

Vascular neoplasia masquerading as cellulitis and persistent hemorrhagic pericardial effusion

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ABSTRACT

Tufted angioma and kaposiform hemangioendothelioma are considered to represent two ends of the spectrum of benign vascular neoplasms that predominantly present during infancy or early childhood. We report a rare case of a 5-month-old infant with complicated vascular neoplasm involving the pericardial cavity and skin over cervical region, masquerading as infective pericarditis with cellulitis. The patient responded dramatically to therapy with oral prednisolone and sirolimus, with a significant reduction of size of skin lesions and complete resolution of pericardial effusion over 8 weeks. The report also highlights the importance of a multidisciplinary team in managing such complicated cases.

Keywords: Kaposiform hemangioendothelioma, tufted angioma, vascular malformation

INTRODUCTION

Pericardial effusion in infancy is quite rare. Moreover, hemorrhagic pericardial effusion is extremely uncommon in infants and is most often secondary to infections followed by tumors of the heart.^[1,2] We hereby report a rare case of a complicated vascular neoplasm involving the pericardial cavity and skin over cervical region, masquerading as infective pericarditis with cellulitis.

CASE REPORT

A 5-month-old girl presented with fever, erythema, and swelling over the left side of neck and upper chest for 1 month. The infant had received intravenous antibiotics for 2 weeks but had persistent fever, progressive increase in neck swelling, and new-onset respiratory distress. History did not suggest trauma; birth and postnatal period were uneventful. On examination, the left suprascapular

and supra- and infraclavicular region were covered with erythematous plaques and blistering, tender nodules coated with seropurulent discharge [Figure 1]. The child had tachycardia (182/min), tachypnea (64/min), cool peripheries with muffled heart sounds.

Blood investigations showed hemoglobin of 9.8 g/dL, total leukocyte count of 10,110/mm³ (neutrophils 22% and lymphocytes 54%), and platelet count of 128,000/mm³. Liver, kidney function tests, levels of C-reactive protein, procalcitonin, and galactomannan were normal. Echocardiography revealed massive pericardial effusion with right ventricular diastolic collapse, suggestive of cardiac tamponade. Bedside pericardiocentesis drained 120 ml hemorrhagic fluid which on microscopy showed field full of red blood cells (RBCs) and 30 pus cells/high power field; there were no malignant cells. Bacterial

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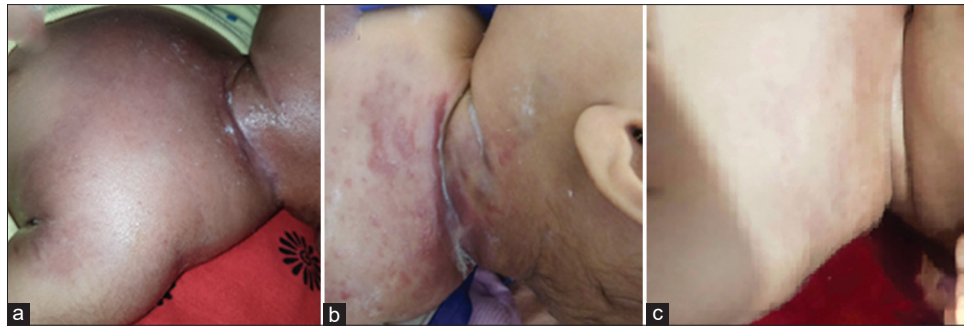


Figure 1: Evolution of skin lesions on left supraclavicular region and upper chest wall, over time. (a) Erythema and discoloration 1 week before admission. (b) Erythematous plaques with induration at presentation. (c) Near-complete resolution after 6 months of therapy with sirolimus

