Ureteropelvic Junction Obstruction Secondary to Metastatic Relapse of Breast Cancer

Paras H. Shah, Alex T. Smith, David A. Leavitt, Oksana Yaskiv, Louis R. Kavoussi

Department of Urology, Arthur Smith Institute for Urology, North Shore Long Island Jewish Health System, 405 Lakeville Road, Suite M41, New Hyde Park, NY 11040, USA

ABSTRACT

We describe the case of a 53-year-old woman with a history of localized breast cancer who presented with flank pain and was found to have new-onset obstruction of the left ureteropelvic junction. Although initially believed to be unrelated to her history of prior malignancy, intraoperative assessment of tissue from the ureteropelvic junction during planned laparoscopic pyeloplasty revealed urothelial infiltration by carcinoma of breast origin.

© 2016 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Hydronephrosis in the absence of ureteral dilation is concerning for obstruction at the level of the ureteropelvic junction (UPJ). Although most commonly encountered in the pediatric and young adult population, its presence in older adults is often underestimated. The differential diagnosis among adults is broad and includes intraluminal blockage from a ureteral stone, stricture, or malignant urothelial polyp, extrinsic compression by a retroperitoneal disease process, such as lymphadenopathy or fibrosis, or impingement by vessels in close proximity to the renal pelvis. In the absence of an identifiable source of obstruction, anatomic compression of the UPJ by a parapelvic cyst is suspected. We present a case where the first sign of systemic relapse in a patient with a history of breast cancer was UPJ obstruction secondary to malignant infiltration of the proximal ureter at the cellular level. Few reports exist describing isolated metastatic involvement of the UPJ, particularly by solid organ tumors in the absence of other visceral sites of disease.

Case presentation

A 53 y/o female presents with episodic bouts of flank pain concerning for renal colic. Her symptoms prompt cross-sectional imaging of the abdomen and pelvis which reveals isolated swelling of the left renal pelvis and tapering at the UPJ, findings concerning for UPJ obstruction (Fig. 1A). Intraluminal blockage of the proximal left ureter is not visualized and the retroperitoneum appears pristine without evidence of lymphadenopathy, mass lesion, or fibrosis. No enhancement of the ureteral wall or periureteral tissue around the left UPJ is identified after administration of intravenous contrast and careful inspection of the vascular architecture in the vicinity of left renal pelvis fails to reveal a crossing vessel (Fig. 1B). Excretory phase images on CT urography demonstrate a delayed nephrogram and failed opacification of the left renal pelvis and ureter, confirming left renal obstruction (Fig. 1C). Compression of the UPJ by a moderate-sized parapelvic cyst is suspected.

The patient has a history of localized breast cancer managed initially with breast conserving surgery and radiation. She experienced local relapse 15 years after her initial diagnosis for which she underwent salvage mastectomy with breast reconstruction and started on chemotherapy to minimize risk for distant recurrence. CT scan performed 2 years before her current presentation does not demonstrate hydronephrosis of the left kidney. Additionally, there is no evidence of systemic disease on previous and current imaging.
In anticipation of definitive intervention, diuretic renography is performed. The left kidney exhibits both delayed uptake and absent excretion of the radiotracer, consistent with impaired relative function (37% in left kidney versus 63% in right kidney) and high-grade obstruction, respectively. After being counseled on treatment options, both endoscopic and surgical, the patient opts for laparoscopic pyeloplasty.

Upon isolating the renal pelvis with the intent to perform a dismembered pyeloplasty, the left UPJ and adjacent proximal ureter is noted to have a nearly circumferential desmoplastic rind (Fig. 2). An obvious difference in the textural quality of the UPJ and more distal ureteral tissues is appreciated, with the former more rigid and gritty in consistency.

Due to these highly uncharacteristic features, tissue from the UPJ is sampled intraoperatively. Frozen section analysis reveals anaplastic cells with considerable nuclear-cytoplasmic derangement concerning for a high-grade malignant process. Ureteral tissue samples taken from the edges of the grossly diseased segment demonstrated normal tissue phenotype and architecture, indicating tissue samples taken from the edges of the grossly diseased segment.

