Research Paper

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Role of Bronchial Arterial Embolization in The Management of Massive Haemoptysis: an Interesting Case Report

Medical Science

KEYWORDS : Angiography, Arterial embolization, Bronchial artery, Chhattisgarh, Hemoptysis, Raipur

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ABSTRACT

Despite continued technologic progress, including advances in medical imaging, hemoptysis remains an important clinical and potentially grave condition. Any hemorrhage resulting in compromise of pulmonary or hemodynamic status should be considered substantial necessitating therapeutic intervention. The management of life-threatening hemoptysis demands a well-integrated, multidisciplinary approach.

Introduction

Endovascular arterial embolization is becoming more and more favored over wedge resections for massive hemoptysis due to being less invasive and offering fewer complications, especially to those who are poor surgical candidates or have less pulmonary reserve. Readers will be able to learn from this case about the issues we present with hemoptysis in patients with underlying chronic lung disease.

Case report

A 40-year-old man, non-smoker, presented with 1500 ml of bright red hemoptysis. He was diagnosed with pulmonary tuberculosis 6 years back, which evaluating for chronic cough. At that time he had chronic cough but no hemoptysis and he had undergone successful medical management for pulmonary tuberculosis. He remained asymptomatic until 2 year back with episode of mild hemoptysis which was managed conservatively. At present he presented with massive hemoptysis. MDCT scan revealed lower lobe consolidation and enlarged left bronchial and superior intercostal artery.

On presentation, the patient was noted to be anxious and dyspneic with hemoptysis. He had tachycardia and tachypnea with an oxygen saturation of 90% on supplemental oxygen. Blood pressure was normal. Bilateral diffuse crackles were auscultated. Hemoglobin was 6gm% following three units of blood transfusion was given. [**Figure-1(a, b)**] Patient was tried on conservative management for massive haemoptysis but was no significant improvement in haemoptysis. So patient was urgently taken to Angiosuite for Diagnostic Angiogram which revealed blushing of the parenchyma and extravasation of contrast from Rasmussen aneurysm (rupture of aneurysm during angiogram) on left bronchial artery. [**Figure-2**] Successful particle embolisation was performed after super selective catheterization of left-sided bronchial artery following endovascular coiling was done for further haemostasis. The patient tolerated the procedure well and there were no obvious complications identified. His haemoptysis resolved and repeat bronchoscopy did not reveal further haemorrhage. Although wedge resection would be possible in a person with pulmonary hemorrhage, parenchymal-sparing strategies had to be considered given the concern that he would require future resections which could probably compromise his remaining pulmonary function. During serial follow-up evaluations over the next 7 days, the patient remained asymptomatic with no further episodes of haemoptysis. He reported significant improvements in exercise tolerance. Three month follow-up revealed no active hemoptysis. [**Figure-3, 4**]

Discussion

Tuberculosis mostly affects young adults, in their most productive years. Although, all age groups are at risk. Over 95% of cases and deaths are in developing countries **[1]**. Chronic inflammation associated with tubercular lesions leads to neovascularization and increased collateral supply from nearby systemic arteries. These newly formed collateral vessels have weak arterial wall and are prone to rupture. Tubercular cavities and tubercular bronchiectasis are often the source of bleeding. **[2–10]** Granulocyte-Colony Stimulating Factor, Granulocyte Macrophage Colony Stimulating Factor, Basic Fibroblast Growth Factor, and Vascular Endothelial Growth Factor (most potent) have been implicated as direct mediators of angiogenesis and neovascularization. Prostaglandins E1 and E2 (PGE1, PGE2), Tumour Necrosis Factor α (TNF α), Interleukins 1, 6, and 8 (IL-1, IL-6, IL-8) and Nitric Oxide are inflammatory mediators that have indirect angiogenic activity. **[4]** Hypervascularity and hypertrophied bronchial arteries are the common findings on angiograms. Bronchial artery aneurysms have been reported in about 7% of patients of pulmonary tuberculosis presenting with massive hemoptysis.**[2]** The term pseudoaneurysm is often used interchangeably with the aneurysm.**[11]** Bronchial artery aneurysm has also been associated with congenital causes such as pulmonary sequestration or pulmonary agenesis, or acquired causes like atherosclerosis, inflammatory lung disease, bronchiectasis, sarcoidosis, Osler-Weber-Rendu disease, and trauma.**[6–10]** Bronchial artery aneurysms may arise either within the mediastinum or from the intrapulmonary portion of the artery.**[11]** Rupture of bronchial artery aneurysms located in mediastinum may cause hemothorax and mediastinal hemorrhage whereas rupture of the intrapulmonary aneurysm can give rise to massive hemoptysis. Rarely, an aneurysm of the pulmonary artery (Rasmussen aneurysm) is also caused by erosion from adjacent tubercular cavities. **[12]**