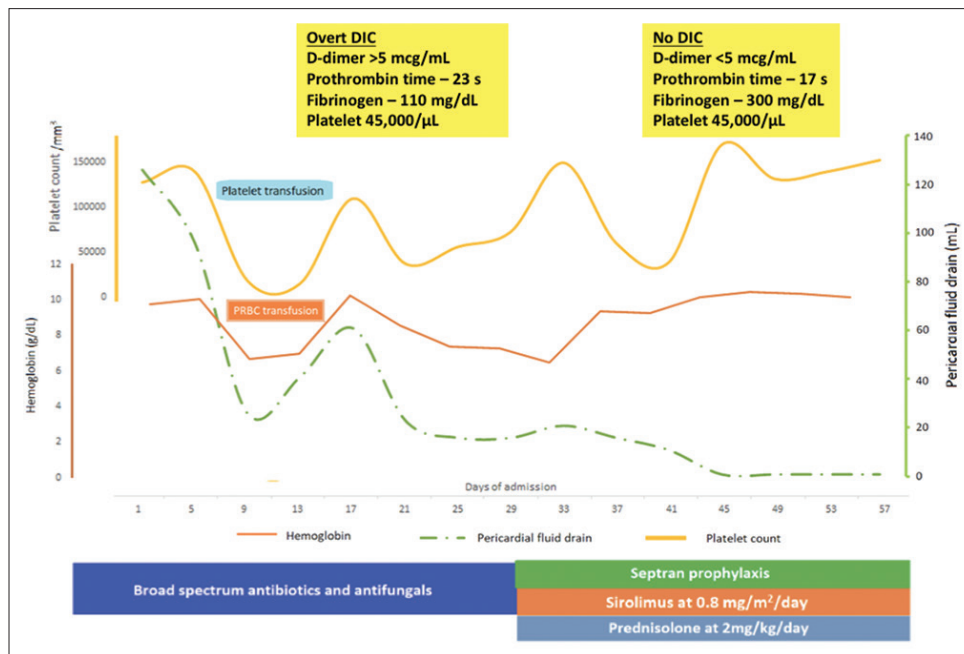


Figure 2: Graphical depiction of clinical course in relation to management during and following hospital stay. PRBC: Packed red blood cells

and fungal cultures of the fluid were sterile. Evaluation for tuberculosis (tuberculin skin test, adenosine deaminase levels, GeneXpert, and *Mycobacterium* growth indicator tube from pericardial fluid) was also negative. Antinuclear and antineutrophil cytoplasmic antibodies were negative and thyroid profile was normal.

With a provisional diagnosis of acute bacterial pericarditis with cellulitis, empirical therapy with intravenous vancomycin and meropenem was initiated. Repeat echocardiography after 24 h showed reaccumulation of fluid, requiring insertion of a pigtail catheter percutaneously. During the 2nd week, fever and tachypnea improved and the subcutaneous induration and seropurulent discharge decreased. However, the child remained irritable and hemorrhagic pericardial fluid drainage persisted at 30–40 ml/day. The levels of hemoglobin and platelets fell to 7.1 g/dL and 15,000/mm³, respectively [Figure 2], requiring transfusion of blood products. The pericardial fluid showed budding yeast

cells, and hence, intravenous caspofungin was started in light of thrombocytopenia and prolonged antibiotic use. Budding yeast cells persisted despite 2 weeks of antifungal therapy, but serial blood and pericardial fluid cultures were sterile. The pericardial catheter was replaced after which budding yeast cells disappeared, suggesting colonization of the initial pericardial catheter. Meanwhile, the cutaneous lesions progressed to involve the left mandibular region, and platelet count and hemoglobin level fell again despite antibiotic and antifungal therapy [Figure 2].

Evaluation for primary immunodeficiency (immunoglobulin level, T-cell subsets, dihydrorhodamine flow cytometry test, and neutrophil oxidase index of granulocytes) was unremarkable. Disseminated intravascular coagulation (DIC) was suggested by increased prothrombin and activated partial thromboplastin time, elevated D-dimer, and low fibrinogen levels. With a suspicion of Kasabach–Merritt phenomenon (KMP)

