

Case Report

Intercostal artery pseudoaneurysm in pulmonary tuberculosis - A rare cause of hemoptysis: A case report with review of the literature

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ABSTRACT

Pulmonary tuberculosis (TB) is one of the common causes of life-threatening hemoptysis, particularly in developing countries. Bronchial and pulmonary arteries are the major source of hemoptysis in pulmonary TB. Intercostal artery pseudoaneurysm as a cause of hemoptysis in pulmonary TB is extremely rare, with only a few reported cases. We describe a case of intercostal artery pseudoaneurysm in a patient of pulmonary TB, presenting as massive hemoptysis. Computed tomography bronchial angiography (CTBA) revealed a contrast-filled outpouching in a left upper lobe cavity. Catheter angiography revealed a pseudoaneurysm arising from one of the left intercostal arteries, which was managed subsequently by endovascular embolization. Pseudoaneurysm from visceral arteries is an extremely rare but important cause of massive hemoptysis in pulmonary TB, which if not managed promptly may prove fatal.

KEY WORDS: Embolization, endovascular, hemoptysis, intercostal artery pseudoaneurysm, tuberculosis

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INTRODUCTION

Hemoptysis is a common presentation in patients with pulmonary tuberculosis (TB) and it remains the leading cause of hemoptysis in developing countries.^[1] Hemoptysis in pulmonary TB can be seen in active disease as well as sequela to healed infection.^[2] Hemoptysis occurs either due to rupture of small friable vessels secondary to inflammation or due to the involvement of large vessels such as a pulmonary artery. Life-threatening hemoptysis secondary to Rasmussen's aneurysm is common.^[2] Very rarely, pseudoaneurysms of other visceral arteries can also be seen in pulmonary TB.^[3-5] Pseudoaneurysm of an intercostal artery in pulmonary TB is extremely rare with only a few cases reported in the literature.^[4,5] We describe a case of life-threatening hemoptysis secondary

to intercostal artery pseudoaneurysm in a patient of pulmonary TB, which was subsequently managed by transarterial embolization.

CASE REPORT

A 34-year-old female presented to the emergency department of our institute with massive hemoptysis. Initially, the patient had streaky hemoptysis for 1 week, followed by a bout of massive hemoptysis (~300 ml in 24 h). The patient had a past history of sputum positive pulmonary TB for the past 2 years, for which she had received antitubercular therapy. On examination, the patient had

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tachycardia (pulse 110/min), hypotension (blood pressure: 90/58 mmHg), and respiratory rate was 18/min with oxygen saturation of 92% on room air. Local examination revealed crepitation in the left upper zone. Laboratory investigations revealed leukocytosis ($18 \times 10^3/\text{dl}$), elevated erythrocyte sedimentation rate was 60 mm/h, and anemia (hemoglobin was 9 g/dl). Liver and renal function tests and coagulation profile were within normal limits.

Chest radiograph showed fibrocavitary changes in bilateral upper zones (not shown here). Computed tomography bronchial angiography (CTBA) was performed with bolus tracking technique with the preset trigger of 100 HU at descending thoracic aorta at the level of T4, on a 64 slice CT (Lightspeed VCT, GE Healthcare, USA) with detector collimation of $64 \text{ mm} \times 0.625 \text{ mm}$. 80 ml of iodinated nonionic contrast medium (omnipaque, GE Healthcare, USA) was administered during the study at a rate of 3.8 ml/s. CTBA revealed fibrocavitary changes with surrounding consolidation in bilateral upper lobes with centrilobular nodules in left upper lobe consistent with reactivation of disease. A small contrast-filled outpouching was seen within the cavity in left upper lobe [Figure 1a and b]. However, a vessel of origin could not be traced and was presumed to be arising from one of the pulmonary artery branches. (Rasmussen's aneurysm); no evidence of bronchial artery hypertrophy was seen, however intercostal arteries on the left side were prominent.

The patient was subsequently considered for endovascular management. Diagnostic angiogram of bronchial arteries using 5F SIM 1 catheter (Cook, Bloomington, USA) using the right transfemoral approach showed normal bronchial arteries on both sides with no abnormal parenchymal blush. A pseudoaneurysm was seen arising from the left 3rd posterior intercostal artery with abnormal parenchymal blush and systemic pulmonary shunting [Figure 2a]. Selective cannulation of the intercostal artery was done with progreat microcatheter (Terumo, NJ, Japan) [Figure 2b] and embolized using polyvinyl

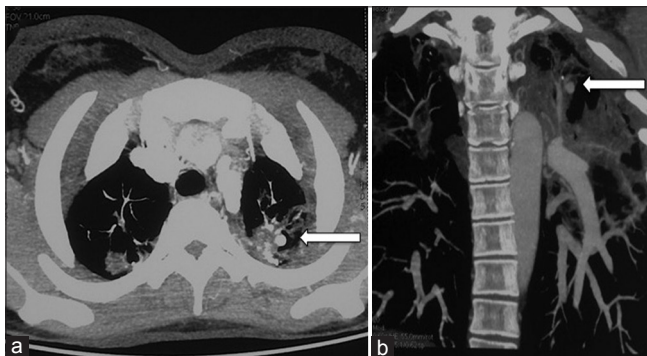


Figure 1: Computed tomography bronchial angiography axial (a) and coronal (b) maximum intensity projection images in mediastinal window setting show a well-defined contrast outpouching (white arrows in a and b) in the left upper lobe. Note patches of consolidation in bilateral upper lobes

alcohol particles (PVA) 500 μm –700 μm and gelfoam slurry. Postembolization check angiograms did not show opacification of pseudoaneurysm [Figure 2c]. The procedure was uneventful with improved hemodynamic status postprocedure. There was no further episode of hemoptysis on follow-up for 3 months.

