Bilateral Wilms Tumor With Ureteral Extension

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Wilms tumor is the most common renal tumor in children. However, tumor extension into the ureter is exceedingly rare. We present a case of bilateral Wilms tumor with unilateral ureteral extension into the bladder. This case illustrates the importance of thoughtful diagnostic evaluation and surgical planning to obtain a good oncologic outcome while preserving renal function. UROLOGY 102: 219–221, 2017. © 2017 Elsevier Inc.

CASE

A previously healthy 23-month-old female presented to the emergency department with history of an enlarging abdominal "lump" noted by her parents for 2 weeks. Physical examination revealed an abdominal mass extending from the left upper quadrant to the left hemipelvis. Renal and bladder sonography followed by computed tomography of the chest, abdomen, and pelvis revealed a bilobed 14.5 × 9.0 × 9.0 cm mass replacing the left kidney. A distended left ureter containing solid tumor or debris along its course protruded into the bladder lumen (Figs. 1, 2). Additionally, a 4.0 × 3.0 × 3.0 cm mass in the right renal sinus was identified (Fig. 3). There was enlargement of 1 left perirenal lymph node to 1.6 cm and 1 left superior mediastinal lymph node measuring 1 cm. No visceral metastases were seen. The patient had a normal creatinine of 0.2 mg/dL. Urinalysis was positive for 10 red blood cells.

Three days after presentation, she underwent port placement for presumptive diagnosis of multifocal Wilms tumor (WT). Cystoscopy was performed, and an intravesical tumor emanating from the left ureteral orifice was visualized and biopsied. Retrograde pyelography was not possible on the left. A right retrograde pyelogram revealed a filling defect in the renal pelvis, consistent with tumor extension into the collecting system. Biopsy specimens were nondiagnostic, consistent with necrotic tissue.

She underwent neoadjuvant chemotherapy with vincristine, dactinomycin, and doxorubicin for 6 weeks, modeled after the COG-AREN0534 protocol. Restaging computed tomography following chemotherapy showed minimal decrease in the size of the renal masses with persistent extension into the left ureter. Lymph nodes remained stable in size. As bilateral partial nephrectomies were not feasible and a less than partial response to chemotherapy was seen, bilateral open renal biopsies were performed to assess tumor histology. Final pathology was consistent with favorable histology, stromal-predominant WT. She underwent an additional 6 weeks of chemotherapy. Repeat staging was consistent with a poor chemotherapeutic response and slight increase in the size of her renal masses but decreased involvement of the left ureter.

She returned to the operating room 3 months after her initial presentation. A peritoneal dialysis catheter was placed prophylactically. Cystoscopy revealed no residual intravesical tumor. Retrograde pyelography did reveal a persistent filling defect in the proximal left ureter. A transperitoneal approach to tumor resection was taken with a generous vertical midline incision. The right kidney was assessed (with the assistance of our Transplant Surgery colleagues) for ex vivo partial nephrectomy. This was deemed impossible due to small vasculature. An in vivo partial nephrectomy on the right was ultimately possible with the use of intraoperative sonography. The entire kidney and its vasculature were placed into a sterile plastic bag to separate it from the remainder of the peritoneum in the case of tumor spillage. There was tumor extension into the collecting system noted after the kidney was bivalved. After all gross tumor was resected, defects in the collecting system were closed with absorbable suture in a watertight fashion. No hilar clamping was performed. Hemostasis was achieved with manual renal compression. Frozen margins were negative for malignancy. Approximately two-thirds to three-fourths of the right renal parenchyma was preserved. Attention was then turned to left nephroureterectomy. Before extensive manipulation of the left renal tumor, the renal vessels were meticulously ligated to prevent hematogeneous spread. After the kidney, tumor, and ureter were mobilized, a vertical cystotomy was made to allow complete ureteral mobilization and excision of the distal ureter and bladder cuff. There was no tumor spillage. Bilateral regional lymphadenectomy was performed. Final pathology was consistent with favorable histology triphasic WT with