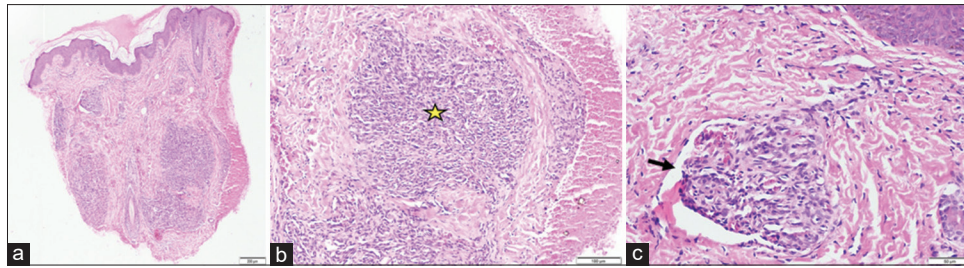


Figure 3: Light microscopy findings on skin biopsy. H and E stained images show (a) lobular architecture of the dermis with proliferating capillaries in low power view ($\times 10$). Higher magnification ($\times 40$) showing (b) a single capillary lobule without any significant pleomorphism or atypical mitosis (star) and (c) capillary proliferation within dilated thin-walled vessels, forming a tufted angioma (black arrow)

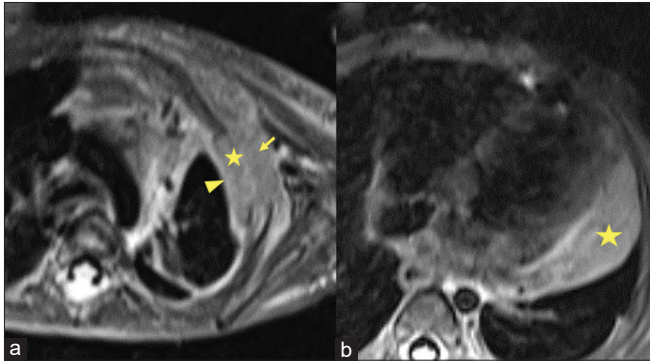


Figure 4: Magnetic resonance imaging. (a) Axial T2 image showing hyperintense lesion in the left first intercostal space (yellow star) extending into the soft tissues along the left lateral chest wall (arrow) externally and along the pleura internally (arrowhead). (b) Axial T2 image showing hyperintense pericardial lesion (yellow star) adjacent to the free wall of the left ventricle

secondary to underlying vascular neoplasm, the opinion of dermatology specialist was sought. A punch biopsy of the cutaneous lesion was performed, which showed tufts of capillaries with extravasated RBCs, suggesting a tufted angioma (TA) [Figure 3]. The diagnosis of vascular tumor on histopathology mandated cross-sectional imaging to delineate the extent of the tumor and its characterization. A magnetic resonance angiography was performed after discussion with the radiology team and it showed homogenous, hyperintense lesions involving the skin and subcutaneous tissue of the left side of neck, supraclavicular region and left upper chest, extending deep into the first intercostal space, indenting the second rib, associated with marrow edema and expansion [Figure 4a] and enlarged left deltopectoral lymph node. Another hyperintense lesion was found in the pericardium along the left ventricular free wall [Figure 4b]. These findings suggested a multifocal infiltrating vascular neoplasm.

Despite the histological diagnosis of TA, the clinical and radiological features of a multifocal, aggressive, and locally invasive mass with associated KMP supported a diagnosis of Kaposiform hemangioendothelioma (KHE). The partial response of subcutaneous induration and seropurulent discharge to systemic antibiotics was attributed to secondary infection of the vascular neoplasm. Therapy

with oral sirolimus was initiated at 0.8 mg/m² twice a day, targeting trough levels of 10-15 ng/ml, along with prednisolone at 2.5 mg/kg daily. Over the next week, there was remarkable improvement with resolution of thrombocytopenia, improvement in hemoglobin, and cessation of pericardial drainage. Fibrinogen level normalized by day 14. Cutaneous vascular lesions regressed significantly by 4 weeks [Figure 2].

Blood pressure, lymphocyte count, liver function tests, and lipid profile were monitored 2 monthly. Therapy with sirolimus was well tolerated, without evidence of mucositis, pneumonitis, hypertension, or peripheral edema during 6-month follow-up. Lipid profile was deranged for the first 4 weeks after initiation of sirolimus and normalized subsequently. Prednisolone tapering was started at 2 months with cessation at 5 months. At last follow-up of 6 months, the cutaneous as well as pericardial lesions had regressed completely [Figures 2 and 5]. We plan to continue sirolimus for a total duration of 18 months with gradual tapering while monitoring for rebound tumor growth.

