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Epithelioid Angiomyolipoma in a Pediatric Patient: Case Report and Review of Literature☆

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ABSTRACT

We report a case of a 17-year-old girl with tuberous sclerosis complex who underwent partial nephrectomy for a newly discovered 7.5-cm renal mass subsequently determined to be an epithelioid angiomyolipoma, a rare variant of angiomyolipoma that can be confused clinically, radiographically, and pathologically for renal cell carcinoma. Proper diagnosis and treatment are critical, especially in the pediatric patient. This case report and review of literature serve at increasing the awareness of this renal tumor, with its somewhat unpredictable outcome, reviewing the pertinent literature on the topic of epithelioid angiomyolipoma in the clinical setting of tuberous sclerosis complex.

Introduction

The renal manifestations of tuberous sclerosis complex include tubular cysts, angiomyolipoma, and renal cell carcinoma; these 3 lesions are seen in aggregate in 20% of affected individuals and their frequency is 25%-50%, 60%-80%, and 3%-5%, respectively.[1,2] All are potentially lethal in their own unique fashion. For instance, renal cystic disease is a cause of chronic renal failure; the latter complication may be seen as well with progressive replacement of the kidneys by angiomyolipomas (AMLs). However, the epithelioid angiomyolipoma (EAML), one of the pathologic subtypes and the subject of this report, may pursue a malignant course, even in affected children and adolescents.[3] It is important for the urologist to appreciate the malignant potential of the EAML in contrast to the generally indolent behavior of the more common classic triphasic AML.

Case presentation

A 17-year-old girl with tuberous sclerosis complex (TSC) who was referred for evaluation of a left renal mass, had a history of severe developmental delay and bilateral AMLs that had been serially monitored, but never required treatment. Recent imaging revealed multiple bilateral AMLs, all of which were less than 1 cm, but a newly recognized 5 cm exophytic enhancing solid mass was identified and it was fat poor (Fig. 1). After discussions with her parents regarding the treatment options, the decision was made to perform a left robotic-assisted laparoscopic partial nephrectomy. Her recovery was uncomplicated.

A 7.5 × 6.5 × 3.5 cm yellowish-tan solid mass occupied a substantial portion of the resected kidney (Fig. 2). The mass was sharply demarcated from the surrounding renal parenchyma. The tumor was composed predominantly of polygonal epithelioid cells with abundant eosinophilic cytoplasm, mild nuclear atypia, and absence of mitotic activity (Fig. 3A). The adjacent kidney contained scattered tubular cysts and microfoci of classic AML. Immunohistochemical staining revealed positivity for vimentin (Fig. 3B), limited positivity for smooth muscle actin (Fig. 3C), and more diffuse positivity for MART-1/Melan-A (Fig. 3D). The surgical margins were free of tumor involvement.

Discussion

EAML is the least common subtype of AML. This tumor is generally regarded as one tumor type in a family of neoplasms known as perivascular epithelioid cell tumors or “PEComas.” In addition to the classic triphasic AML with a mixture of smooth muscle, fat and blood vessels, the family of PEComas also includes the myomelanocytic tumor of the falciform ligament, so-called clear cell tumor of the lung, lymphangiomyomatosis, and EAML of

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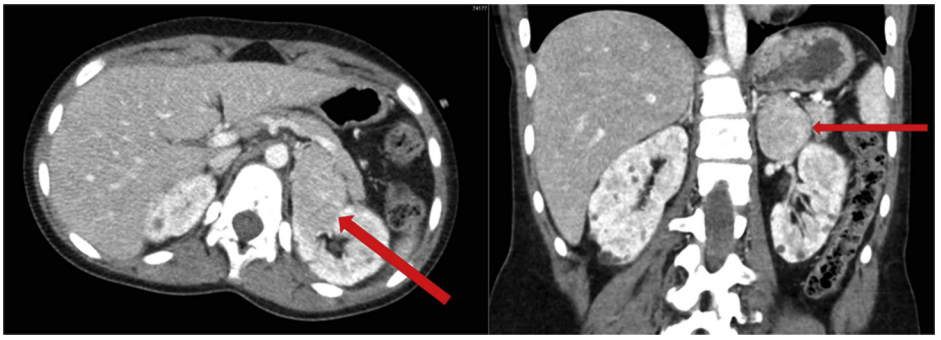

Figure 1. Computed tomography scan showing epithelioid angiomyolipoma. Note bilateral angiomyolipoma with visible macroscopic fat. Arrows indicate the EAML in axial and coronal views.