MDCT angiography is a non-invasive investigation that enables detailed evaluation of the lung parenchyma, airway and mediastinum along with the thoracic vasculature in a single study.**[3]** CT scan helps in localizing the site of hemorrhage in 63–100% of patients with hemoptysis, a rate that is higher than that for fibro-optic bronchoscopy (FOB).**[11]** It shows distal airways beyond the reach of the FOB and the lung parenchyma surrounding these airways.**[13]** However, FOB is more useful than CT in evaluating endobronchial lesions and early mucosal abnormalities. Another advantage of FOB is that it can be used to localize the site of hemoptysis in patients whose condition is not stable enough to allow them to leave the intensive care unit to undergo CT. FOB can be used to give local therapy for control of hemor-

rhage and to provide sample for tissue diagnosis and microbiology work up. Thus, FOB remains an important, complementary diagnostic tool in the evaluation of acute hemoptysis. Although in a case of massive hemoptysis, the patient can be directly taken up for combined diagnostic angiography and bronchial artery embolization without CT scan and bronchoscopy, this approach has some disadvantages.[13] Performing CT first can rule out situations in which surgery would be preferred over bronchial artery embolization.

Bronchial and non-bronchial systemic artery embolization is an established procedure for the treatment of massive hemoptysis. [10] Intrapulmonary bronchial artery aneurysms have been successfully treated with transcatheter embolization using various embolizing agent such as particulate, liquid and platinum or fibered coils. However, large aneurysms and those located in mediastinum may require surgery or aortic stent graft. [5–9]

Conclusion

Compared with conventional angiography, MDCT angiography is a minimally invasive, quick, and relatively low cost procedure. In emergency situations, it can be performed rapidly as it does not require much pre-procedure work up and is widely available in most tertiary care and trauma centers. However, conventional angiogram remains the gold standard to exactly locate the site of arterial leak and with added advantage of immediate embolization of the selective arterial leak. Combination of MDCT and conventional angiogram helps to provide the next best step in the management of the patients with hemoptysis. Thus, the current study emphasizes the importance of bronchial artery embolization in the early and emergency management of T.B. related massive hemoptysis.

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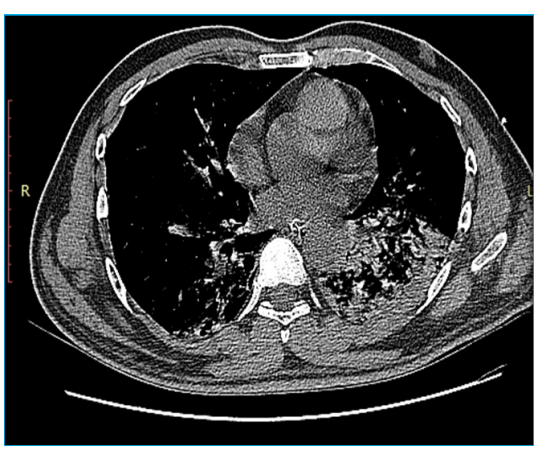

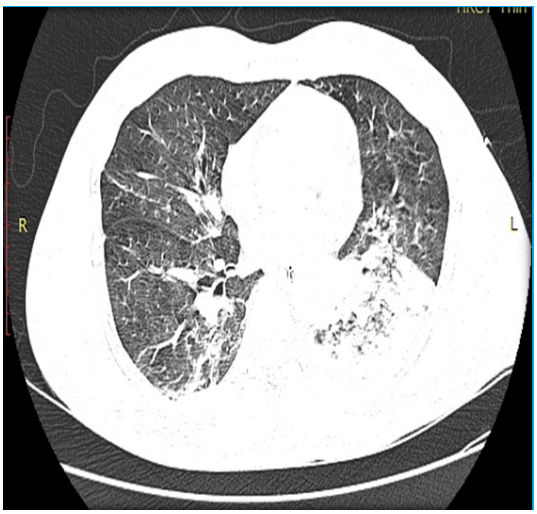

Figure-1: (a) Mediastinal window (b) Lung window shows left lobe irregular consolidation with mild volume loss

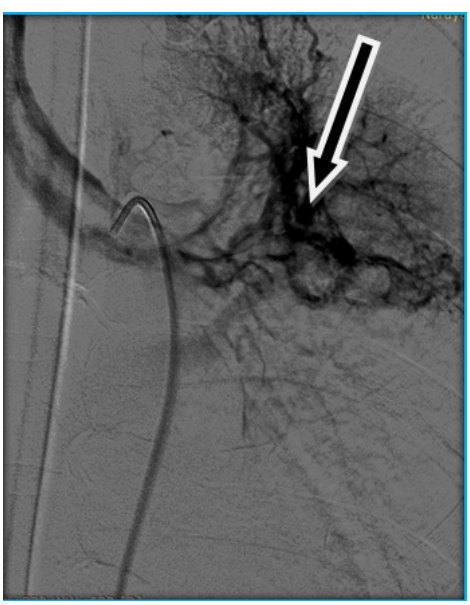

Figure-2: Selective catheterization of left bronchial artery demonstrate parenchymal blush with ongoing source of hemorrhage from ruptured Rasmusen Aneurysm (Large arrow) into the left main bronchus.