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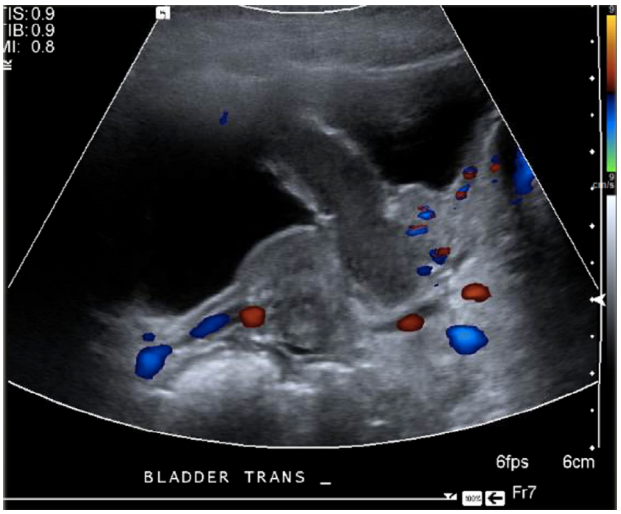

Figure 1. Bladder sonogram at presentation revealing a 1.0 cm diameter mass extending into the bladder at the level of the left trigone. (Color version available online.)

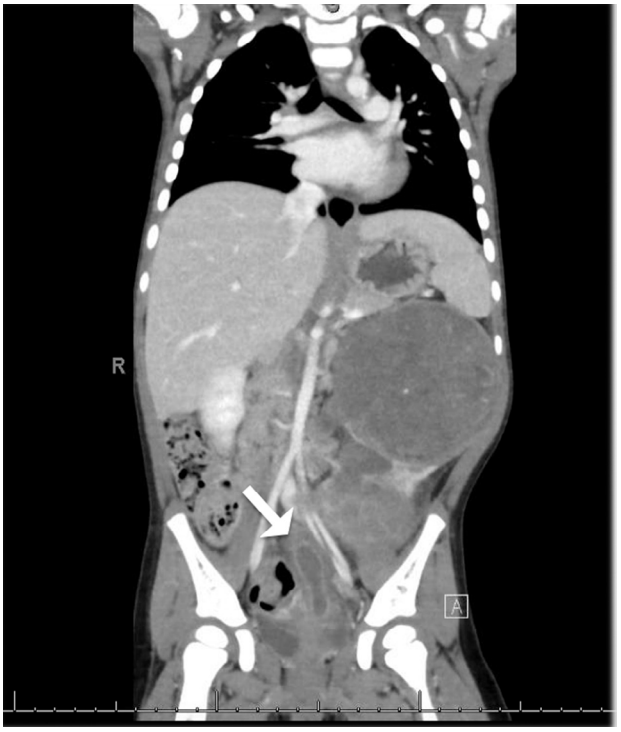

Figure 2. Computed tomography of the chest, abdomen, and pelvis at presentation showing a bilobed mass replacing the left kidney. The arrow denotes the distended and thickened left ureter with mass or debris extending into the bladder lumen.

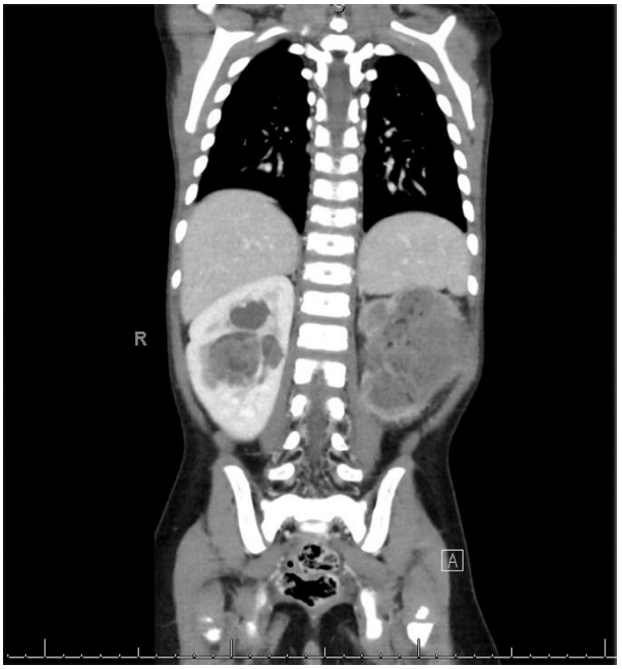

Figure 3. Computed tomography of the chest, abdomen, and pelvis at presentation showing a centrally located mixed attenuation mass in the right kidney in addition to the left renal mass.

negative margins. All 14 lymph nodes resected were negative for malignancy.

