**International Journal of Current Research in Science and Technology**
Volume 9, Issue 04 April (2023)
**ISSN:** 2394-5745
https://doi.org/10.57181/ijcrst/vol9i04/61
Available Online: www.ijcrst.in

International Journal of Current Research in Science and Technology

# A Rare Case of Aggressive Histiocytic Sarcoma in A 9- Years Old Male Child: Case Report and Literature Review

*Case Report*

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**Abstract:**

**Background:** Neuropsychological Histiocytic Sarcoma (HS) is an extremely rare non-Langerhans neoplasm primarily composed of malignant cells with morphologically and immunohistochemically showing features of mature tissue histiocytes. It can affect any part of the body with unknown etiology and is an aggressive disease with a worse prognosis and management often requires multimodal treatment.

Here, we report a 9-year-old boy who was diagnosed with histiocytic sarcoma after he presented with left-side chest pain, dry cough, and significant weight loss of four months duration. Contrast-enhanced chest CT scan shows a heterogeneous contrast-enhancing solid extra parenchymal mass lesion that appears to be attached to the posteromedial basal pleura with adjacent lung subsegmental collapse and a minimal amount of ipsilateral pleural effusion. There was no evidence of systemic arterial supply. The patient underwent left posterolateral thoracotomy and mass excision. The biopsy and immunohistochemical examination confirmed the diagnosis of Histiocytic Sarcoma. The mass recurred after a month, and he started systemic chemotherapy with a CHOP regimen. Despite the multimodal treatment, he had a progressive disease with multiorgan involvement and was put on palliative care.

**Keywords:** Histiocytic Sarcoma, Non-Langerhans histiocytes, Chest CT scan, Immunohistochemistry, Aggressive disease, CHOP regimen.

## INTRODUCTION

Histiocytic sarcoma (HS) is a rare non-Langerhans cells histiocytic malignant neoplasm that accounts for less than 1% of all hematolymphoid neoplasms [1, 2]. It affects patients with a wide age range, from infancy to elderly; but it most commonly occurs in adults with the median age of 52 years [3, 4]. There are no identifiable environmental or hereditary genetic risk factors predisposing to the development of HS. It can occur as an isolated disease or in the context of other hematologic neoplasms, such as follicular lymphoma, myelodysplasia, or acute lymphoblastic leukemia [3,5]. In most cases, the presentation is extra nodal, involving the skin, spleen, and the gastrointestinal tract [6,7]. The rarity of HS and its non-specific presentation makes the diagnosis challenging and the diagnosis is confirmed

based on morphology and immunohistochemistry examination. Here, we report a 9- years old boy with HS after he presented with left side chest pain, dry cough, significant weight loss and low-grade intermittent fever of four- months duration. Chest CT with contrast showed a heterogeneously contrast-enhancing solid extra parenchymal mass lesion that appears to be attached to the posteromedial basal pleura with adjacent lung subsegmental collapse. The biopsy and immunohistochemical examination of the sample confirmed the diagnosis of HS.

**Case presentation**

A nine- years old Ethiopian boy presented to the hospital with a four-month history of left side chest pain, dry cough, significant weight loss and low-grade intermittent fever of 04 months duration. When the easily fatigability and dry cough worsened, he went to a nearby Hospital and was diagnosed to have chest mass and severe anemia with a hemoglobin level of 6g/dl. He was transfused with two units of packed red blood cells. Chest x ray showed radiopacity in the left mid and lower lung zone and chest CT scan was requested for further characterization. Physical examination at admission revealed comfortable child with pulse rate 110 beats per minute, respiratory rate 22 breaths per minute, temperature 37.4 degree centigrade and oxygen saturation of 94% at room air. He has pale conjunctivae and no palpable lymph nodes in all accessible areas. Chest examination showed dullness over the left 1/3rds of the lung, decreased air entry over lower 2/3 of the left posterior lung fields.

Investigations revealed a white blood count of 10,300, with 70% neutrophils, hemoglobin of 8 g/dl and platelet count of 550K. Serum ferritin was 1324 ng/ml (reference 16- 243 ng/ml) and all organ function tests, serum electrolytes, alpha-fetoprotein, coagulation profiles and abdominal ultrasound were normal.

