interpretation of data, revising the article, and final approval. Andrea Tannapfel: analysis and interpretation of data, revising the article, and final approval. Burkhard Ubrig: analysis and interpretation of data, revising the article, and final approval. Waldemar Uhl: conception, design, analysis and interpretation of data, revising the article, and final approval. Orlin Belyaev: conception, design, analysis and interpretation of data, drafting and revising the article, and final approval.

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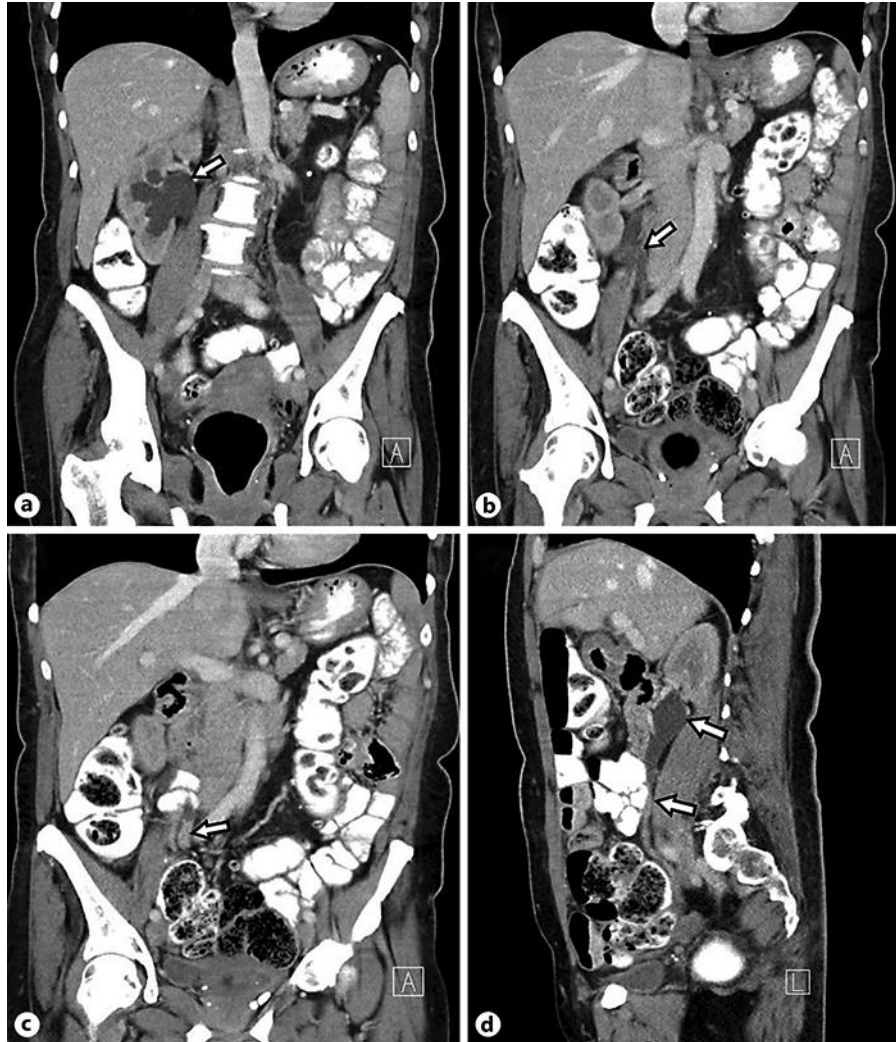


Fig. 1. a–d Abdominal CT scan showing hydronephrosis (arrows) on the right (a, b, d), caused by a mass (arrows) in the middle third of the ureter (c, d).

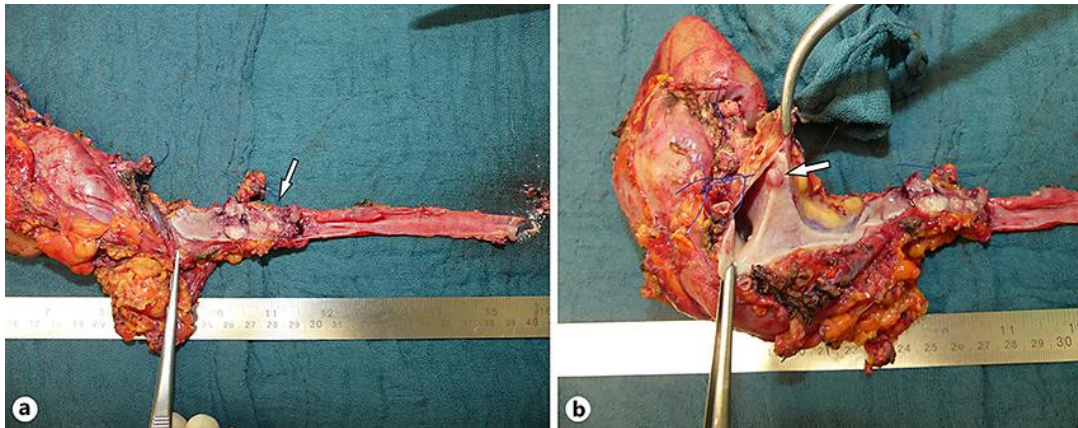


Fig. 2. a, b Specimen after right nephroureterectomy demonstrating a complete malignant ureteral obstruction caused by metastasis (arrow in a) as well as a second smaller metastasis to the right renal pelvis (arrow in b).

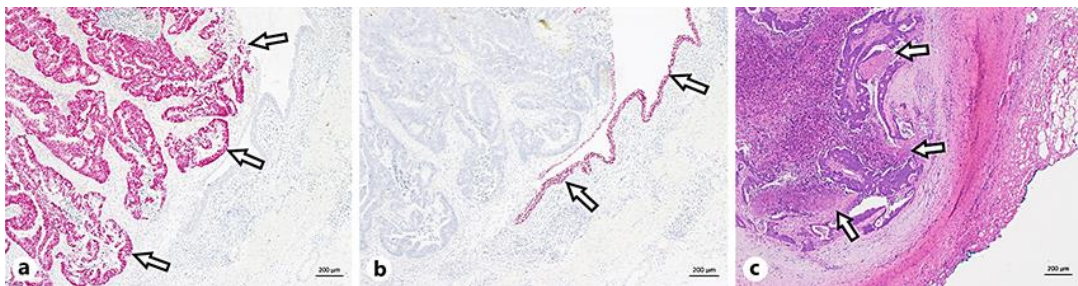


Fig. 3. a–c Immunohistochemistry showing a positive CDX2 expression in the metastasis (a) (arrows) and a positive GATA3 expression only in the urothelium (b, arrows). c No signs of tumor infiltration to the outer layers of the ureter (arrows show margins of the tumor growing intramucosal) can be seen.