

Epithelioid Sarcoma in a Young Child: A Case Report and Literature Review

Joseph Hany Talbet, BA*
 Jennifer L. McGrath, MD*
 Monica Manrique, MD*
 Esperanza Mantilla-Rivas, MD*
 Holly J. Meany, MD†
 Albert K. Oh, MD*
 Gary F. Rogers, MD, JD, LLM,
 MBA, MPH*

Summary: Epithelioid sarcoma is a rare, high-grade malignant soft tissue tumor that is often misdiagnosed. Classified as a mesenchymal malignancy, it exhibits both mesenchymal and epithelial markers. Occurrence in children under age 10 is extremely rare. This report describes the clinical course and management of a 5-year-old girl who presented with epithelioid sarcoma in the distal extremity. The lesion was initially misdiagnosed and treated for over a year as a common wart. (*Plast Reconstr Surg Glob Open* 2021;9:e3377; doi: [10.1097/GOX.0000000000003377](https://doi.org/10.1097/GOX.0000000000003377); Published online 1 February 2021.)

Epithelioid sarcoma (ES) is a rare soft tissue tumor comprising around 1% of all soft-tissue sarcomas.¹ Unlike many other forms of sarcoma, it typically does not develop from malignant transformation or dedifferentiation of benign soft tissue tumors. The tumor often presents as a solitary painless firm lump in or under the skin, and can be confused with a number of benign skin lesions, including a wart.^{2,3} Histologically, ES is characterized by a nodular arrangement and epithelioid appearance of cells, and is associated with early necrosis.^{1,2} Distal parts of extremities are most commonly involved, particularly the hand, yet it can arise in any part of the body, including the penis, vulva, and perineum.²

Although ES conventionally involves distal extremities in young adults, proximal involvement has been reported in older patients and is associated with poorer prognosis. These 2 types of presentation are considered to be a continuum of the same disorder rather than separate entities because they have a similar immunophenotypic profile consisting of epithelial membrane antigen, cytokeratin, and vimentin.^{1,2,4} Mavrogenis and colleagues described a higher prevalence in Caucasians and a median age at incidence of 27 years, with only 2% of cases occurring in children younger than 10 years.⁵

We present the clinical history and management of a 5-year old girl who presented with a progressive growth of a lesion at the tip of her left index finger that had been

treated as a wart for over a year by her dermatologist. Although exceedingly rare, this entity should be considered in the differential diagnosis of progressively growing hand lesions in children.

CASE REPORT

A 5-year-old, otherwise healthy African-American girl presented to the plastic surgery clinic with 1-year history of a slow growing mass on the tip of her left index finger. This mass had been diagnosed and treated by her dermatologist as a wart, and she had undergone numerous unsuccessful treatments with topical salicylic acid and liquid nitrogen. After showing a lack of response to these treatments, she was referred to plastic surgery for evaluation. At the time of consultation, there was a 7-mm firm, cystic lesion at the distal tip of her index finger (Fig. 1). The patient had no discomfort related to this mass, and the surrounding skin and finger appeared unaffected. The lesion was presumed to be an epidermal inclusion cyst and was treated with a marginal excision and simple closure. Histology confirmed a diagnosis of epithelioid sarcoma based on the presence of a multinodular pleomorphic proliferation of epithelioid cells with abundant eosinophilic cytoplasm and an intermediate number of mitoses. Immunohistochemical staining showed nuclear loss of INI1 and positivity for pan-cytokeratin, vimentin, and EMA. Desmin, SMA, and S100 were negative.

After a review at our institutional tumor board, the patient was examined by hematology/oncology and there was no clinical evidence of epitrochlear or axillary adenopathy. Extensive imaging was performed, including a whole-body PET CT scan, and CT scans of the chest and upper extremity. There was also no evidence of regional or metastatic disease. This tumor was staged as 1a (AJCC) based on the small size (≤ 5 cm) and superficial location of the mass, lack of any distant spread by clinical examination, and multiple imaging modalities. Based on the tumor stage, the child's age, and current literature suggesting that

From the *Division of Plastic and Reconstructive Surgery, Children's National Hospital, Washington, D.C.; and †Center for Cancer and Blood Disorders, Children's National Hospital, Washington, D.C.