Chest X ray (PA & lateral) showed left posterior mid and lower chest radio-opacity [**Figure 1**]. Chest CT scan showed lobulated left postero-inferior extra parenchymal mass with intense contrast enhancement measuring 17 cm X 6.1 cm. There is a minimal amount of ipsilateral pleural effusion. Systemic arterial supply is not demonstrated; the adjacent left intercostal veins drained the mass. There is compression of the left basal lung resulting in atelectasis. Based on the CT findings the possibilities of mesenchymal tumors and sarcomas were entertained. [**Figure 2**].

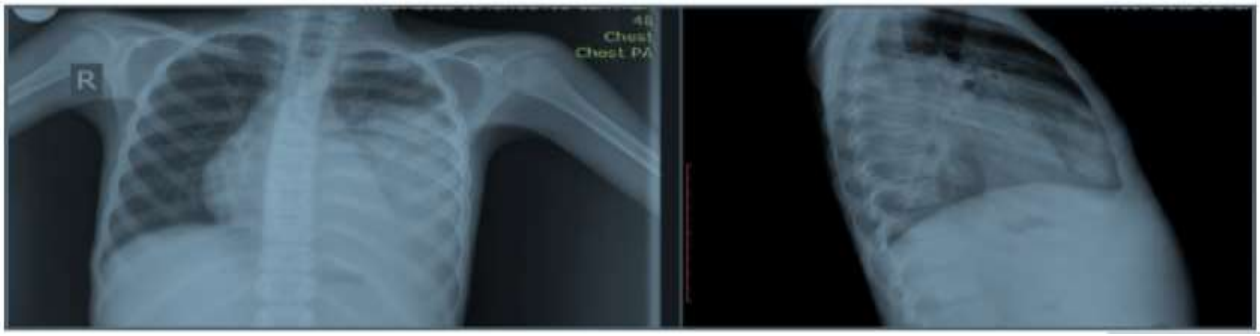


***FIGURE 1-*** *PA and Lateral CXR Suggestive of Left Mid and Lower Chest Mass*

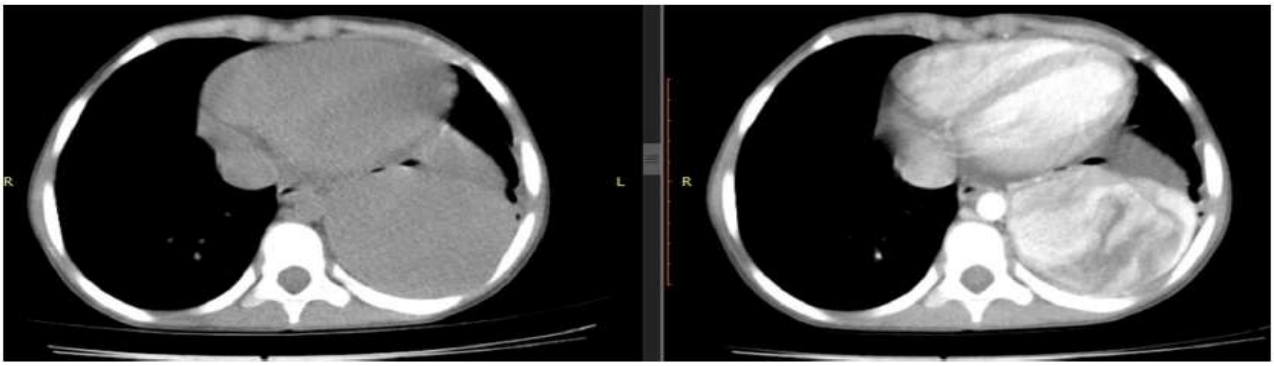


***FIGURE 2-*** *Chest CT Scan and Angiography Showing Left Pleural Based Mass Having Heterogeneously Contrast Enhancing Mass.*

Echocardiography showed a 5mm circumferential pericardial effusion more on the left ventricular apex with clear fluid, no echo debris.

After having consent from the parents, left posterolateral thoracotomy was done and mass was excised. Intraoperatively there was a 10 X 8cms firm extra pleural mass, adherent to the lower lobe base. No feeding vessel identified and no air way communication. The mass was very fragile which bled massively with every touch, the mass dissected out with sharp and blunt dissection [**Figure 3**]. Intraoperatively he was transfused with whole blood, platelets, and fresh frozen plasma. A draining tube thoracostomy with underwater seal was placed. The resected mass was sent for biopsy and immunohistochemistry.

