case report

Pulmonary epitheloid hemangioendothelioma PET CT findings and review of literature

Imran Nizami,[a] Shamayel Mohammed,[b] Mohei El Din Abouzied[c]

From the [a]Organ Transplant Center; [b]Department of Pathology and [c]Department of Radiology, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia

Correspondence: Dr. Imran Yaqoob Nizami · Organ Transplant Center, MBC 96, King Faisal Specialist Hospital and Research Centre, PO Box 3354 Riyadh 11211, Saudi Arabia · T: 966-11-4647272 loc 76164 F: 966-11-4647272 loc 76167 · imranyaqoob@kfshrc.edu.sa

Ann Saudi Med 2014; 34(5): 447-449

DOI: 10.5144/0256-4947.2014.447

We describe a case of pulmonary epitheloid hemangioendothelioma (PEH) in a 13 years old girl, the aggressive nature of the tumor in this particular case and the PET CT findings. PEH are rare tumors of vascular origin, first described by Dial and Liebow in 1975. This is an uncommon pulmonary neoplasm, 4 times more common in young women. This tumor can affect multiple organs (lung, liver, bones and soft tissue, skin, heart, central nervous system) However lung and liver represent 2 main locations.Clinical manifestations are variable; typically patients are asymptomatic, and PEH is detected on routine chest radiographs as bilateral small (1 cm or less) nodules in the lungs Diagnosis usually requires a surgical lung biopsy. The prognosis is very unpredictable, with life expectancy ranging from 1 to 15 years. The tumor is usually considered as low to intermediate grade sarcoma. There is no single effective treatment however spontaneous remissions and aggressive behavior has been described

A 13-year-old girl presented to the King Faisal Specialist Hospital and Research center, Riyadh, Saudi Arabia, with a 6-month history of progressive dyspnea and cough. She denied any hemoptysis or purulent sputum production. She was admitted because she complained of right-sided chest pain that started 4 months ago. She denied fever or night sweats. She had some weight loss recently but was not sure how much weight she lost in the past 6 months.

She was seen in the peripheral hospitals and was found to have multiple pulmonary nodules. The work-up in the peripheral hospitals including purified protein derivative skin test, sputum acid-fast bacilli stains and cultures, connective tissue serologies, and bone marrow biopsy were all negative for the evidence of any infection, malignancy, or connective tissue disorder. She was empirically treated for tuberculosis for 4 months without any symptomatic improvement. She was referred to our center for lung biopsy.

On presentation, she looked short of breath with vital signs showing the heart rate of 150/min, respiration rate of 32/min, blood pressure 111/56, and temperature 97.5°F (36.4°C). Arterial hemoglobin oxygen saturation was 87% while breathing room air and improved to 94% with the use of supplemental oxygen at 4L/minute via nasal cannula. No enlarged lymph nodes were observed. The lungs were clear to auscultation with reduced breath sounds at the right lung base. The abdominal examination revealed no organomegaly, and there was no clubbing of fingers or toes. Her height was 153 cm and weight was 32.6 kg (body mass index 13.6). Venous blood gas showed a pH of 7.4, pCO_2 6.9 kp, PO_2 7.5 kp. Complete blood cell count, and renal and hepatic profiles were essentially normal. Human immunodeficiency virus and connective tissue serologies were negative.

Chest x-ray showed multiple small pulmonary nodules with interstitial prominence and right-sided pleural effusion. The high-resolution computerized axial tomographic scan of the chest confirmed multiple bilateral pulmonary nodules, interstitial thickening, areas of ground glass alveolar opacities, small liver nodule (1.1×0.8 cm), and small bilateral pleural effusions. The serologies for connective tissue diseases were repeated and were negative. She underwent bronchoscopy, and bronchoalveolar lavage was negative for infections including tuberculosis and malignant cells. Right-sided thoracentesis was done, and it showed transudative effusion again negative for infections or malignancy.

18-fluoro-deoxyglucose (FGD) positron emission tomographic (PET) scan was performed. Approximately 50 minutes following the intravenous administration of approximately 8 mCi of FGD, a nondiagnostic computed tomography (CT) from the base of the brain to mid-thigh was performed on an 8-slice PET/CT Discovery LS system (8 slice CT) by GE (Milwaukee, WI, USA). Immediately after and without altering the position of the patient, a PET scan of the identical region was acquired. Blood glucose was 5.9 mmol. The described pulmonary bilateral nodules with interstitial thickening and patchy airspace/ground-glass opacities throughout both lungs showed mild FDG uptake, with the maximum standardized uptake value (SUV) of 3.5. Small right-sided pleural effusion without FDG activity was reported (**Figure 3**). The described hepatic hypodense lesion at segment number 7 also showed mild focal FDG uptake.