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Fig. 1. A 5-mm cystic lesion located on distal tip of left index finger.

complete surgical excision is comparable to more radical treatments, our oncology service recommended re-excision of the residual scar and tumor bed to achieve a tumor-free margin and sparing the digit, if possible. The surgical resection included the distal third of the finger pad and nail bed, and most of the distal phalangeal tuft. The defect was primarily closed. Pathology showed a very small microscopic focus of tumor at the center of the biopsy specimen but the surrounding margins, including the underlying bone, were tumor free. No adjuvant chemotherapy or radiation was recommended. Her distal tip resection healed uneventfully (Fig. 2) and she has undergone scheduled surveillance for recurrent or metastatic disease, including interval physical examinations and chest and extremity CT scans. The patient has been disease free for over 12 months since her surgery. She will continue to undergo interval clinical and radiographic monitoring for at least 5-years post-resection, including every 3 months for the first year, every 4 months during the second year, and then every 6 months thereafter for the remaining time. Additionally, the patient will undergo left upper extremity CT scan every 3 months with chest CT scan alternating with x-ray imaging.

DISCUSSION

ES is a rare, soft tissue type of tumor with high propensity to occur in the distal upper extremities in young

adults. It is more commonly diagnosed in males (age: 10-35 years) and, like the vast majority of non-rhabdomyosarcoma soft tissue sarcomas, is more common in adult patients.^{2,3} Macroscopically, the lesion is a yellowish-brown, slowly-growing, painless, nodular arrangement with epithelioid appearance on distal extremities that can grow up to 20 cm. ES tends to invade surrounding tissue and metastasize to draining lymph nodes initially. However, distant metastasis subsequently occurs through lymphatics or bloodstream to the lungs.⁶ The distal-location type is often seen in younger male patients and is characterized by tumor nodules with central hyalinization and necrosis surrounded by polygonal and spindle cells in the periphery. This is in contrast to the proximal-location type found in older individuals, which is characterized by large epithelioid carcinoma-like cells, marked nuclear atypical and rhabdoid features, and absence of the granulomatous-like pattern growth of large polygonal cells with a focal rhabdoid morphology.^{1,2,4} On the molecular level, ES is associated with deletions and cytogenic translocations between short arms of chromosomes 12 and 22 $t(12;22)(q13;q12)$ that are associated with the chimeric fusion *EWSR1/ATF1* gene transcript and promotes growth of the tumor.⁶

Diagnosis of ES can be challenging and it is often confused with other entities such as malignant melanoma and perivascular epithelioid cell neoplasms, among others.⁵ ES is often misdiagnosed and excised as benign lesions without proper wide margins, which may adversely affect treatment protocol and outcomes.⁷ Prognosis of this disease can vary depending on factors such as tumor stage, depth of the tumor in relation to the deep fascia, local recurrence, and regional nodal metastases.² Although tumor size is not a good indicator for overall survival, small tumors (as in our patient) are less likely to metastasize.⁴

Historically, all STS were managed with wide surgical margins (>3 cm) with or without chemotherapy and radiation to reduce local recurrence in lesions where disease-free margins are difficult to obtain.^{4,7} Nevertheless, this aggressive approach has been refuted and current recommendations for grade 1 soft tissue sarcoma (STS) is surgery alone with a disease-free margin. Harati et al evaluated the relationship between size of surgical margin and prognosis in 643 patients with STS.⁸ These authors found that achieving a tumor-free microscopic margin was most predictive of a favorable outcome. In a series of 160 STS of the upper extremity, Lenhardt and coworkers found that prognosis depended only on whether the tumor was primary or recurrent, tumor size and grade, and achieving a tumor-free resection.⁹ Additionally, postoperative hematoma should be avoided to prevent residual tumor cell displacement and local recurrence.¹⁰ Sentinel lymph node biopsy and subsequent regional lymphadenectomy may have a role in treatment, but there is no standard recommendation due to the rarity of ES and a lack of sufficient clinical studies.¹¹ Based on the child's age, superficial location of the lesion, and lack of physical or radiographic findings of adenopathy or other signs of metastasis, our oncology service advised against sentinel node biopsy and recommended a margin-free excision.

