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CASE REPORT

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A rare cause of recurrent massive hemoptysis

Priya N. Deshpande[1] | **Kavitha Venkatnarayan**[1] | **Uma Maheswari Krishnaswamy**[1] | **Chitra Veluthat**[1] | **Likith Niranjanmurthy**[2] | **Uma Devaraj**[1] | **Priya Ramachandran**[1]

[1]Department of Pulmonary Medicine, St. John's National Academy of Health Sciences, Bengaluru, India

[2]Department of Radiodiagnosis, St. John's National Academy of Health Sciences, Bengaluru, India

Correspondence
Uma Maheswari Krishnaswamy, Department of Pulmonary Medicine, St. John's National Academy of Health Sciences, Bengaluru, India.
Email: uma.mk@stjohns.in

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Abstract

Pulmonary artery aneurysmal rupture is a rare cause of massive hemoptysis. When the suspected origin of bleeding is the pulmonary artery, comprehensive evaluation is necessary to determine aetiology and guide appropriate management. Behçet's disease and Hughes–Stovin Syndrome (HSS) are important differentials to consider after infections and malignancy have been ruled out. Pulmonary artery aneurysms with aneurysmal wall enhancement and 'in-situ' thrombus should prompt the suspicion of HSS. Early diagnosis and treatment with immunosuppressants and endovascular interventions in selected patients may improve the prognosis and prevent episodes of fatal hemoptysis.

KEYWORDS

Hughes–Stovin syndrome, massive hemoptysis, pulmonary artery aneurysm

INTRODUCTION

Hughes–Stovin syndrome (HSS) is an uncommon vasculitis characterized by thrombophlebitis, vascular thrombosis and pulmonary artery aneurysms (PAA). It is considered a vascular phenotype of Behçet's disease (BD) owing to shared clinical and genetic signatures.[1] HSS should be suspected when traumatic and infectious causes of PAA have been ruled out and the complete constellation of BD is absent. We report a case of recurrent hemoptysis, wherein a detailed evaluation led to the diagnosis of HSS.

CASE REPORT

A 24-year-old man presented with a 3-month history of dry cough, shortness of breath, intermittent fever, and one episode of massive hemoptysis (300 mL), for which he was evaluated in another centre. Chest radiogram was within normal limits. A positron emission tomography-computed tomography (PET-CT) had been performed, which showed a necrotic mass in the right hilum. He was referred to our centre for endobronchial ultrasound (EBUS)-guided sampling.

On examination, vital parameters and systemic examination were normal. Laboratory investigations (hemogram, coagulation profile and renal function tests) were within normal range. Bronchoscopy showed an endobronchial nodule in the right main bronchus. EBUS imaging was suggestive of a soft tissue lesion with extensive vascular channels and aneurysmal right upper lobe pulmonary artery on US Doppler; thus, needle aspiration was deferred (Figure 1). Bronchoalveolar lavage was negative microbiologically and for malignant cells.

A computed tomography (CT) angiography was performed in view of the EBUS findings, it showed an eccentric filling defect suggestive of a thrombus in the right pulmonary artery with mural enhancement seen on the venous phase. The right upper lobe pulmonary artery was aneurysmal with prominent right bronchial artery and a few venous collaterals in the mediastinum (Figure 2). Transthoracic echocardiography was suggestive of right ventricular hypertrophy, dilated right atrium and right main pulmonary artery. In view of mediastinal mass with vascular involvement, anti-nuclear antibody profile, anti-neutrophil cytoplasmic antibody (ANCA- both p-ANCA and c-ANCA) and immunoglobulin G4 levels were done and found to be normal.

Considering the above findings, Behçet's Disease was suspected. There was no history of oro-genital ulcers or ocular symptoms. Erythrocyte sedimentation rate was 70 mm per hour and C-reactive protein was 3.52 mg/dL. HIV serology was negative. *Treponema pallidum* hemagglutination assay was negative. Ophthalmological evaluation showed no