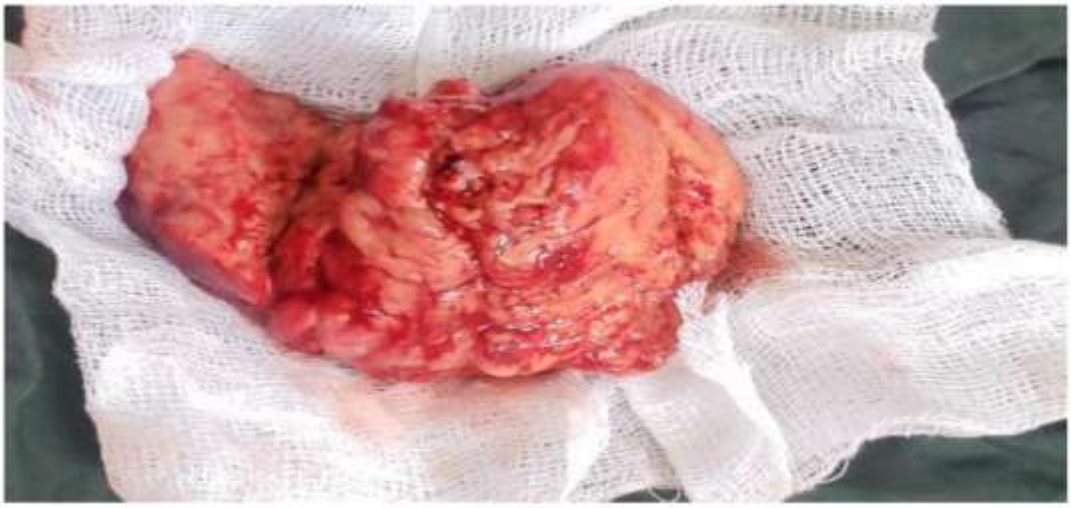

***FIGURE 3-*** *The Excised Mass*

Tissue histopathology shows an infiltrating neoplasm composed of large histocytes like atypical cells arranged in sheets. Individual cells have moderate cytoplasm and pleomorphic vesicular nuclei showing prominent nucleoli. Few multinucleated giant cells and foci of emperipolesis noted. The background shows mixed inflammatory infiltrates [**Figure 4**].

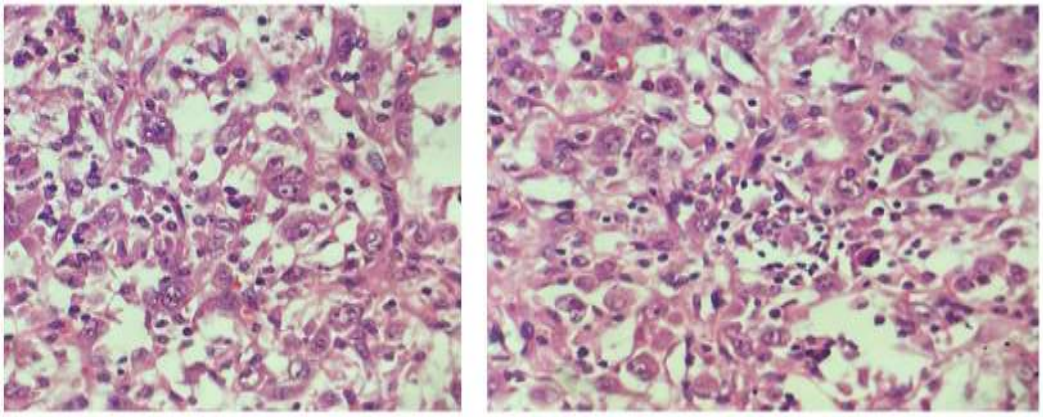

***FIGURE 4-*** *Histopathology Shows Infiltrating Neoplasm Composed of Large Histocytes With Pleomorphic Vesicular Nuclei Showing Prominent Nucleoli*

Immunohistochemistry showed the neoplastic cells express **Vimentin, HLA-DR, CD68, CD 163** and the Ki index is up to 40%. The neoplastic cells are negative for CK, CD 34, ERG, desmin, STAT6, S100, CD1a, CD10, CD30, CD 45, CD8, CD 15, SMA, MPO, CD23, CD 56, lysosome, fascin, MyoD and TEEF-3 [**Figure 5**].

