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Massive Hemoptysis Due To Rasmussen's Aneurysm – Successful Treatment with Pulmonary Artery Coiling

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Abstract

Rasmussen's aneurysm is an inflammatory pseudo-aneurysmal dilatation of a branch of pulmonary artery within or adjacent to a tuberculous cavity. Although uncommon, hemoptysis from the rupture of a Rasmussen's aneurysm can be massive and life threatening and is a dreaded complication of cavitary tuberculosis (TB). We describe the case of a young gentleman who presented with low-grade fever and massive bouts of hemoptysis due to cavitating tuberculosis which did not respond to conservative measures and anti-tuberculosis drugs. Computed tomographic (CT) angiography revealed aneurysmal dilatation of the right lower lobe pulmonary artery branch adjacent to the cavity wall, which was successfully treated with catheter guided trans-pulmonary arterial glue embolization.

Key words: Massive hemoptysis, Rasmussen's aneurysm, Pulmonary artery pseudo aneurysm, pulmonary artery coiling, endovascular coiling

Introduction

Massive hemoptysis is a medical emergency which might necessitate coordinated multidisciplinary care from pulmonologists, intensivists, interventional radiologists, anaesthesiologists and thoracic surgeons. Airway management is crucially important and is the first step followed by prompt diagnostic tests to establish the aetiology. With life threatening bleeding not responding to conservative measures, interventional procedures help to arrest on-going bleed, provide time for definitive therapy and avoid further cardio-respiratory compromise.

Tuberculosis still continues to pose significant medical threat in the developing world. Hemoptysis can occur in both active and quiescent TB. The causes of hemoptysis in TB are manifold. Minor hemoptysis in active TB is often self-limited and settles with a few days to weeks of anti-tubercular therapy along with conservative measures. However, life threatening hemoptysis is often arterial in origin which warrants urgent intervention. Rasmussen's aneurysm is an inflammatory pseudo-aneurysmal dilatation of a branch of a pulmonary artery (PA). We hereby present the case of a young gentle man who presented with massive hemoptysis from a disrupted Rasmussen's aneurysm needing lifesaving intervention and airway management.

Case Report

A 44 year old gentleman, manual labourer by occupation presented to the emergency department with massive bouts of hemoptysis. He gave history of cough, on and off fever and breathlessness of 1 month duration. He had significant smoking history and history of chronic consumption of alcohol. He denied any medical illness or admission in the past. He never experienced bleed from elsewhere.

On admission patient had a pulse rate of 120/min, respiratory rate of 36 with some degree of hypoxia (SpO2 93% on room air). His blood pressure was 110/ 70 mm of mercury. Laboratory reports revealed a .hemoglobin level of 13.8 g/dl, total leukocyte count of 18,000/cumm. Arterial blood gas analysis showed hypoxia. Antibodies for human immunodeficiency virus by ELISA and serum hepatitis B surface antigen were negative. His prothrombin time, renal and liver functions were within normal range. Chest Xray (Figure 1a)showed consolidation of the middle and lower lobe of the right lung with small right pleural effusion. He was immediately initiated on hemostatic agents, antitussives, antibiotics and sedatives. CT angiogram was performed at the emergency department itself. Computed tomography [Figure 1b, c] demonstrated an area of consolidation with cavitation in the right lower lobe and a focally dilated pulmonary artery branch in the cavity wall showing intense contrast enhancement, consistent with a Rasmussen's aneurysm.

A high risk bronchoscopy was performed on an emergency basis which did not reveal any endobronchially treatable bleeding source. Intrabronchial clots were retrieved from both lower lobes. Bronchoalveolar lavage fluid from lower lobes demonstrated positivity for acid fast bacilli. He was initiated on antitubercular treatment (ATT). Since he had active bouts of hemoptysis despite conservative measures, he was immediately taken up for a pulmonary angiography through a femoral vein approach. Aneurysmal coiling was performed by interventional radiology team. (Figure 2 a, b, c)

He did not develop any major bleeding post procedure. His serial haemoglobin levels revealed no drop. His chest radiograph in the subsequent days showed significant clearance of shadows (Figure 3) and he was discharged on ATT.

Discussion

Pulmonary tuberculosis (PTB) can cause a myriad of complications and sequelae**.** It can cause parenchymal destruction, fibrosis, airway abnormalities like broncholithiasis, bronchial tenosis, vascular lesions due to pulmonary/bronchial artery involvement leading to hemoptysis.

Hemoptysis can occur due to bleeding from cavity wall, active endobronchial tuberculosis (TB), post TB bronchiectasis, aspergilloma, rupture of bronchial artery and Rasmussen's aneurysm. Bronchial artery involvement is more common in PTB. The origin of massive hemoptysis in 95% of cases is from the bronchial circulation. [1] Ruptured pulmonary arterial pseudo aneurysm (Rasmussen's aneurysm) is an uncommon but fatal cause of hemoptysis.

