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A Rare and Unexpected Cause of Pulmonary Hypertension: Pulmonary Capillary Hemangiomatosis

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CASE REPORT

ABSTRACT

Pulmonary capillary hemangiomatosis (PCH) is an idiopathic disease characterized with pulmonary hypertension (PH) caused by the proliferation of numerous capillaries within alveolar walls of the lung. Administration of vasodilator therapy, in contrast to primary PH, is risky due to possible fatal pulmonary edema; therefore, differentiation of PCH and primary PH is of significant importance. Since the clinical features of PCH are vague and histopathologic examination may not be usually feasible due to unstable conditions of the patients, radiological findings may help establish the diagnosis. A 17-year-old girl presented with exertional dyspnea and fatigue. PH was observed with both two-dimensional Doppler echocardiography and right heart catheterization. The diffuse ground glass opacifications of both lungs and the signs of PH on computed tomography (CT) raised the suspicion of PCH. The diagnosis was then confirmed with histopathologic examination. We herein report this rare pediatric case of PCH with emphasis on CT imaging findings.

Keywords: Pulmonary capillary hemangiomatosis, pulmonary hypertension, computed tomography

INTRODUCTION

Pulmonary hypertension (PH) is associated with significant mortality and morbidity in the pediatric age group (1). Although it has been reported to be predominantly idiopathic, the clinical classification of PH also emphasizes on other clinical conditions, including pulmonary capillary hemangiomatosis (PCH) (2). PCH is an extremely rare cause of PH; however, it is crucial to distinguish idiopathic PH from PCH due to fatal pulmonary edema caused by the standard vasodilators when used in PCH (3). Therefore, in order to rule out PCH and design an appropriate medical therapy for the patients with PH, radiologic evaluation plays a crucial role.

The age range associated with PCH is broad (from 2 to 71 years), and in the English literature, there have been only a reported few pediatric cases (4). Herein, we aimed to draw attention to a pediatric case presented with PH and diagnosed with PCH by means of its radiological and histopathological findings.

CASE REPORT

A 17-year-old female presented with the progression of dyspnea that had been existing for past 3 years, and fatigue. Her medical history was otherwise unremarkable. The physical examination revealed perioral cyanosis and bilateral basilar crackles with the auscultation. The six-minute walking test was terminated on 80 m due to diminished oxygen saturation (from 95% to 77%). The diffusing capacity of CO (DLCO) detected with the pulmonary function test was 11.8 of 49% the predicted level, and there was no significant evidence of obstructive or restrictive airway disease. The electrocardiogram showed right axis deviation and right ventricular hypertrophy with ST-T changes. Two-dimensional Doppler echocardiography revealed no structural abnormality except right ventricle hypertrophy. Right heart catheterization performed with the suspicion of PH revealed an elevated level of mean pulmonary artery pressure (PAP) of 31 mmHg. Serum biomarker analysis of collagen disease (ANA, RF, ANCA, and anti-dsDNA), hepatitis, viral pneumonia, and HIV were negative. Although chest X-Ray indicated solely the enlargement of main and right pulmonary arteries, a chest computed tomography (CT) was acquired on a 320-MDCT scanner (Aquilion One; Toshiba, Tokyo, Japan) to uncover the cause of the PH and possible pulmonary interstitial lung disease. Bilateral, diffuse, poorly defined alveolar ground glass opacifications (GGO) without septal thickening, enlargement of main pulmonary artery (34 mm) and right heart chambers were observed; this suggested the diagnosis of PCH (Figure 1). To confirm the diagnosis, she underwent a transbronchial lung biopsy of her left lower lobe. Based on the capillary proliferation within alveolar walls revealed by the histopathologic examination of the lung, the final diagnosis of PCH was made (Figure 2). She was directed for lung transplantation. Written informed consent was obtained from the parents of the patient.

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DISCUSSION

Pulmonary capillary hemangiomatosis is a rare idiopathic disease that is associated with PH due to proliferation of the capillaries within the pulmonary interstitium (5). To date, over 100 cases with PCH have been reported with a median age of 30 years. Progressive exertional dyspnea and hemoptysis define the most characteristic symptoms of the disease affecting approximately 1/3 and 2/3 of the patients, respectively. Additionally, patients may have the symptoms of chest pain, syncope, and the clinical features of right heart failure caused by PH (4). In our case, similar to the literature, progressive exertional dyspnea was the presenting symptom and, subsequently, the diagnosis of PH was made with a mean PAP >25 mmHg (31 mmHg) via right heart catheterization.

Radiologic examinations, including chest X-Ray and, in particular, CT, are suggested to be performed in patients diagnosed with PH to exclude PCH before the initiation of medical therapy, since standard vasodilator agents used in primary PH may result with fatal pulmonary edema in PCH. On chest X-Ray, main and right pulmonary artery enlargement and bilateral symmetric reticulonodular opacities may be encountered. Symmetric, diffuse centrilobular GGOs accompanied with the signs of PH (right ventricle hypertrophy and enlarged pulmonary arteries) is the most helpful finding detected on CT to make the diagnosis of PCH. Contrary to pulmonary venooclusive disease (PVOD) that takes the first place in differential diagnosis of PCH, pleural effusion and septal thickening are occasionally detected (6). Recently in a study of Miura et al. (7), according to CT images of the patients with PCH and PVOD, the size of the GGOs were reported to be significantly larger in patients with PCH than in those with PVOD. Although the differential diagnosis of diffuse GGOs of lungs includes both hypersensitivity pneumonitis and viral infections, in the setting of PH without the history of exposure to allergens and viral agents, the preliminary diagnosis of PCH or PVOD may be suggested. The definite differentiation of PCH and PVOD is established on the histopathologic examination. The predominant finding in PCH is the capillary proliferation within the alveolar walls particularly well demonstrated by CD34 immune staining, as defined in our current case, while PVOD is associated with intimal fibrosis of the veins (8).

