Ureteric obstruction: an unusual presentation of metastatic colon carcinoma

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We present the case of a 78-year-old male who presented to clinic for follow-up of a papillary transitional cell carcinoma of the urinary bladder. Notably, the patient also had a history of colorectal resection for an adenocarcinoma. The follow-up appointment revealed left hydronephrosis with evidence of a distal ureteric stricture. Cytology and biopsy from the ureter subsequently disclosed the presence of malignant cells that were originally thought to be of urothelial origin. Upon surgical resection the lesion was found to be an adenocarcinoma, morphologically consistent with a metastasis from the patient's primary colonic adenocarcinoma. This case illustrates a diagnostically challenging situation, with metastatic colonic carcinoma to the ureter occurring in a patient with two previously documented malignancies.

Key Words: colon adenocarcinoma, transitional cell carcinoma, ureter, obstruction, ureteric metastasis

Introduction

Hydronephrosis caused by a tumor compressing the ureter, or direct invasion through the serosa and muscularis propria of the ureter, is not uncommon. However, obstruction arising as a result of a malignancy metastasizing to the ureter – with spread to the ureter via the lymphatics or blood vessels – is quite rare.[1,2] Here we report a case of ureteric obstruction due to metastatic colonic adenocarcinoma to the wall and lumen of the ureter, offering a reminder for the possibility of this infrequent presentation.

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Case report

In November 2003 a 78 year old man was seen in urology clinic for follow-up of a transitional cell carcinoma (TCC) *in situ* of the bladder (pTaNXMX).[3] The TCC was originally diagnosed in May 1999, after the patient presented with hematuria. Cystoscopy at that time revealed a polypoid lesion emanating from the left lateral bladder wall, near the orifice. He was subsequently managed by transurethral resection of the bladder tumor (TURBT), followed by surveillance cystoscopy and urine cytology every 3 months. The patient's past history also included colorectal resection for an invasive adenocarcinoma, diagnosed in October 1999 (pT3N1MX),[3] which was followed by three cycles of raltitrexed; he had declined further chemotherapy citing adverse side effects.

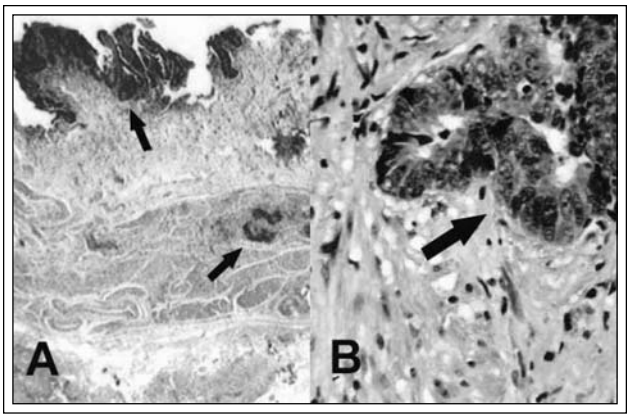

Figure 1. Histopathology of ureteric lesion.
A. Metastatic adenocarcinoma is present within the lumen and wall of the ureter, respectively (arrows, x25).
B. Higher magnification of the adenocarcinoma within the ureter wall highlighting the glandular differentiation (arrow, x250).

At the current follow-up, the patient underwent an ultrasound that revealed moderate left-sided hydronephrosis. A retrograde pyelogram subsequently confirmed the presence of a distal ureteric stricture, thus a stent was placed. Washings collected from this region were sent to cytology where abnormal cells were identified, and interpreted as consistent with TCC. Ureteroscopy subsequently confirmed the presence of an obstructive mass, which was biopsied, and the results suggested the presence of low-grade dysplasia of transitional epithelium. The patient ultimately underwent nephroureterectomy in March 2004.

On surgery there was no evidence to suggest an extension to the ureter from a retroperitoneal or colonic tumor deposit. In the pathology laboratory, gross examination of the resected specimen revealed a ureteral stricture measuring 2 cm in length. The mucosa was granular; however, the length of serosa was unremarkable and lacked an obvious surface deposit. The entire stricture was sectioned and submitted for histologic examination. Microscopy revealed a denuded urothelium and carcinoma within the wall of ureter. Of note, a serosal surface deposit was not identified, thereby suggesting the lesion arose as a result of metastasis, rather than direct spread.