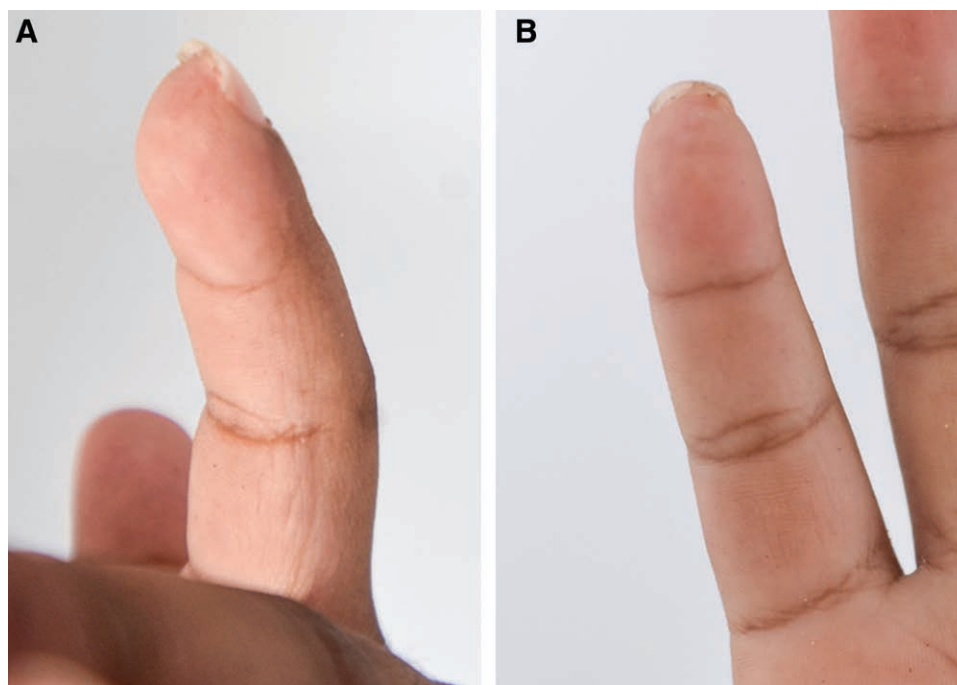


Fig. 2. Healed distal tip of left index finger, 10 months after initial surgical procedure. The loss of distal tip projection and bulk reflect the large wedge of tissue that was removed. A, Lateral view. B, Vertex view.

Clark et al reported 23% local recurrence at 9-months post-resection in their 72-patient cohort,¹² but a wide range of recurrence rates have been reported in the literature.¹³ Inadequate operative management of the primary tumor seems to contribute to a higher rate of recurrence.¹³ Nevertheless, there was no significant difference in metastasis and mortality rates between patients with successful treatment of primary tumors and those requiring re-excision.¹ Kouloxouzidis et al documented higher recurrence for patients undergoing R1 microscopic incomplete resection compared with R0 complete resection, which punctuates the need for a tumor-free resection.¹⁰ Epithelioid sarcoma is unique when compared with other sarcomas, as lymph node metastasis commonly occurs, with a range of 3%–65% in published case series.² Regional metastases are associated with poor outcomes.² Although distal amputation was considered in our patient, the tumor stage, patient's young age, and lack of any local or regional spread were considered in the recommendation to preserve the majority of her distal finger while still achieving a clean margin of tissue throughout the sample. At one year follow-up, the patient has no evidence of recurrence.

To our knowledge, this is the first case report describing a proximal-type epidermoid sarcoma in a 5-year-old African-American girl. It is likely that the rarity of this entity in this clinical setting contributed to the initial misdiagnosis and delay in definitive treatment. Additionally, our patient did not fit the classic demographics of epithelioid sarcoma (young age, female gender, and African-American), making the diagnosis even more difficult. The immunohistological studies in our patient reveal positive cytokeratin and vimentin, which is consistent with almost all reported cases of epidermoid sarcoma.¹

Although the patient is currently disease-free, long-term follow up is essential due to the high local and metastatic recurrence rates of this particular tumor. Because of the rarity of this condition and its presentation being similar to that of inflammatory or benign conditions, it is more likely to be managed by a primary physician, plastic surgeon, or hand surgeon rather than by a surgical oncologist. It is imperative, therefore, that such providers need to be vigilant and consider soft tissue tumors as a potential diagnosis.

Gary F. Rogers, MD, JD, LLM, MBA, MPH
 Division of Plastic Surgery
 Children's National Hospital
 111 Michigan Ave, NW
 Washington, D.C. 20010
 E-mail: grogers@childrensnational.org

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