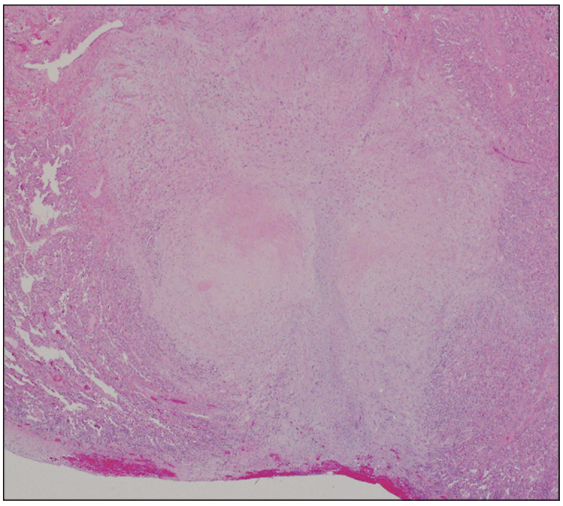

Figure 1. Multiple oval to round nodules with a sclerotic and myxofibrous stroma.

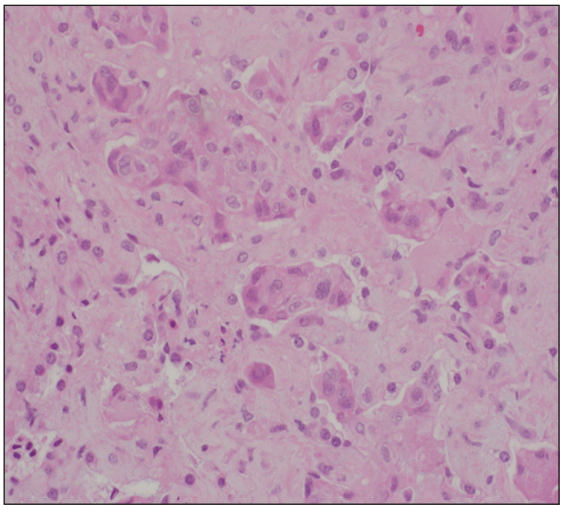

Figure 2. Tumor shows cords and nests of rounded cells with eosinophilic cytoplasm.

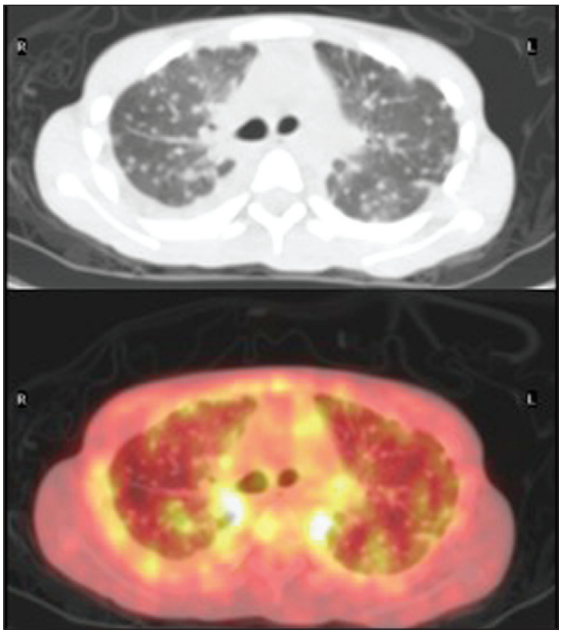

Figure 3. The transaxial non enhanced CT of the chest and the fused FDG PET/CT show multiple bilateral pulmonary nodules that vary in size and metabolic activity.

The fine-needle aspiration biopsy of the liver lesion was planned but could not be done due to technical reasons. The patient underwent right thoracoscopic lung and pleural biopsies, which revealed hemangioendothelioma involving the lung and the pleura. Biopsies from both lung and diaphragmatic nodules showed similar morphology.

Multiple oval and irregular nodules with hypocellular sclerotic myxofibrous stroma were noted. Within these nodules was a neoplastic infiltrate comprising plump epithelioid cells. These cells had round-to-oval nuclei with abundant eosinophilic cytoplasm. Intracytoplasmic vacuoles and occasional rhabdoid cellular differentiation were identified. (**Figures 1-2**)

Postoperatively, the patient was extubated but required noninvasive ventilation and subsequently reintubation and mechanical ventilation. Multiple attempts to wean from the mechanical ventilator failed. It was the opinion of the multidisciplinary team that her failure to wean was due to extensive tumor burden infiltrating the normal lung parenchyma. To reduce this tumor burden, she received 2 cycles of chemotherapy with VP16 and carboplatin followed by sorafenib. No radiological or clinical response was observed. She

developed progressive worsening of respiratory status, multiorgan failure, and died. An autopsy was not performed.

