Pediatric Case Report

Recurrent Metanephric Stromal Tumor in an Infant

Maria Debora De Pasquale, Francesca Diomedi-Camassei, Annalisa Serra, Renata Boldrini, Alessandro Inserra, Paolo Caione, and Alessandro Jenkner

A 9-month-old boy underwent nephrectomy for a renal mass. Congenital mesoblastic nephroma was diagnosed, and the patient received postoperative chemotherapy. Tumor recurred 6 months later as a scrotal mass. After orchiectomy, diagnosis of metanephric stromal tumor (MST) was made; review of the nephrectomy specimens confirmed this diagnosis. No additional treatment was given, and the child is alive and well 31 months later. Taking into account the histopathological entity of MST in the differential diagnosis of stromal renal tumors in childhood can spare the patient further, potentially toxic, treatment even in the case of relapse, as reported here for the first time. UROLOGY xx: xxx, xxxx. © 2011 Elsevier Inc.

Nephroblastoma, the most common pediatric renal neoplasm, is composed of blastemal, stromal, and epithelial components. Stromal tumors, comprising less than 20% of primary renal neoplasms,[1] include congenital mesoblastic nephroma (CMN), clear cell sarcoma of kidney (CCSK), and rhabdoid tumor of kidney (TRK).

Metanephric stromal tumor (MST) is a recently described, renal-specific, pure stromal, benign pediatric neoplasm.[1-3] It is considered part of the metanephric tumor family, which also includes a purely epithelial form, metanephric adenoma (MA), and a biphasic form, metanephric adenofibroma (MAF).[4,5]

MST is the pure stromal variant of MAF and shares some microscopic features with CMN and CCSK.[5]

In the largest published series,[1] the median age of patients with MST was 13 months (range 1 day to 11 years); the most common presentation was that of an abdominal mass. No clustering with known syndromic associations was found, and no familial cases were reported; tumors were multifocal in 16% of cases, and no nephrogenic rests or other developmental abnormalities were noted in the uninvolved kidney. Immunoreactivity for CD34 molecule (a human hematopoietic progenitor cell antigen not found in CCSK or CMN) was helpful in the differential diagnosis; botryoid extension into the renal pelvis[1] and even into the bladder and the prostatic urethra have been observed.[6]

From the Departments of Hematology-Oncology, Pathology, Surgery, and Urology, Istituto di Ricovero e Cura a Carattere Scientifico, Bambino Gesù Children's Hospital, Rome, Italy

Reprint requests: Maria Debora De Pasquale, M.D., Ph.D., Department of Hematology-Oncology, Istituto di Ricovero e Cura a Carattere Scientifico, Bambino Gesù Children's Hospital, Piazza S. Onofrio, 400165 Rome, Italy. E-mail: mdebora.depasquale@opbg.net

Submitted: February 28, 2011, accepted (with revisions): April 12, 2011

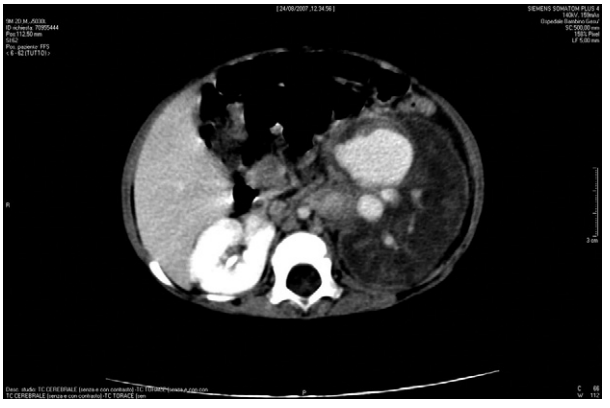

Figure 1. Primary left renal mass.

Most patients have been treated with surgical excision alone, without additional therapy, and none have experienced either local or metastasic recurrence.[1]

Recognition of this entity can spare a child the potentially toxic adjuvant chemotherapy required by its malignant counterparts, particularly CCSK. We report a case of MST recurring as a gonadal mass 6 months after nephrectomy and adjuvant chemotherapy.