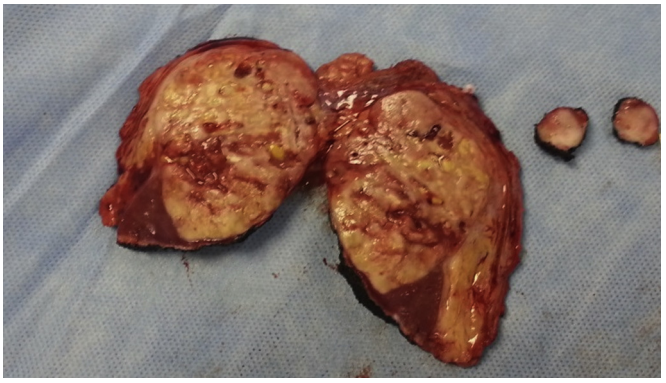

Figure 2. Gross appearance of renal epithelioid angiomyolipoma.

the liver. The corroboration of the diagnosis of EAML generally relies upon the immunohistochemical expression of a melanocyte marker—MART-1/Melan-A, Human Melanoma Black-45, or both.[4] Smooth muscle actin expression is variable from one case to another; there was only minimal and quite localized staining in our case.

Classic AMLs of the kidney are initially recognized at or before the age of 10 years in approximately 10%-15% of TSC cases. Individuals with TSC have multifocal AMLs measuring 4 cm or less in most cases detected in the first decade of life.[2] As in our patient at 17 years of age, AMLs are known to increase in size during the adolescent years and beyond to exceed 4 cm in greatest dimension in some cases. In addition to a size of >4 cm, another worrisome feature of the EAML is the minimal fat content or none at all so that concern about renal cell carcinoma is warranted.

Recent studies of EAML, one advocating for the preferred designation of “pure” epithelioid PEComa of the kidney, have

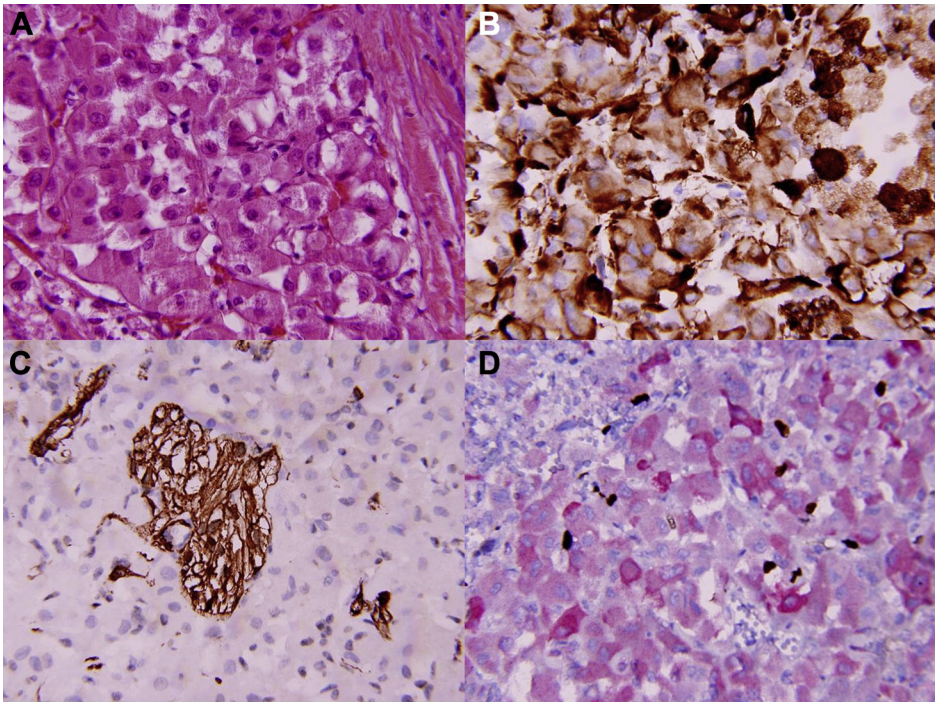

Figure 3. **(A)** Epithelioid angiomyolipoma composed of uniform polygonal or epithelioid cells with abundant eosinophilic cytoplasm. The nuclei have a prominent nucleolus but otherwise minimal atypia. **(B)** Vimentin immunostaining shows variably intense cytoplasmic positivity. **(C)** The epithelioid cells show minimal cytoplasmic staining for smooth muscle actin, whereas an isolated island of smooth muscle is intensely positive. **(D)** Melan-A/Ki-67 shows diffuse positivity of the cytoplasm for the melanocytic marker, melan-A and 5% of nuclei stain positively for the proliferation in antigen, Ki-67.