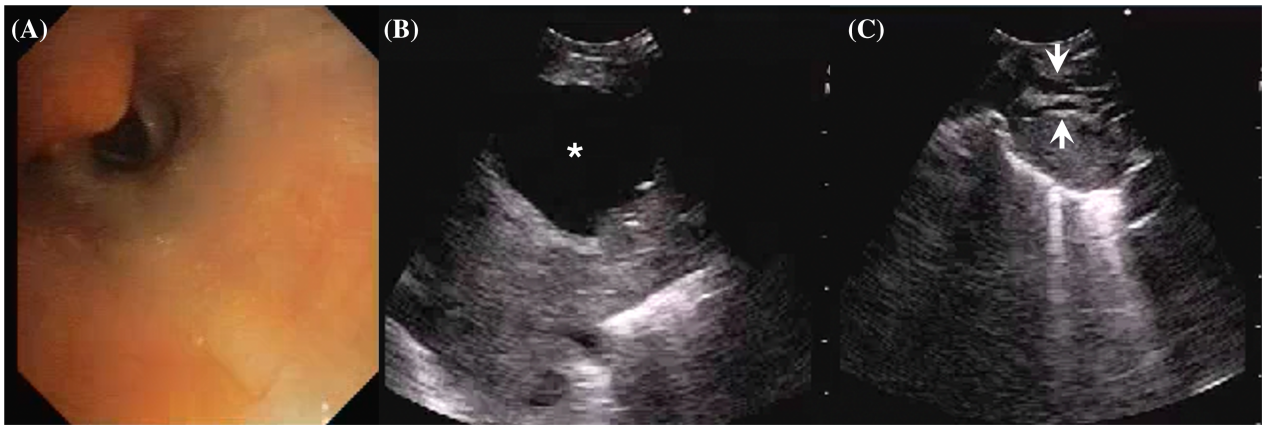

FIGURE 1 (A) Endobronchial nodule in the right main bronchus; (B, C) endobronchial ultrasound images showing aneurysmal right upper lobe pulmonary artery (asterisk) and vascular channels in the surrounding soft tissue (arrows).

evidence of uveitis or retinal vasculitis. Lower limb venous Doppler was negative for deep venous thrombosis. Work-up for antiphospholipid antibody syndrome, HLA-B51 and pathergy test were negative. Hence, a diagnosis of Hughes–Stovin Syndrome was made.

He was started on oral corticosteroid (1 mg/kg prednisolone) and intravenous Cyclophosphamide and discharged on Cotrimoxazole prophylaxis.

An episode of massive hemoptysis recurred prior to the second dose of Cyclophosphamide. Repeat CT angiography showed new thrombosis of segmental branches of left lower lobe pulmonary arteries; however, there were no new aneurysms. He was treated with intravenous pulse Methylprednisolone for 3 days in addition to the second dose of Cyclophosphamide. He was discharged with a plan to continue 6 cycles of monthly Cyclophosphamide.

DISCUSSION

Massive hemoptysis can pose a diagnostic dilemma for any clinician. Although bronchial arteries are the commonest source of hemoptysis (90%), pulmonary artery injury or invasion by infectious, inflammatory or malignant processes as a cause of hemoptysis can be more challenging.[2]

Pulmonary artery aneurysms (PAA) can be congenital or acquired. Acquired PAA are usually secondary to infections like syphilis, tuberculosis or fungal infections; malignancy or vasculitis.[3] Behçet's disease (BD) and Hughes–Stovin syndrome (HSS) are autoimmune vasculitides commonly reported to cause PAA.

HSS is an uncommon systemic vasculitis characterized by vascular thrombosis and PAA. The disease is reported to progress through three stages: thrombophlebitis, formation of aneurysms and aneurysmal rupture.[4] Although the pathogenesis is not completely understood, vasculitic involvement of vasa-vasorum may lead to elastic and muscular layer destruction and formation of aneurysms. Hemoptysis results from the rupture of these dysplastic vessels. Thrombosis in HSS develops secondary to the 'inflammatory' vasculitic process and is thus adherent to the vessel wall.[1] This is in contrast to pulmonary thromboembolism, where the thrombus is mobile and usually develops in the deep veins of lower limbs.

HSS is usually reported in young males with varied presenting symptoms. Chronic cough, dyspnea, chest pain, fever and weight loss are symptoms of pulmonary involvement.[5] Patients with PAA may be asymptomatic until they present with hemoptysis. Other presentations include superficial thrombophlebitis, deep venous thrombosis, cerebral venous thrombosis, mesenteric ischemia and peripheral vascular disease. Diagnosis is mainly based on the characteristic constellation of vascular thromboses (arterial or venous), normal coagulation profile, and pulmonary artery aneurysms.

Computed tomography angiography is the imaging modality of choice to diagnose PAA. Aneurysmal wall enhancement may be one of the earliest signs. An actively leaking PAA may be associated with an area of consolidation or ground glass opacity in the adjacent lung. Pseudoaneurysms (PAP), on the other hand, are identified as aneurysmal lesions with an eccentric or marginal thrombus. Distinctive radiological characteristics of PAA and PAP have been reported by Emad et al in their review of the largest cohort of HSS cases.[6] PET-CT may provide useful information regarding the extent of inflammation in the vessel wall.

HSS has been variably considered a part of the spectrum of BD or a vascular phenotype of BD.[1] In a patient presenting with PAA and thrombosis, BD or HSS have to be considered after infections, malignancy and traumatic causes are ruled out. BD is diagnosed based on a history of recurrent oro-genital, ocular involvement, skin lesions, and a positive pathergy test.[7] Patients without the complete complement of findings are considered to have incomplete BD or HSS.