DISCUSSION

Massive hemoptysis is a life-threatening emergency, and the most common cause in developing countries still remains the pulmonary TB.^[1] Endovascular embolization is preferred and safe method for management of life-threatening hemoptysis and has become first-line treatment for massive hemoptysis. It is preferable to localize the cause and site of bleeding by CTBA, if clinical situation permits for better planning of endovascular treatment.^[3]

Hemoptysis in pulmonary TB is of bronchial artery origin in more than 90% of cases;^[6] rarely, it can be from the pulmonary artery (Rasmussen's aneurysm) or systemic arteries when the disease is peripheral or pleural. The most common systemic arteries are subclavian, axillary, internal mammary, intercostal, and inferior phrenic arteries.^[6]

We report a case of massive hemoptysis in which CTBA revealed cavity in the left upper lobe with small contrast-filled outpouching. Vessel of origin could not be localized on CT. On catheter angiography, a pseudoaneurysm was seen arising from an intercostal artery, which was subsequently embolized. Thus, index case highlights the importance of searching for nonbronchial systemic supply in a case of hemoptysis.

Pseudoaneurysm of the intercostal artery is very rare. Only two cases of intercostal artery pseudoaneurysms in pulmonary TB have been reported previously.^[4,5] Aneurysmal lesion associated with cavitory lesion in a patient with pulmonary TB is due to the involvement of bronchial or pulmonary arteries.^[7,8] However, in our case, there was an intracavitary aneurysm arising from the intercostal artery. Arterial wall weakening from tubercular cavity is thought to be responsible for pseudoaneurysm formation.^[5]

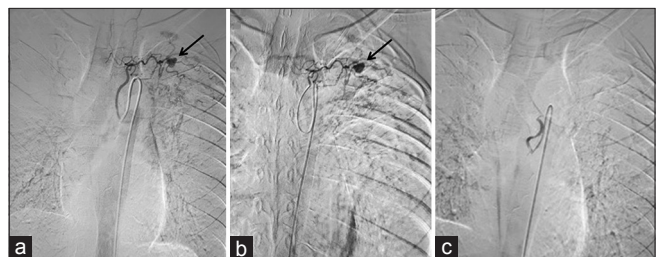


Figure 2: Diagnostic angiograms (a and b) of left 3rd intercostal artery shows a lobulated pseudoaneurysm (black arrow). The intercostal artery was prominent and tortuous with an abnormal parenchymal blush. Postembolization check angiogram (c) shows the isolation of pseudoaneurysm

Management of intercostal artery pseudoaneurysm includes endovascular embolization, with surgery being reserved for refractory cases. The use of coils^[4] and gelatin sponge^[9] for embolization of intercostal artery pseudoaneurysm has been described in the literature. Embolization of visceral artery pseudoaneurysm with n-butyl cyanoacrylate for the management of hemoptysis has also been described.^[3] In index case, we used PVA and gelfoam for embolization of intercostal artery.

CONCLUSION

Emergency physician should not ignore the possibility of bleed from nonbronchial systemic circulation in a case of life-threatening hemoptysis. Pseudoaneurysm of an intercostal artery in pulmonary TB is extremely rare and can present with massive hemoptysis. Thus, a thorough search should be made for any nonbronchial systemic supply in any case of massive hemoptysis. Catheter angiography followed by endovascular embolization remains the treatment of choice in these cases, with surgery reserved for refractory cases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Prasad R, Garg R, Singhal S, Srivastava P. Lessons from patients with hemoptysis attending a chest clinic in India. *Ann Thorac Med* 2009;4:10-2.
2. Paramasivan R, Rajasekaran S, Parthasarathy RT. Haemoptysis and pulmonary tuberculosis – An analysis. *Lung India* 1994;12:192.
3. Singhal M, Giragani S, Lal A, Sharma A, Khandelwal N. An unusual cause of hemoptysis: Costocervical trunk pseudoaneurysm. *Emerg Radiol* 2011;18:53-5.
4. Chu WP, Cheng LF. Mycotic aneurysm of an intercostal artery: A rare cause of haemothorax. *J Hong Kong Col Radiol* 2010;13:144-8.
5. Hernández-Velásquez D, Monreal-Robles R, Ruiz-Sánchez D, Delgado-García G. Massive hemoptysis due to intercostal artery aneurysm in pulmonary tuberculosis. *Pneumologia* 2016;65:48-50.
6. Yoon W, Kim JK, Kim YH, Chung TW, Kang HK. Bronchial and nonbronchial systemic artery embolization for life-threatening hemoptysis: A comprehensive review. *Radiographics* 2002;22:1395-409.
7. Iriki T, Morinoa E, Takasakia J, Sugiyama H, Kobayashi N. Contrast-enhanced chest computed tomography leads to early diagnosis and prompt treatment of unruptured Rasmussen's aneurysm. *AJRS* 2012;1:439-44.
8. Karmakar S, Nath A, Neyaz Z, Lal H, Phadke RV. Bronchial artery aneurysm due to pulmonary tuberculosis: Detection with multidetector computed tomographic angiography. *J Clin Imaging Sci* 2011;1:26.
9. Muthuswamy P, Samuel J, Mizock B, Dunne P. Recurrent massive bleeding from an intercostal artery aneurysm through an empyema chest tube. *Chest* 1993;104:637-9.