Rasmussen's aneurysm was first described by a Danish physician Fritz Valdemar Rasmussen in 1868.[2] Rasmussen's aneurysm is a rare entity with a prevalence rate of 5**%.** [3] A true aneurysm is a focal dilatation of a vessel wall involving all three layers. When a destructive pathology like tuberculosis erodes through a vessel wall, the media of the vessel is destroyed and thickened intima protrudes out creating a pseudoaneurysm. Rasmussen's is a pseudo aneurysm, thereby increasing chances of rupture and torrential hemoptysis. [3]

It can present as recurrent minor hemoptysis episodes or as a single major episode of fatal hemoptysis as in our case. Multi Detector Computed Tomography (MDCT) angiography is the investigation of choice in a case of massive hemoptysis depending on the safety associated with individual case. Assessment of the images will demonstrate focal contrast enhancement within the vascular aneurysm thus helping in identification of site of bleed and planning an embolization procedure. [4]

Patients with active hemoptysis leading to hemodynamic instability and airway compromise should be immediately secured with intubation and stabilised in an intensive care set up. Keeping the bleeding lung in a dependent position may prevent further blood spillage into the non bleeding lung and prevent airway compromise. Placing single lumen endotracheal tube into either the right or the left mainstem bronchus can be beneficial.[5]

Arterial trans-catheter embolization is the management of choice for massive hemoptysis originating from either bronchial or pulmonary circulation and not promptly responding to conservative measures. Commercially available substances include particulate materials such as embospheres, proximal blocking agents comprising of coils, glue, gelfoam, detachable balloons, stent grafts and finally, sclerosing agents such as alcohol. Studies have been conducted evaluating various methods for embolization though limited data exists comparing these methods to each other. Whatever available data suggests no clear advantage of one over the other.[6,7].

Conclusion

Life threatening massive hemoptysis in active pulmonary tuberculosis can occur from a Rasmussen's aneurysm. An emergency MDCT of the chest is valuable is such instances which localizes the lesion and establishes the source from pulmonary circulation. This differentiation is crucial as a substantial majority of massive hemoptysis have origin from bronchial circulation, a situation where the therapeutic approach is different. With continuing life threatening bouts of hemoptysis not responding to pharmacological management, emergency endovascular technique like arterial trans-catheter embolization is the preferred therapeutic modality for achieving hemostasis.

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Legends Figure

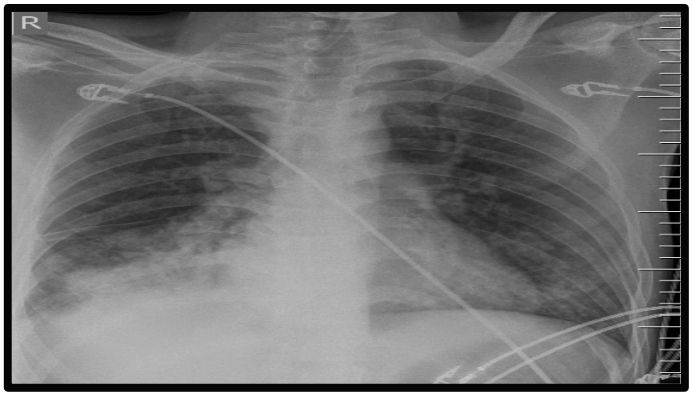

Figure 1a : Chest radiograph showing right lower zone haziness

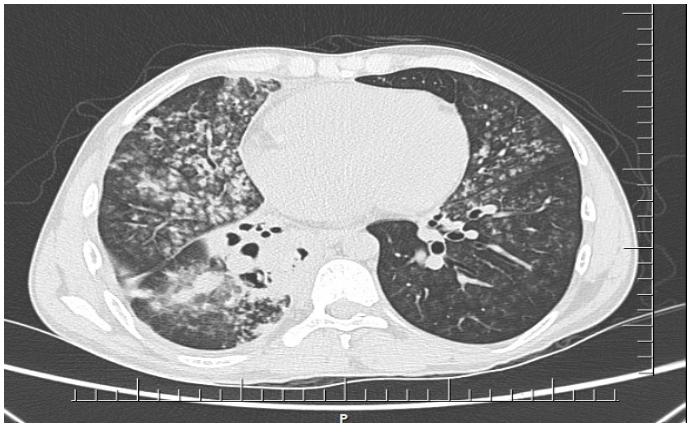

Figure : 1b - CT chest showing consolidation with cavitation of right lower and middle lobe with pleural effusion

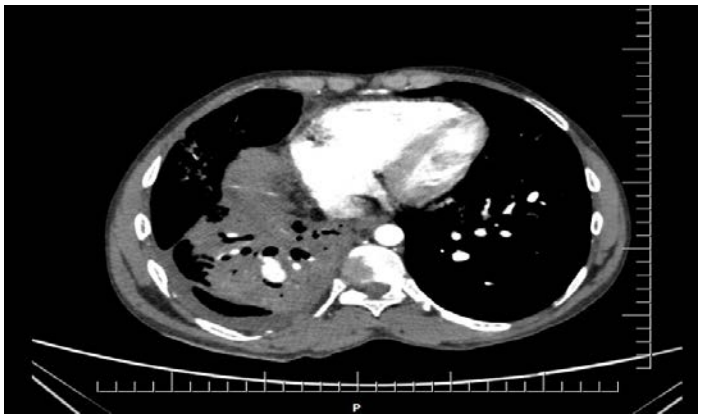

Figure 1 c : Contrast image showing focally dilated pulmonary artery (PA) branch in the cavity wall showing intense contrast enhancement, consistent with a Rasmussen's aneurysm.