The mainstay of HSS treatment includes steroids and immunosuppressants, with cyclophosphamide being the preferred agent. Tumour necrosis factor antibodies are

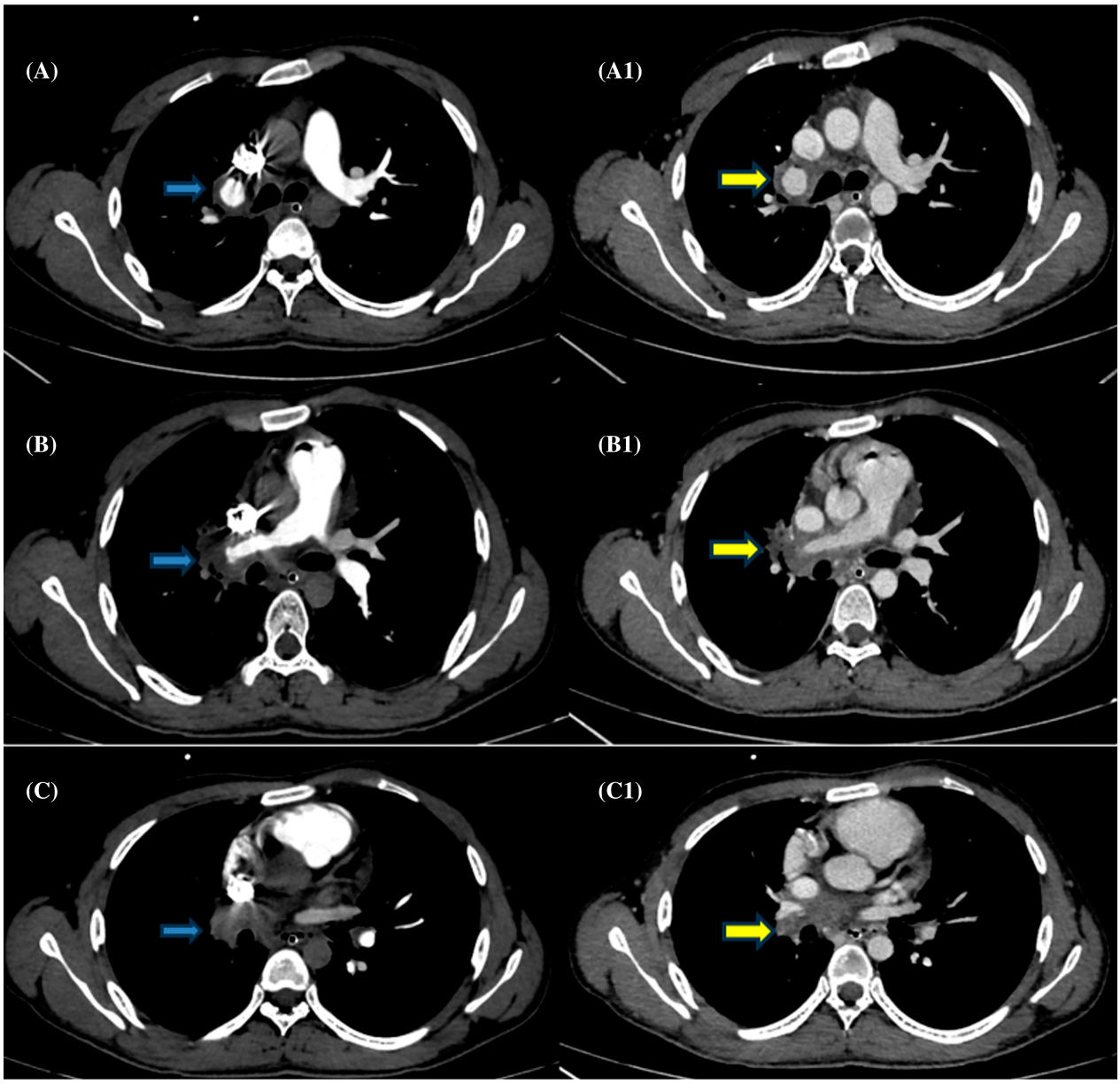

FIGURE 2 Axial computed tomography images in pulmonary arterial phase (left column) and venous phase (right column) at different sections showing eccentric filling defect suggestive of thrombus in the right pulmonary artery (blue arrow) with mural enhancement seen on the venous phase (yellow arrow).

recommended in refractory cases. Endovascular interventions like coil embolization of the aneurysm are less invasive alternatives to surgical management like segmentectomy, lobectomy or pneumonectomy.[8] Anticoagulation can prove detrimental in HSS leading to life-threatening haemorrhage from the PAA. However, anticoagulation decisions should be individualized and benefits may outweigh risks, especially in those with intracardiac thrombus and cerebral venous thrombosis.[9] Ruptured PAA is an independent risk factor associated with mortality and can occur even in the absence of active vasculitis.[10] Fatal outcomes and massive hemoptysis are less common in patients treated with corticosteroids, immunosuppressants and endovascular procedures.[11]

AUTHOR CONTRIBUTIONS

Planning: Priya Deshpande and Kavitha Venkatnarayan. *Conception and design*: Kavitha Venkatnarayan and Priya Deshpande. *Reporting*: Priya Deshpande, Kavitha Venkatnarayan, Likith Niranjanmurthy, Chitra Veluthat, and Uma Maheswari Krishnaswamy. *Acquisition of data*: Priya Deshpande, Likith Niranjanmurthy, and Kavitha Venkatnarayan. *Editing and revision*: Kavitha Venkatnarayan, Uma Maheswari Krishnaswamy, Chitra Veluthat, Uma Devaraj and Priya Ramachandran.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

ORCID

Uma Maheswari Krishnaswamy https://orcid.org/0000-0002-5144-4731

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