Rasmussen Aneurysm

AK Singh¹, Varun Gupta², Bindu Rani², Manish Kumar², Saurabh Kaushik³

Abstract

Angiographic findings in tuberculosis patients presenting with hemoptysis include hypervascularity, hypertrophy of systemic arteries, aneurysm, systemic to pulmonary anastomosis, and rarely, contrast extravasation. Bronchial arteries are the source of hemorrhage in majority of cases with non-bronchial systemic or pulmonary arteries being less common as the source. Rasmussen’s Aneurysm is a very rare sequela of Pulmonary Tuberculosis. We present one such case of Rasmussen’s aneurysm and review of the relevant literature.

Introduction

Rasmussen’s aneurysm is a pulmonary artery aneurysm adjacent or within a tuberculous cavity. It may lead to rupture and haemorrhage. It is named after Fritz Valemar Rasmussen.

Hemoptysis in the presence of TB, often massive, can result from a number of different etiologies, namely, bronchiectasis, aspergilloma, TB reactivation, scar carcinoma, chronic bronchitis, microbial colonization within a cavity, and vascular complications such as pseudoaneurysms. Usually, the source of bleeding is the bronchial arteries due to the surrounding chronic lung parenchymal inflammation, resulting in hypervascularity and elevated pressure within the bronchial arteries or arteriovenous fistula formation. Another, rarer etiology of hemoptysis in TB is due to pulmonary arterial bleeding from a Rasmussen’s aneurysm.

Case Report

A 45 year old male patient presented with moderate to severe hemoptysis for 7 days. He had been experiencing mild grade fever since 5 months and cough with moderate expectoration loss of weight and night sweats since 5 months. Patient was chronic smoker from 20 years. On examination patient was having below average built. His Blood Pressure was 110/70 mmHg, pulse rate-86, respiratory rate was 24/min and respiratory pattern was abdominothoracic. Pallor was present but cyanosis, clubbing, lymphadenopathy, icterus were absent. On auscultation tubular bronchial sound with fine crepts in left inframammary area were heard. The haemogram, coagulogram and routine biochemistry were as follows: Hemoglobin of 7.8 g/dl, TLC-9800 ESR-65 mm in the first hour. Platelet count were 2.76 lac/cumm and coagulation profile (Bleeding time and Clotting time) were normal. His serum creatinine was 0.9 mg/dl, SGOT/SGPT were 18/22 IU/L, total bilirubin was 1 mg/dl.

A chest radiograph PA view (Figure 1) showed no abnormality, with left lateral view (Figure 2) having fibrotic opacities and thin walled cavity just behind the heart in lower lobe of left lung.

CECT thorax (Figure 3) was suggestive of active pulmonary tuberculosis with sequelae in the form of collapse-consolidation and cavitation in left lower lobe, with an enhancing dilated vessel seen inside the cavity suggestive of Rasmussen Aneurysm.

Fibreoptic bronchoscopy revealed mucosal hyperemia with purulent secretions in basal segments of left lower lobe.

BAL for microscopy was AFB...
positive. BAL for cytology was negative for malignant cells. Culture was positive for M. tuberculosis

Treatment given to the patient was conservative in the form of Antitubercular therapy and he was referred to higher centre for further evaluation and management of aneurysm.

Outcome: Patient did not opt for further pulmonary angiography and embolisation procedure as his bleeding stopped after the treatment. He has taken about four months ATT till present and his sputum has become negative for AFB and presently he is in the continuation phase of his treatment.

Discussion

The lungs have two functionally distinct circulatory pathways. The pulmonary vessels convey deoxygenated blood to the alveolar walls and drain oxygenated blood back to the left side of the heart, and the much smaller bronchial vessels, which are derived from the systemic circulation, provide oxygenated blood to lung tissues that do not have close access to atmospheric oxygen, i.e. those of the bronchi and larger bronchioles. The bronchial arteries are having high blood pressure therefore more prone to bleed while pulmonary artery is having low pressure, hence bleeding is not common from pulmonary artery.