Immunohistochemical stains performed as part of final pathologic assessment reveal the sampled UPJ tissue to be negative for mammoglobin and gross cystic disease fluid protein, however, strongly positive for estrogen receptor (Fig. 3). In the context of this patient’s history of breast cancer, these findings were concerning for metastatic relapse in the urothelium at the level of the UPJ.

Discussion

Metastasis to the genitourinary system is a relatively rare occurrence and when present, most often seen to the bladder or kidneys. Systemic disease is generally well established prior to neoplastic involvement of urinary tract. To date, only a few cases of malignant spread to the upper urothelial collecting system have been described with isolated involvement of the UPJ recognized few-and-far between. Malignant infiltration of the UPJ and resultant UPJ obstruction as the first sign of systemic recurrence has only been observed in the setting of an underlying hematologic malignancy. Liston et al presented a patient in whom the first indication of relapse of his mantle-cell lymphoma was UPJ obstruction. Similarly, Schniederjan and Osunkoya identify diffuse large B-cell lymphoma to be the main form of malignancy which demonstrates a pattern of extranodal invasion involving the ureter. To our knowledge, this report is the first to describe malignant infiltration of the UPJ by a solid organ tumor.

This patient has a history of breast cancer managed initially with breast conserving therapy and radiation. She subsequently experienced local relapse almost 15 years after her initial diagnosis requiring salvage mastectomy. Given concerns over distant relapse, chemotherapy was also initiated; there was no obvious indication of metastatic disease on serial cross-sectional imaging. Breast cancer has a predilection to metastasize to the lungs, liver, bone, and brain. Therefore it is interesting that her first sign of metastatic recurrence was new-onset hydronephrosis associated with UPJ obstruction. Particularly remarkable is that cross-sectional imaging did not reveal urothelial wall enhancement or prominence of perireteral tissue planes at the level of the UPJ despite conspicuous encasement of the UPJ by a desmoplastic reaction as observed intraoperatively. The presence of such features on imaging may have prompted endoscopic investigation first to enable visualization and biopsy of diseased tissue.

Survival benefit in women with breast cancer has been demonstrated after metastatectomy for limited spread to the lungs and liver. In this context, the question arises of whether total excision of grossly diseased tissue in the proximal ureter and renal pelvis should have been undertaken not only for potential oncologic purposes, but also definitive relief of this patient’s obstruction. The true margins of disease, however, would have been difficult to delineate and as such, reconstruction of the UPJ may have
incorporated neoplastic tissue. This would have risked not only recurrence of stricture and obstruction, but also breakdown or fistulization of the anastomosis and the complications inherent to this. Currently, this patient is receiving chemotherapy for treatment of her metastatic breast cancer and regular ureteral stent exchange for management of left UPJ obstruction. Interestingly, there remains no radiographic evidence of systemic disease at 6 months.

**Conclusion**

New-onset UPJ obstruction in adult patients with a history of malignancy should prompt suspicion for metastatic relapse within the urothelial tissue, particularly in the absence of extrinsic compression from retroperitoneal pathology. Contrast-enhanced imaging of the abdominopelvic cavity should be performed as this may demonstrate enhancement of the urothelial wall at the site of malignant infiltration. Endoscopic investigation may be warranted when concern for a neoplastic process exists to help establish a diagnosis and better define avenues of treatment.

**Conflicts of interest**

None.

**References**

1. Grasso III M, Caruso RP, Phillips CK. UPJ obstruction in the adult population: are crossing vessels significant? *Rev Urol.* 2001;3:42–51.
2. Lowe FC, Marshall FF. Ureteropelvic junction obstruction in adults. *Urology.* 1984;23:331–335.
3. Naranji I, Zakri RH, Liston T. Mantle cell lymphoma presenting as a pelvi-ureteric junction obstruction. *J Med Case Rep.* 2013;7:105.
4. Schiederjan SD, Osunkoya AO. Lymphoid neoplasms of the urinary tract and male genital organs: a clinicopathological study of 40 cases. *Mod Pathol.* 2009;22:1057–1065.
5. Du Y, Wang Y, Zhang F, et al. Regulation of metastasis of bladder cancer cells through the WNT signaling pathway. *Tumour Biol.* 2015. Epub ahead of print.