CASE REPORT

A 9-month-old boy was referred to the pediatric emergency room with a 2-week history of low-grade fever, loss of appetite, and abdominal pain. Physical examination was unremarkable, but abdominal sonography demonstrated a large both solid and cystic left renal mass. Subsequent computed tomography (CT) confirmed a 10 × 7.6 × 6.7-cm mass arising from the left kidney (Fig. 1). No distant metastases were found. A CT-guided needle biopsy was performed, and histology revealed a fascicular, spindle-cell proliferation with no atypical nuclei, consistent with a diagnosis of mesoblastic nephroma (CMN).

0090-4295/xx/$36.00
doi:10.1016/j.urology.2011.04.029

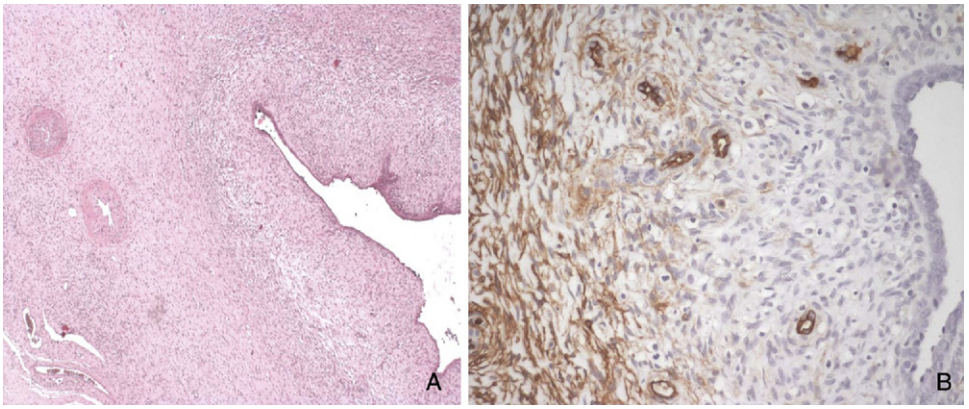

Figure 2. Paratesticular recurrence. **(A)** Spindle cell proliferation infiltrating the epididymis (hematoxylin and eosin, ×4). **(B)** CD34 immunostain positivity of neoplastic cells (DAB chromogen, ×20).

Increased blood pressure was observed, and the child was started on amlopidin. Left radical nephroureterectomy was performed, and an inferior polar, firm mass measuring 10 × 7 × 6 cm was removed. The neoplasm focally infiltrated the renal sinus and the perirenal fat tissue. On histologic examination, the tumor was composed primarily of spindle cells, with low proliferation index, diffusely infiltrating the perirenal fat. These features confirmed the initial diagnosis of classic CMN, a low-risk neoplasm according to the International Society of Pediatric Oncology (SIOP) classification. Although lymph nodes were negative, surgicopathological staging was Stage III because of tumor extension beyond the renal capsule into peri-renal fat and up to the resection margins. A centralized SIOP pathology panel review confirmed the diagnosis of CMN. The patient then received 4 weeks of postoperative chemotherapy (vincristine 1.5 mg/m^2 i.v. weekly for 4 weeks, plus dactinomycin 45 μg/kg i.v. the second week) and then had careful follow-up. Six months after completing treatment, a left paratesticular mass was detected, and left orchiectomy was performed. On gross examination, the testis measured 4 × 2 × 1.5 cm and harbored a solid mass, measuring 2.5 × 1.5 cm, which infiltrated the epididymis; 2 additional small nodules (a few millimeters in diameter) were detected along the spermatic cord. Histologically, a spindle-cell neoplasm with focal myxoid stromal features was found; muscular hypertrophy and intimal myxoid change of arteries were characteristic findings, and tumoral proliferation infiltrated the epididymal structures and the spermatic cord. Immunostaining for CD34 and vimentin was positive, and actin, CD99, cKit, and S-100 protein were negative (Figs. 2A, 2B). A diagnosis of MST was made. Review of the original nephrectomy slides disclosed alternating areas of myxoid or sclerotic hypocellularity and fibroblastic hypercellularity, concentric cuffing of spindled stromal cells around renal tubules and blood vessels, prominent angiodysplasia of intratumoral arterioles, and prominent juxtaglomerular cell hyperplasia; a CD34 immunostain was performed and results were positive (Fig. 3). All findings were consistent with MST. Review by the SIOP pathology panel confirmed the revised diagnosis. No additional treatment was given and, at present, the patient is well, without evidence of disease, 31 months from his second surgical procedure.