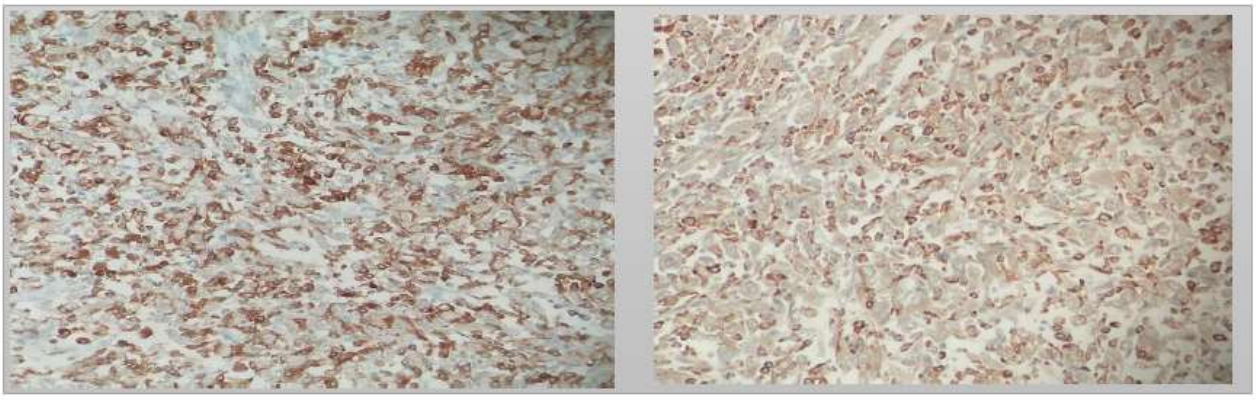

***FIGURE 5-*** *Immunohistochemistry Showing Neoplastic Cells Express CD68, CD 163,*

The biopsy and Immunohistochemistry features were suggestive of Histiocytic Sarcoma.

After a month post op Chest CT scan showed a left intrathoracic heterogeneously enhancing mass lesion measuring 9 x 10cms with internal non-enhancing hypoattenuation. Lesions abutted the mediastinal vascular structures particularly the descending thoracic aorta but with no encasement. There was also a well-defined mass lesion in the posterior pleural sulcus measuring 4.8 cm X 2.7 cm and minimal free fluid collection in the ipsilateral pleural cavity **[Figure 6**]. The findings are consistent with recurrent tumor. Then the patient started chemotherapy with CHOP regimen. After one month of the first cycle of chemotherapy he developed acute liver failure with elevated bilirubin and deranged coagulation profiles. And after the discussion with the family, he was put on palliative care.