She continued her chemotherapy regimen to complete 25 weeks in total. Because of the extent of her disease, lack of response to chemotherapy, and extension into the lower urinary tract requiring cystotomy and excision of a bladder cuff, the decision was made to perform adjuvant whole abdomen external beam radiation. She received 10.50 Gy of radiation, completed 6 weeks postoperatively. Her dialysis catheter was eventually removed, unused. Her creatinine remained stable at 0.3 mg/dL.

Imaging at 5, 8, 12, and 17 months postoperatively showed no evidence of residual or recurrent disease. She has developed iron-deficiency anemia but is otherwise in good health, and her renal function remains stable.

DISCUSSION

Prior to 2008, there were only 16 reported cases in the literature of WT with tumor extension into the ureter. Three tumor-related deaths occurred in these cases, but 2 were treated prior to the era of multimodal treatment for WT.[1-3] One death occurred in a child with metastatic disease. Some reports have hypothesized ureteral extension in WT to increase the risk of resistance to therapy.[3-5]

In 2008, Ritchey et al reviewed the National Wilms' Tumor Study Group (NWTSG) database to define the presentation and associated outcomes of this cohort of patients.[6] Of all children enrolled in NWTS-3, 4, and 5 from 1979 to 2003, 45 children were identified as having tumor extension into the ureter. The incidence of ureteral extension in NWTS-5 was 2%. Unique symptoms at presentation included gross hematuria, passage of tissue per urethra, flank pain, and urethral mass. No patients had bilateral (Stage V) disease. Favorable histology was found in 84% of patients. There were 4 deaths, 3 of which were associated with

unfavorable histologic findings and 1 with treatment toxicity. It was the conclusion of the authors that the tumor histology likely had a greater impact on survival than the presence of ureteral extension. Because of the small number of patients, the impact of ureteral tumor spillage or a positive ureteral margin on survival could not be assessed.

Despite an uncertain impact on survival, it is imperative to be aware of not only the presence of ureteral involvement but also the level of involvement. Complete en bloc resection of tumor prevents tumor spillage, upstaging, and potentially local recurrence. The Children's Oncology Group defines any tumor spill as Stage III disease, whereas if disease with ureteral extension is removed intact, it is considered Stage II. Heightened suspicion for ureteral involvement is warranted in patients with gross hematuria, hydronephrosis, or a nonfunctioning renal unit. Cystoscopy and retrograde pyelography can be helpful in diagnosing patients in whom ureteral extension is suspected. However, cystoscopy is not routinely recommended for all WT patients, and there is no evidence to show benefit for cystoscopic surveillance following resection of WT with ureteral extension.

Although it is unclear how her disease biology relates to her ureteral extension, our patient was distinctive in that she also exhibited chemo-refractory bilateral disease. Because of this lack of response, we performed bilateral open renal biopsies. Factors known to contribute to poor patient outcomes in bilateral WT are understaging and undertreatment, delay of local disease control, and increased incidence of anaplasia.[7] Based on the results of NWTS 4, it is recommended that patients with poor initial response to chemotherapy should undergo biopsy before undergoing additional chemotherapy. Biopsy serves to rule out rhabdomyomatous differentiation, complete necrosis, or stromal differentiation, despite the risk of tumor seeding.

Our case presented a unique challenge in a patient with not only ureteral extension but also Stage V disease. However, with careful preoperative evaluation, surgical planning, and adherence to oncologic principles, this patient has preserved renal function and remains free of recurrent disease.

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