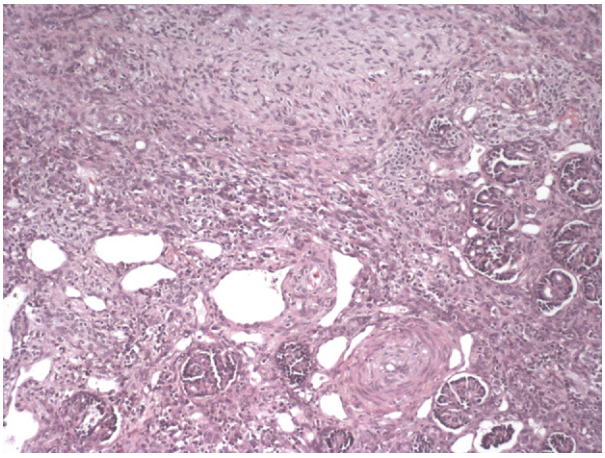

Figure 3. Renal metanephric stromal tumor (MST): neoplastic scalloped margins (top). Juxtaglomerular apparatus hyperplasia and angiodysplasia (bottom) of infiltrated renal parenchyma (hematoxylin and eosin, ×10).

COMMENT

MST is a pure stromal renal tumor of childhood, with an excellent prognosis. Most cases of MST were previously categorized as CMN until this neoplasm was recognized in a retrospective review of the National Wilms Tumor Study Pathology Center files as a new, rare, and benign entity.[1] A total of 31 cases were identified; all but 1 were treated by nephrectomy, the last case being treated by partial nephrectomy. One patient received preoperative radiotherapy. Of 31 cases, 24 received no additional treatment after nephrectomy, and neither local nor distant recurrences were subsequently reported. Three patients, diagnosed with CCSK, received postoperative chemotherapy with dactinomycin, vincristine, doxorubicin, and radiotherapy. Two other patients received postoperative dactinomycin ad vincristine.

Three other cases of MST have been reported in the literature, that of a 15-year-old boy and a 1-month old girl, both treated with radical nephrectomy only,[2,3] and a 2-year-old boy with continuous extension of the tumor through the ureter into the bladder and the proximal urethra, requiring cystotomy to completely remove the lesion.[6]

To the best of our knowledge, this patient is the first case of MST recurring at a distant site after nephrectomy. Initially diagnosed as CMN, he had been treated with 4 weeks of adjuvant chemotherapy after primary nephrectomy, because of microscopically incomplete resection. At the time of relapse, a pathology review of the initial histology resulted in the final diagnosis of MST.

Our interpretation of the recurrence was that the renal tumor could have contaminated a persistent processus vaginalis either at the time of surgery or earlier (spontaneous tumor rupture or shedding); a second possibility may be that of a dysembriogenetic process within ectopic nephrogenic tissue (metachronously occurring in the scrotum). The prolonged event-free survival of our patient without further treatment gives credence to this hypothesis and emphasizes the importance of taking this benign entity into account in the differential diagnosis of stromal renal tumors in childhood.

References

1. Argani P, Beckwith JB. Metanephric stromal tumor. *Am J Surg Pathol.* 2000;24:917-926.
2. Palese MA, Ferrer F, Perlman J, et al. Metanephic stromal tumor: a rare benign pediatric renal mass. *Urology.* 2001;58:462xv-462xvii.
3. Rajalakshmi V, Chandran P, Selvambigai JG. Metanephric stromal tumor: a novel pediatric renal neoplasm. *Indian J Pathol Microbiol.* 2009;52:389-391.
4. Muir TE, Cheville JC, Lager DJ. Metanephric adenoma, nephrogenic rests, and Wilms' tumor. *Am J Surg Pathol.* 2001;25:1290-1296.
5. Arroyo MR, Green DM, Perlman EJ, Beckwith JB, Argani P. The spectrum of metanephric adenofibroma and related lesions. *Am J Surg Pathol.* 2001;25:433-444.
6. Lorenzo AJ, Timmons C, Weinberg A, Megison SM, Snodgrass WT. Metanephric stromal tumor with urothelial extension. *J Urol.* 2003; 169:1095-1097.