The prognosis of PCH is extremely poor, and median survival has been reported to be no more than 3 years (9). The employment of medical therapies does not go beyond conservation prior to the lung transplantation that is the only therapy that cures. Besides, imatinib, tyrosine kinase inhibitor, and α-interferon are the two medical therapy agents used in experimental studies reported to be promising presumably by interfering angiogenesis (4, 10).

CONCLUSION

Although PCH is an exceedingly rare cause of pediatric PH, consideration of PCH in the differential diagnosis list of primary PH is essential. Since discrimination of PCH and primary PH based on clinical features is difficult, radiological imaging of the chest, particularly CT, should be acquired before the final diagnosis. Diffuse GGOs on chest CT not accompanied by septal thickening should

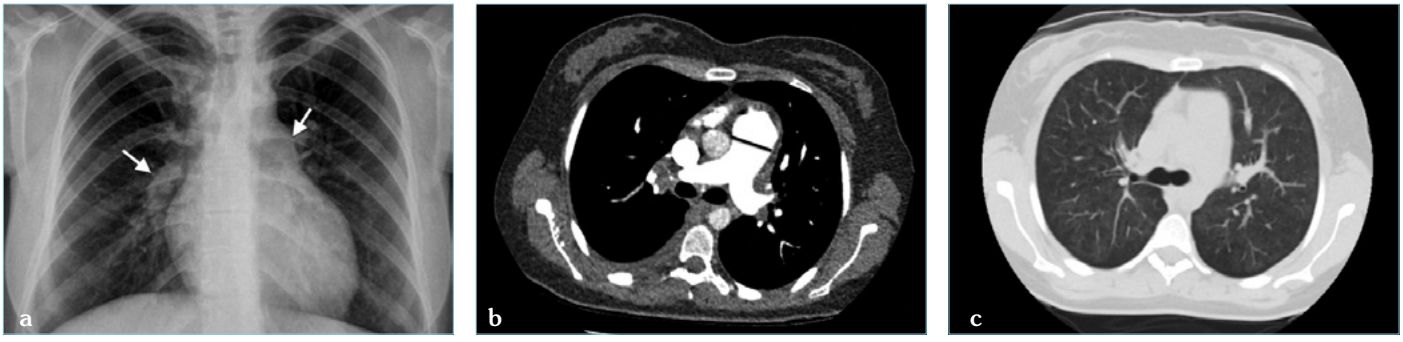

Figure 1. Posteroanterior chest X-Ray demonstrates solely the enlargement of the main and right pulmonary arteries (arrows) (a). Chest multidetector computed tomography image in the mediastinum setting window shows dilatation of the pulmonary truncus (black line) (b) while bilateral diffuse ground glass opacification is revealed in image with lung setting window. Note that there is no septal thickening (c)

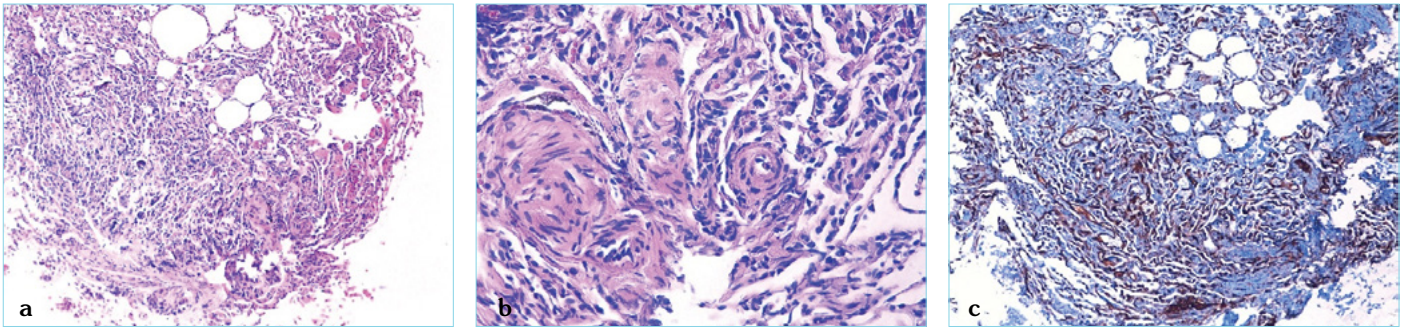

Figure 2. The significant thickening and increased cellularity of the alveolar walls resulted from capillary proliferation is demonstrated (a) (H-E stain, ×100), (b) (H-E stain, ×400). The capillary proliferation was also confirmed by immunohistochemical staining with anti-CD34 antibodies (c) (×100)

raise the suspicion of PCH, so that patients may be promptly directed for transplantation.

Informed Consent: Written informed consent was obtained from the patient who participated in the study.

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