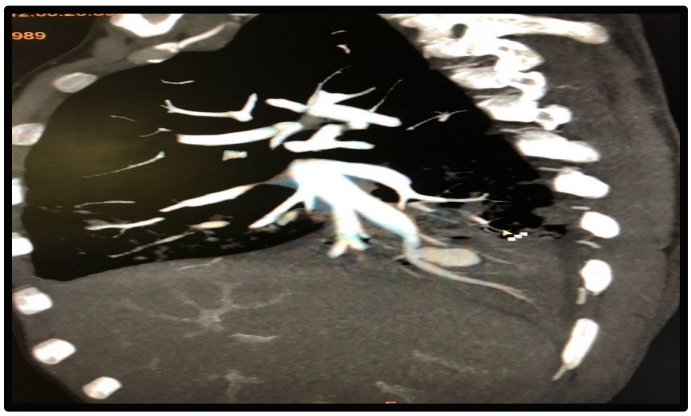

Figure 2 a : Right lower lobe PA angiogram showing right lower lobe medial basal segmental saccular aneurysm.

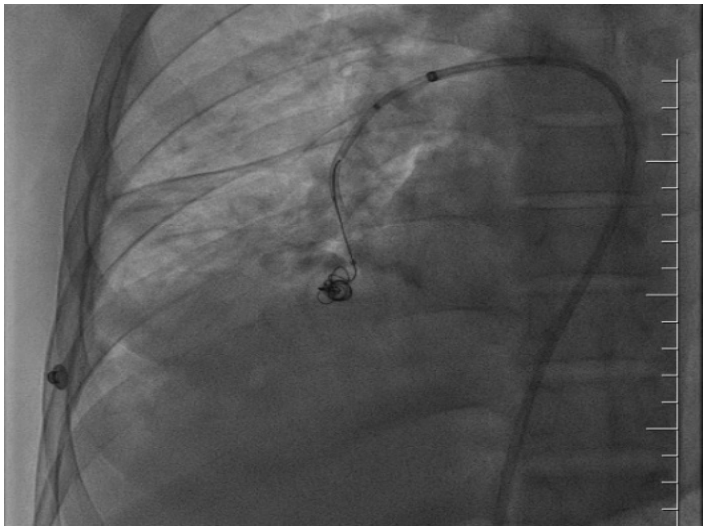

Figure 2 b: Successful coil embolization of the aneurysm sac.

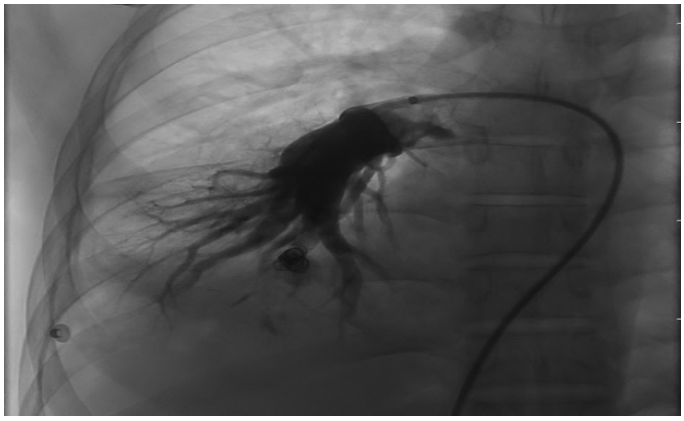

Figure 2c: Post embolization angiogram showing obliteration of the aneurysm sac with normal filling of rest of the lower lobe PA branches.

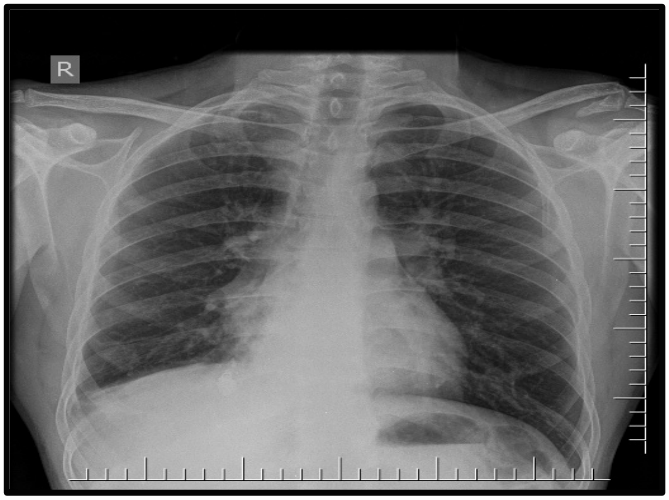

Figure 3: Post coiling and bronchoscopy CXR showing significant clearance of right lower zone shadows