The neoplasm involved not only the muscular layers of the ureter, but extended through the mucosa into the lumen producing the obstruction, Figure 1a. Morphologically the tumor exhibited a distinctive glandular pattern; the tumor cells were polygonal in shape and showed a moderate degree of nuclear pleomorphism and atypia, Figure 1b. Immunohistochemistry demonstrated positivity for low molecular weight keratin (LMWK), cytokeratin 20 (CK20) and carcinoembryonic antigen (CEA); the tumor cells were negative for high molecular weight cytokeratin (HMWK), cytokeratin 7 (CK7) and vimentin. Staining for alpha smooth muscle actin (SMA) confirmed the presence of tumor cells not only involving the smooth muscle layers of the wall of the ureter but also demonstrated involvement of endothelial lined vascular spaces. Consequently, the previous biopsies of the bladder and ureter, cytology preparations, and colorectal resection were re-reviewed. The ureteric lesion producing the obstruction and hydronephrosis was found to have a microscopic appearance analogous to that of the colonic adenocarcinoma.

TABLE 1. **Review of English literature on large bowel metastases to ureter**

Location	Author	Citation
Colon	Cohen, Freed, Hasson†	J Urol 1974;112:188
	Williams, Chaffey	Brit J Urol 1966;38:563
	Kleiman	J Urol 1947;57:120
	Jeck	J Urol 1936;35:206
Rectum	Fazeli-Matin, Levin, Streem	Urology 1997;49:955
	Cohen, Freed, Hasson†	J Urol 1974;112:188
	Brotherus, Westerlund	J Urol Nephrol 1971;5:86
	MacLean, Fowler	J Urol 1956;75:384.
	Fitch, Robinson, Radwin	Arch Surg 1976;111:874
Colo-rectal‡	Richie, Withers, Ehrlich	Surg Gynecol Obstet 1979;148:355
	Presman, Ehrlich	J Urol 1948;59:312.

†The authors describe separate cases including both types of lesions.
‡ Not otherwise specified.

Discussion

Ureteric obstruction due to metastatic colon adenocarcinoma is relatively uncommon. More frequently it is the result of extrinsic compression of the ureters, and/or direct invasion through the ureter wall. The diagnosis of metachronous TCC of the ureter following TCC of the bladder is also relatively rare.[4] A review of the English literature, Table 1, discloses that metastatic adenocarcinoma from the lower gastrointestinal tract to the ureter was reported in nine cases of colonic primary, six cases from rectal primaries and nine cases from non-specified regions of the large bowel. This list likely under-represents the actual incidence; and, in addition to our own contribution, additional cases may be derived from the Japanese literature.[5]

Metastasis to the ureter was defined by MacKenzie and Ratner as necessitating identification of malignant cells within vascular or lymphatic spaces.[6] Presman and Ehrlich regarded this criteria as unnecessarily strict and suggested the diagnosis could be made with: *"The demonstration of malignant cells in a portion of the ureteral wall together with the absence of any neoplasm in adjacent tissues…"*.[2] More recently the description has been further expanded to include three potential patterns of involvement:[1] 1) involvement of the ureteral wall or mucosa by metastasis; 2) periureteral soft tissue infiltration by tumor with compression of the lumen and 3) juxtaureteral metastatic tumor adherent to periureteral soft tissue.

We feel that spread attributable to intraabdominal/pelvic surface deposits would be difficult to distinguish from the latter category, thereby making this distinction difficult. That said, common amongst all of these diagnostic criteria is the supposition that metastatic cells are spread by lymphatics or blood vessels from a primary neoplasm located elsewhere in the body.

This case posed an interesting diagnostic challenge because of the patient's previous history of both bladder TCC and colon adenocarcinoma. Cytology of ureteral washings can be particularly challenging in the presence of obstruction and inflammation. While transureteroscopic biopsy can be a particularly useful diagnostic tool in providing a greater amount of diagnostic material, pathologists remain challenged by both the small quantity of tissue, and "crush artefact" induced by the instrumentation; the latter can distort tissue and even preclude further studies such as immunohistochemistry. Understandably, in patients with a previous adenocarcinoma, awareness of the potential for intraluminal ureteric metastases is warranted, thereby necessitating a broad clinical and pathologic differential. □

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