shown that these neoplasms have a malignant potential with metastatic spread to regional lymph nodes, mesentery, liver, and lungs in 5%-10% of cases.[5] It is estimated that 25%-30% of all EAMLs present in the clinical setting of TSC.[3] The presence of multifocal microscopic AMLs and tubular cysts in the kidney with an EAML should raise the distinct likelihood of TSC in a patient without an established diagnosis of TSC.

A distinction is made pathologically between the "pure" EAML and those EAMLs with an admixture of classic triphase AML.[3] The latter "mixed" AML behaves in a nonaggressive fashion like the triphasic AML. A comprehensive clinicopathologic study of EAMLs by Nese et al[5] concluded that those neoplasms which were >7 cm in greatest dimension had extrarenal extension and/or renal vein invasion; a nested or gland-like pattern with carcinoma-like features correlated with malignant behavior; nuclear pleomorphism, mitotic activity, atypical mitotic figures, and necrosis were present more frequently in those EAMLs with carcinoma-like features than those tumors with a diffuse pattern of epithelioid and plump spindle cells. The EAML in our patient did not extend beyond the kidney and had a diffuse growth pattern of epithelioid cells. Minimal nuclear atypia and minimal mitotic and proliferative activity were additional favorable findings in our case.

Radiographically, EAML can have a wide range of findings. Although classic AML can often be diagnosed by the presence of macroscopic fat on computed tomography, EAML can have a large vascular and low adipocytic component, as well as areas of necrosis. These lesions often have an exophytic growth and are indistinguishable from renal cell carcinoma on computed tomography scan.

The management of EAML is surgical resection given its malignant potential, which can only be ascertained by a thorough pathologic examination. There is no clearly identified role for neoadjuvant, adjuvant, or primary chemotherapy or targeted therapies. Nephron-sparing surgery should be attempted as these patients are at increased risk for both benign and malignant pathologies, which may require procedures that exacerbate renal function. Because the natural course of this rare neoplasm is not predictable, these patients should undergo surveillance for recurrence or development of new lesions. Of the 33 patients with follow-up data reported by Nese et al,[5] 5 patients recurred with a mean time to recurrence of 32 months (range, 8-72 months). There are no guidelines on the imaging modality or frequency for surveillance.

Conclusion

EAML is a rare variant of AML that can mimic renal cell carcinoma in its radiographic appearance. Histologically, EAML can be diagnosed by Human Melanoma Black-45 staining and the presence of dysmorphic vasculature, epithelioid smooth muscle, and adipocytic tissue. Treatment is often surgical excision as current literature suggests the potential for malignancy.

References

1. Dixon BP, Hulbert JC, Bissler JJ. Tuberous sclerosis complex renal disease. *Nephron Exp Nephrol*. 2011;118:e15–e20.
2. Wataya-Kaneda M, Tanaka M, Hamasaki T, Katayama I. Trends in the prevalence of tuberous sclerosis complex manifestations: an epidemiological study of 166 Japanese patients. *PLos One*. 2012;8:e63910.
3. Aydin H, Magi-Galluzzi C, Lane BR, et al. Renal angiomyolipoma: clinicopathologic study of 194 cases with emphasis on the epithelioid histology and tuberous sclerosis association. *Am J Surg Pathol*. 2009;33:289–297.
4. Mete O, van der Kwast TH. Epithelioid angiomyolipoma: a morphologically distinct variant that mimics a variety of intra-abdominal neoplasms. *Arch Pathol Lab Med*. 2011;135:665–670.
5. Nese N, Martignoni G, Fletcher CD, et al. Pure epithelioid PEComas (so-called epithelioid angiomylipoma) of the kidney: a clinicopathologic study of 41 cases: Detailed assessment of morphology and risk stratification. *Am J Surg Pathol*. 2011;35:161–176.