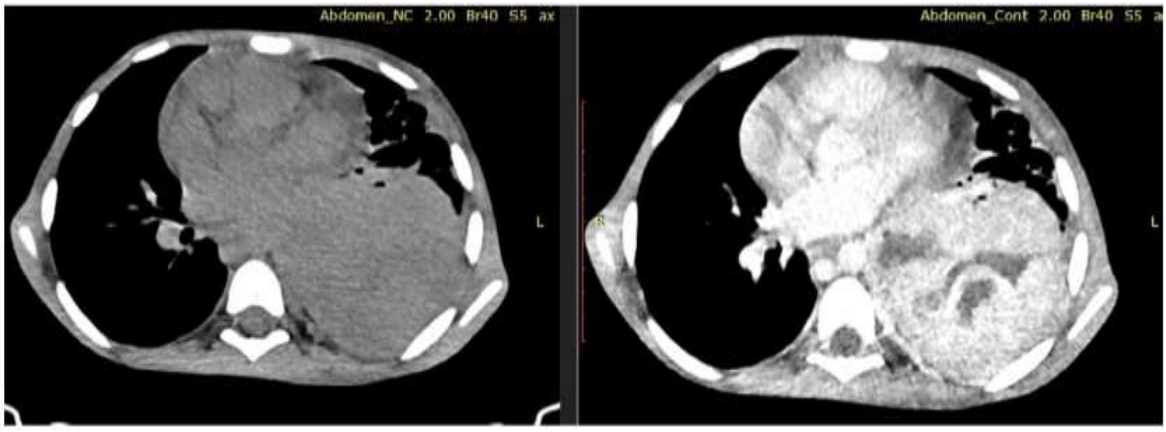


***FIGURE 6-*** *Chest CT Showing Recurrent Heterogeneously Contrast Intrathoracic Enhancing Mass*

**CASE DISCUSSION**

Histiocytic sarcoma (HS) is a rare non-Langerhans cells histiocytic malignant neoplasm that accounts for less than 1% of all hematolymphoid neoplasms [1, 2]. Histiocytic Sarcoma affects patients with a wide age range, from infancy to elderly; but it most commonly occurs in adults with the median age of 52 years. It can be localized and disseminated. [3, 4]. There are no such identifiable environmental or hereditary genetic risk factors predisposing to the development of Histiocytic Sarcoma. It can occur as an isolated disease or in the context of other hematologic neoplasms, such as follicular lymphoma, myelodysplasia, or acute lymphoblastic leukemia [3,5]. In most cases, the presentation is extra nodal, involving the skin, spleen and the gastrointestinal tract [6,7]. The imaging features of HS is not well documented in the literatures; the imaging findings are variable and dependent on the site of organ involvement. Imaging appearances of lymph node Histiocytic Sarcoma on [18F] FDG-PET/CT have been previously reported. The reported cases document solid lesion with cystic changes as well as destructive lesions in the bones [8]. Histopathologically, HS, malignant cells have a large, eccentrically placed, oval nucleus with vesicular chromatin and a prominent single irregular

nucleolus. The cytoplasm is abundant and eosinophilic and may be foamy or vacuolated. Immunohistochemistry and molecular studies are essential for the confirmation of the diagnosis (9). Immunohistochemical markers positive for CD 68, CD 163 and CD45, CD45RO and HLA-DR are usually seen in HS. [2,9]. CD163 has recently been studied in a variety of benign and malignant tissues and shows almost exclusive expression in cells of monocyte/macrophage lineage [10,11]. In our case, the diagnosis of histiocytic sarcoma was confirmed by an immunohistochemistry profile marker. The histopathology examination in our case showed an infiltrating neoplasm composed of large histocytes like atypical cells arranged in sheets. Individual cells had moderate cytoplasm and pleomorphic vesicular nuclei showing prominent nucleoli and few multinucleated giant cells and foci of emperipolesis noted. The malignant cells were positive for Vimentin, HLA-DR, CD68, CD 163 antigens, proving histiocytic proliferation. Being an aggressive malignant neoplasia, HS can be managed using different modalities of management options including surgery, radiotherapy, and chemotherapy. The treatment in our case was surgery and systemic chemotherapy.

The mass recurred after the surgery and systemic chemotherapy with CHOP regimen with cyclophosphamide, vincristine, doxorubicin, and prednisolone was started. After five weeks the child developed yellowish discoloration of the eyes and weight loss despite adequate food intake. He was investigated and laboratory profiles revealed aspartate aminotransferase (AST), alanine transaminase (ALT) and alkaline phosphatase (ALP) level elevated four times, bilirubin level increased progressively to the level of 7.4 with direct hyperbilirubinemia of 4.5, and serum albumin level decreased progressively to 1.9. The patient also developed deranged coagulation profiles with INR persistently increased to 2.5, PT of 29.5 second and PTT being 40.5 second. The coagulation profile didn't decline despite vitamin K administration and fresh frozen plasma (FFP) transfusion. Acute liver failure due to disease progression of distant metastasis was entertained and family was informed and involved in the management plan. And then the child was put on palliative care.

## CONCLUSION

In conclusion, histiocytic sarcoma is an extremely rare neoplasia with unknown etiology. Its non-specific presentation makes diagnosis challenging and the diagnosis should be confirmed with morphology and immunohistochemistry examination. As histiocytic sarcoma is an aggressive disease with worse outcomes, management is often challenging and requires multidisciplinary treatment.

## DECLARATIONS

### Ethical Approval

Written informed consent for the publication of their details, including the intraoperative images, was obtained from the parents. In addition, ethical clearance was obtained from the Department of Research and publication committee of Addis Ababa University.

### Competing interests

We don't have any competing interests.

### Authors' contributions

Dr. Gashaw Arega, Dr. Daniel Hailu, Dr. Mulualeme Nigusie, Dr. Getasew Fekad, Dr. Kalkidan Tesfaye, Dr. Fitsum Dagmawi, Dr. Abel Hailu, Dr. Abdulkadir Mohamedsaid wrote the manuscript. Dr. Hanna Getachew, Dr. Woubedel Kiflu, Dr. Yodit Semere, Dr. Samuel Sisay, Dr. Abrehet Zeray, Dr. Mesfin Asefa, prepared figures 1-6 with their description in the manuscript. All authors reviewed the manuscript.

### Funding

No funds were received.

### Availability of data and materials

Six figures are attached along with their legends which should be put as per their order in the manuscript.

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