DISCUSSION

Hemorrhagic pericardial effusion is uncommon in infancy and is described with bacterial or viral pericarditis, tuberculosis, neoplasms, and connective tissue diseases.^[1,2] Fungal pericarditis, as was suspected in the index patient, is often lethal and mandates aggressive therapy.^[3] Vascular neoplasms are rare and may have diverse clinical presentations ranging from an innocuous incidentally detected mass to a catastrophic illness with DIC, cardiac tamponade, and/or refractory hemorrhagic pericardial effusion.

TA and KHE present during infancy or early childhood and are two ends of the spectrum of benign vascular neoplasms. TA is a slow-growing vascular tumor, histologically characterized by a “cannonball” like arrangement of tufts of capillaries. It is usually solitary and rarely extends beyond the subcutaneous tissue.^[4,5] On the other hand, KHE is an aggressive tumor presenting as large, locally infiltrative violaceous plaques or tumors in the skin overlying extremities, trunk, and cervicofacial region.^[4,5] Histologically, they are characterized by sheets of spindle cells with red

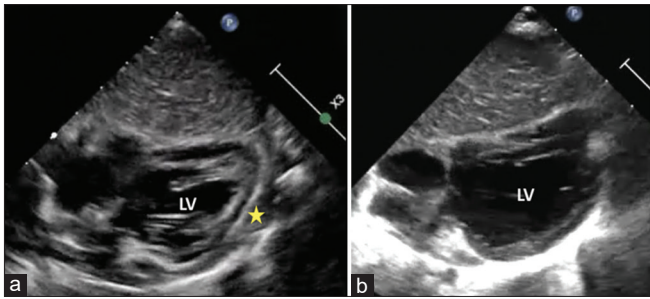


Figure 5: Echocardiography in subcostal long-axis view. (a) Pretreatment image showing mass (yellow star) in the pericardial cavity overlying left ventricular free wall. (b) Repeat evaluation after 6 months of treatment with sirolimus showing regression of the mass

blood cells trapped within microvascular spaces. They are multifocal, involve the viscera, and/or extend deep into retroperitoneum and intrathoracic regions, however, involvement of the pericardium has not been reported, as was observed in the index patient.^[6] An important differential of KHE is Kaposiform lymphangiomatosis but it usually occurs in adolescence, rarely has cutaneous manifestations, and has a distinct histopathology.^[4]

KMP, a life-threatening consumptive coagulopathy, complicates 70% of cases of KHE.^[7] Turbulent flow through small convoluted capillaries of the vascular neoplasm, which have discontinuous and poorly formed basal lamina, is hypothesized to cause platelet aggregation and activation, leading to thrombocytopenia, microangiopathic anemia, and elevated D-dimer. It is associated with local pain and increase in tumor size. Platelet transfusions have minimal benefit and may paradoxically increase the tumor size due to intralesional retention.^[4] In retrospect, the excessive irritability of the child and episodic fall in hemoglobin and platelet count appears attributable to KMP.

The management of KHE with KMP is challenging. Experts previously recommended therapy with intravenous vincristine with/without oral corticosteroids.^[8] Recent reports favor the use of oral sirolimus based on satisfactory outcomes, ease of administration, and relatively favorable safety profile.^[9] Therefore, oral therapy with sirolimus and prednisone is considered the first-line therapy for the treatment of KHE with KMP.^[4] Duration of treatment is individualized based on the rate of resolution of lesions.

This report highlights the challenges in diagnosing vascular neoplasm that can mimic infections and also the importance of a multidisciplinary team comprising experts from pediatric medicine, dermatology, pathology, radiology, and pediatric cardiology in managing such complicated cases. Early diagnosis of KHE enabled prompt management that was associated with a favorable outcome. A diagnosis of KHE with KMP should be considered in patients presenting with a persistent hemorrhagic pericardial effusion and unexplained

severe thrombocytopenia, especially in the presence of coexisting cutaneous lesions and anemia. The distinction between KHE and TA is important as it has therapeutic implications and requires clinicopathological correlation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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