Solitary peripheral pulmonary artery aneurysms are a rare entity. Their etiology includes trauma, infection, congenital or acquired pulmonary vascular abnormalities and pulmonary hypertension. A destructive pathology in the lung irrespective of the etiology erodes the adjacent structures in the lung. When such a process occurs tangentially across a vessel wall, the media of the vessel is destroyed and thickened intima protrudes out and an aneurysm results. The eponym Rasmussen’s aneurysm refers specifically to tuberculous etiology. They are usually peripheral and beyond the branches of main pulmonary artery. The exact incidence is not clear because many of them may not be diagnosed and quite a few may regress with antituberculous therapy. Even in tuberculous patients, the major cause of hemoptysis is of bronchial and not pulmonary arterial origin. Thus, in 100 cases of hemoptysis treated by embolisation in Beijing, 2107 cases reported by Gimeno 3 and in 140 cases from Mumbai there was not a single case of Rasmussen’s aneurysm. Rasmussen’s aneurysm is found in 4% of patients with advanced cavitary disease.4 It can present as repeated episodes of minor hemoptysis or as episodes of major hemoptysis as in our case. When the hemoptysis is scanty and the radiology does not reveal a significant lesion, medical management is appropriate. If the hemoptysis is large, aggressive measures must be taken to identify the lesion. Fibreoptic bronchoscopy will help in localizing the segment of the bleed.

Endobronchial lesions can be treated with a variety of bronchoscopically directed interventions, including cautereization and laser therapy. In case of massive bleed goals are then to isolate the bleeding to one lung and not to allow the preserved airspaces in the other lung to be filled with blood. Patients should be placed with the bleeding lung in dependent position (i.e. bleeding-side down), and if possible dual lumen endotracheal tube or an airway blocker should be placed in the proximal airway of the bleeding lung.

Multidetector CT Angiography (MDCTA) is a relatively new imaging technique that allows delineation of abnormal bronchial and nonbronchial arteries using reformatted images in multiple projections, which can be used to guide therapeutic arterial embolization procedures. The advent of contrast-enhanced MDCTA has enabled a noninvasive, first-line method of localizing the site of arterial bleeding in the setting of massive hemoptysis. This MDCTA tool allows for endovascular treatment planning, prior to invasive angiography, to ensure a one-step treatment option for the unstable patient. Remy et al. 5 previously reported that pulmonary angiography must be performed as the second-line investigation with negative bronchial and nonbronchial systemic arteriography.

Bronchial artery embolization (BAE) is now considered to be the most effective procedure for the management of massive and recurrent hemoptysis, either as a first-line therapy or as an adjunct to elective surgery. Prompt repeat embolization is advised in patients with recurrent hemoptysis in order to identify nonbronchial systemic and pulmonary arterial sources of bleeding. Trascatheter embolisation is ideal to control the bleeding in an emergency. During embolization active search must be made for multiple sites of bleeding because non-bronchial systemic artery may be the cause of bleeding. However embolisation is a temporary method and bleeding can recur. Arterial transcatheter embolization can be performed with a number of different commercially available substances, including particulate materials such as embospheres, proximal blocking agents comprising coils, glue, Gelfoam, detachable balloons, stent grafts, and, finally, sclerosing agents such as alcohol. Many of the other authors who have successfully embolized Rasmussen’s aneurysms used coils to achieve occlusion of the aneurysm. However, there is a high rupture rate with coils, which can prove fatal. Surgical excision is recommended where expertise for radiological intervention is not available or when there is considerable destructive process in the lung, producing infections like Coccidioides immitis or Aspergillum. Surgical lobectomy does provide definitive management when the bleeding point can be localized to one lobe and the patient is operable. However, in an intensive care setting, postoperative complications could be encountered in 50% of patients, with mortality in 20%.

Rasmussen’s aneurysm is a rare sequelae of pulmonary tuberculosis. Most cases of hemoptysis resolve with treatment of infection or inflammatory process or with removal of offending process but massive hemoptysis needs early and aggressive management.

References