DISCUSSION

Dial and Liebow[1] were the first to describe epitheloid hemangioendothelioma (EHE) of the lungs in 1975. It was initially believed to be an aggressive form of bronchoalveolar cell carcinoma invading the adjacent blood vessels. The subsequent work showed that the malignant cells were of the endothelial lineage. Weis et al[2] then introduced the term eptheloid hemangioendothelioma to describe these neoplasms. It is a rare vascular neoplasm considered as low- or intermediate-grade sarcoma; however, the aggressive nature of the neoplasm (like in our case) has been reported. It can involve multiple organs like lung, liver, heart, bones, kidney, spleen, lymph nodes, or soft tissues. It is difficult to determine if the neoplasm is multicenteric or a primary lesion with metastasis to other areas, as simultaneous involvement of multiple organs or multiple sites in the same organ has been discovered.[3]

The clinical features of pulmonary epitheloid hemangioendothelioma (PEH) are variable. PEH is often discovered as an incidental finding because the patients are usually asymptomatic. Rarely, the neoplasm presents as serious or life-threatening symptoms.[4] PEH is 4 times more common in young women than in men. Life expectancy is generally good; spontaneous remissions as well as survival of up to 20 years after the diagnosis have been reported. The aggressive nature of the neoplasm (like in our case) is less commonly reported. The features associated with aggressive nature and poor prognoses are as follows: involvement of pleura, history of weight loss, anemia, pulmonary symptoms, spindle tumor cells, and extrapulmonary involvement.[3]

The most characteristic manifestation of PEH on chest radiograph is reported to be the presence of multiple, well- or ill-defined small nodules measuring up to 2 cm in both lungs.[1,4,5] A solitary lung nodule measuring up to 5 cm has also been reported.[5,6] The CT scan of chest usually demonstrates more nodules with perivascular distribution and irregular margins. There is usually no evidence of hilar or mediastinal lymphadenopathy. Pleural effusion when present (like in our case) is a poor prognostic marker. Interstitial thickening and minute pulmonary nodules in the distribution of lymphatics is a rare radiological finding.[4,6]

FGD PET/CT is a useful tool in detecting high metabolic activity in the pulmonary nodules. The presence of high metabolic activity as detected by an increased uptake of FGD increases the likelihood of the nodules to be malignant. The EHE is an uncommon neoplasm of the lung and, therefore, the data regarding the findings and utility of FGD PET/CT is limited. The previous reports suggested and increased FGD PET uptake as an indicator of malignant EHE nodules that worsen the prognosis[5-7] and may require an intervention either surgical or medical. Our patient underwent FGD PET/CT that showed only mild FGD uptake in the lung nodules despite the aggressive nature of this neoplasm.

Because the EPH is an uncommon pulmonary neoplasm and the clinical course is variable, there is no general consensus on its management. The surgical resection of single or unilateral pulmonary nodules has been proposed.[7] The management of patients with bilateral pulmonary nodules has not yet been standardized. Few case reports an antitumor effect with interferon, or chemotherapy using carboplatin, etoposide, paclitaxel, and vacimuzab have been published.[7,9] In our patient, the previously described poor prognostic markers like pulmonary symptoms, weight loss, anemia, and pleural effusion were present, but the FGD PET showed only mild uptake with an SUV of 3.5 in the lung nodules. We, therefore, add to the literature that the degree of FGD PET uptake in patients with EHE may not necessarily reflect the rate of progression of the disease.

REFERENCES

1. Dial DH. Liebow AA. Intravascular bronchoalveolar tumor. Am J Patology 1975;78: 6ª-7ª.
2. Weiss SW. Ishak KG. Dial DH, et al. Epitheloid hemangioendotheliomaand related leisons. Semin Diag Pathol 1986; 3:259-287.
3. Cronin P. Arenberg D. Pulmonary Epitheliod hemangioendothelioma. Chest 2004;125: 789-792.
4. Sakamoto N. Adachi S. Monzawa S. Hamanaka A. Takada Y. Hunada Y. Kotani Y. Hanioka K. High resolution CT findings of Pulmonary Epitheloid Hemangioendothelioma. J thorac imaging 2005; 20:236-238
5. Erguin, LE. Lim E. Increased FGD uptake in pulmonary epitheloid hemangioendothelioma. Rev, Esp. Med. Nucl 2006;25:188-92
6. Fagen K. Silverman E. Cole R. Detection of a pulmonary epitheloid hemangioendothelioma by FGD PET scan. Clin Nucl Med 2004; 29: 758-759
7. Okamura K. Ohshima T. Nakano R. Ouchi H. Takayama K. Nakanishi Y. A case of pulmonary epitheloid hemangioendothelioma surviving 10 years without treatment. Annals thorac cardiovasc surg 2010 ; 16: 432-435
8. Rest CC. Botton E, Robinet G. Conan CV. Bizais Y. Visvikis D. FGD PET in epitheloid hemangioendothelioma. Clin Nuc med 2004;29:789-92
9. Kim YH, Mishima M. Treatment of pulmonary epitheloid hemangioendotheliom with Bevcizumab. J of Thoracic Oncology 2010; 5:1107-8