Fatal hemoptysis due to ruptured peripheral pulmonary artery pseudoaneurysm

Sir,

Pulmonary tuberculosis (PTB) can cause many complications and sequelae. These may be grouped as (a) parenchymal lesions-tuberculoma, cavity, aspergilloma, carcinoma; (b) airway lesions-broncholithiasis, bronchial stenosis, bronchiectasis; (c) vascular lesions-hemoptysis due to pulmonary/bronchial arteritis, Rasmussen’s aneurysm; (d) mediastinal lesions-lymph node calcification, esophagobronchial mediastinal fistulae, fibrosing mediastinitis; (e) pleural lesions-chronic empyema, fibrothorax, bronchopleural fistula, pneumothorax; (f) chest wall lesions.

Hemoptysis is a serious complication of treated or untreated PTB. It can occur due to bleeding from cavity wall, endobronchial tuberculosis (TB), post-TB bronchiectasis, aspergilloma, or rupture of Rasmussen’s aneurysm. A common cause is the bronchial artery involvement in PTB. Ruptured pulmonary arterial pseudoaneurysm (Rasmussen’s aneurysm) is an uncommon yet often fatal cause of hemoptysis.

Rasmussen’s aneurysm, first described by Fritz Valdemar Rasmussen, a Danish physician in 1868 is found in a TB cavity especially in the upper lobes.[1] Early recognition and proper management is very important because of its associated high mortality.[2] An aneurysm is a focal dilatation of a vessel wall involving all three layers, and a pseudoaneurysm is one which has focal dilatation of the vessel wall without involvement of all three layers, hence is more prone to rupture and life-threatening hemoptysis.[2,3]

We treated a case of a 44-year-old diabetic male who was admitted with a cough, fever, breathlessness, and right-sided pleuritic chest pain, of 1 month duration. There was no history of TB, malignancy, hypertension, or any chemotherapy taken in the past. On admission patient had a pulse rate of 120/min. Respiratory system examination revealed dull note on percussion, reduced breath sounds in the right infra-axillary region and bronchial breath sounds in the right mammary region. The rest of the physical examination was normal.

The following were his laboratory reports - hemoglobin (Hb) - 13.8 g/dl, total leukocyte count - 18,000/cumm, random blood glucose - 324 mg/dl, urine was positive for ketones. Arterial blood gas analysis showed pH-7.249 and bicarbonate levels - 11.6 mmol/L suggestive of metabolic acidosis. Serum human immunodeficiency virus (S.HIV) and serum hepatitis B surface antigen (S.HBsAg) were negative. Chest X-ray [Figure 1] showed consolidation of the right middle and lower lobe of the lung with pleural effusion. Sputum culture grew streptococcus pyogenes sensitive to piperacillin and tazobactam. Sputum tested positive for mycobacterium TB. Diagnostic thoracocentesis was done. Pleural fluid examination showed 150 cells, predominantly lymphocytes with normal protein and low glucose levels (20 mg/dl). The pleural fluid adenosine deaminase level was 74 IU/L (normal ≤40). The growth of S. Pyogenes in sputum and high cell count and low glucose levels in pleural fluid was suggestive of secondary bacterial infection.

The patient was diagnosed to have sputum positive pleuropulmonary TB with secondary bacterial synpneumonic effusion with diabetic ketoacidosis. Patient was started on anti-tubercular drugs (category I of revised National TB Control Programme, India), intravenous fluids, short-acting regular human insulin and piperacillin (4.0 g) - tazobactam (0.5 g) combination in a dose of 4.5 g thrice a day intravenously. The diabetic ketoacidosis was managed as per standard recommendations. Patient’s general condition improved with treatment. On day 12 of admission, the patient complained of two spoonfuls of hemoptysis. Repeat X-ray chest showed right lower lobe consolidation (same as before). Contrast enhanced computed tomography (CT) of the thorax showed consolidation and collapse affecting the right middle and lower lobe with mild pleural effusion. There were multiple cavities and...
breakdown with surrounding infiltrates in the right lower lobe. These findings were suggestive of active TB with secondary infection. A pseudoaneurysm of a peripheral branch of pulmonary artery was detected in the area of consolidation and cavity in the right lung [Figure 2] (Rasmussen's aneurysm). CT pulmonary angiography and fiber optic bronchoscopy was planned for the next day. However in the evening, the patient had sudden massive hemoptysis with collapse and efforts to resuscitate him were unsuccessful. Thus, there was rupture of the Rasmussen's aneurysm resulting in massive hemoptysis, asphyxiation, and death.

Rasmussen's aneurysm is a rare entity with a prevalence rate of 5%.\[4\] It may occur due to iatrogenic injuries especially during Swan-Ganz catheterization, infections such as TB, pyogenic lung abscess, aspergillosis and mucormycosis, septic embolization, Behcet’s disease, bronchiectasis, and necrotic cavitary lung carcinoma.\[5,6\] A destructive pathology in the lung like TB 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 a pseudoaneurysm results.

It can present as episodes of minor hemoptysis or as a single episode of major and often fatal hemoptysis as in our case. It can be effectively treated by steel coil occlusion.\[7\] Fiber optic bronchoscopy will help in localizing the segment of the bleed, and bronchial blockade will help prevent asphyxiation when the active bleeding is occurring. Transcatheter embolization, although temporary, is a quick measure to control the bleeding in an emergency situation. Surgical treatment of an aneurysm due to destructive lung diseases includes a partial/total pneumonectomy or lobectomy.

To conclude, every suspected cavitary TB patient with hemoptysis should be assessed with contrast enhanced CT of the thorax, for the early detection and timely intervention of pulmonary or bronchial artery aneurysm.

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Conflicts of interest
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Bhumika Vaishnav,
Arvind Bamanikar, Vivek Singh Rathore,
Vinit Kumar Khemka
Department of Medicine, Dr. D.Y. Patil Medical College,
Hospital and Research Centre, Pune, Maharashtra, India
E-mail: bhumika.dholakia@gmail.com

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