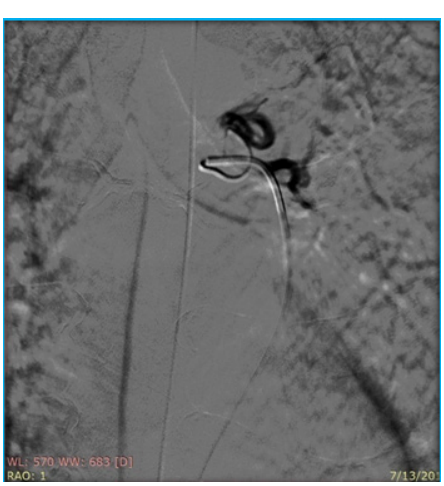

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Figure-3: Super selective embolization of left bronchial artery resulted in resolution of extravasation of contrast.

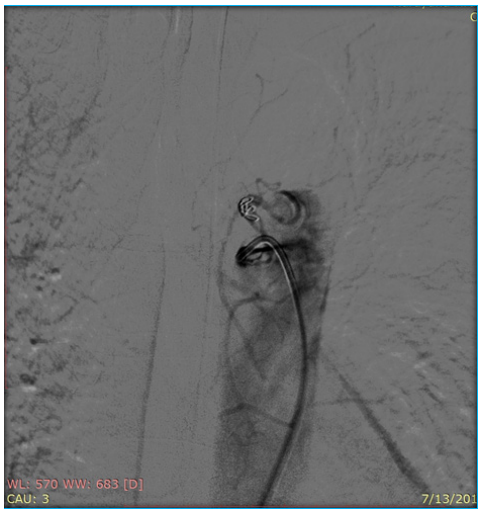

Figure-4: Endovascular coiling of left bronchial artery resulted in complete resolution of extravasation of contrast.

REFERENCE

1. http://www.tbcindia.nic.in/pdfs/TB%20INDIA%202014.pdf | 2. 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. [PMC free article] [PubMed] | 3. Ramakantan R, Bandekar VG, Gandhi MS, Aulakh BG, Deshmukh HL. Massive hemoptysis due to pulmonary tuberculosis: Control with bronchial artery embolization. Radiology. 1996; 200:691–4. [PubMed] | 4. Bruzzi JF, Rémy-Jardin M, Delhaye D, Teisseire A, Khalil C, Rémy J. Multi-detector row CT of hemoptysis. Radiographics. 2006; 26:3–22. [PubMed] | 5. Remy-Jardin M, Bouaziz N, Dumont P, Brillet PY, Bruzzi J, Remy J. Bronchial and nonbronchial systemic arteries at multi–detector row CT angiography: Comparison with conventional angiography. Radiology. 2004; 233:741–9. [PubMed] | 6. Mizuguchi S, Inoue K, Kida A, Isota M, Hige K, Aoyama T, et al. Ruptured bronchial artery aneurysm associated with bronchiectasis: A case report. Ann Thorac Cardiovasc Surg. 2009;15:115–8. [PubMed] | 7. Chatterjee A, Ghosh S, Salhiyyah K, Gaines P, Rocco G. A rare presentation of a ruptured bronchial artery aneurysm. Thorax. 2004;59:912. [PMC free article] [PubMed] | 8. Haddad R. Bronchial artery aneurysm. Eur J Cardiothorac Surg. 2004;26:213. [PubMed] | 9. Sanchez E, Alados P, Zurera L, Canis M, Muñoz I, Casares J, et al. Bronchial artery aneurysm treated with aortic stent graft and fibrin sealant. Ann Thorac Surg. 2007;83:693–5. [PubMed] | 10. Suen HC, DuMontier CC, Boeren J, Charland W, Daily BB. Ruptured bronchial artery aneurysm associated with sarcoidosis. Thorac Cardiovasc Surg. 2003;125:1153–4. [PubMed] | 11. Yoon W, Kim JK, Kim YH, Chung TW, Kang HK. Bronchial and nonbronchial systemic artery embolization for lifethreatening hemoptysis: A comprehensive review. Radiographics. 2002;22:1395–409. [PubMed] | 12. Leung AN. Pulmonary tuberculosis: The essentials. Radiology. 1999;210:307–22. [PubMed] | 13. Sirajuddin A, Mohammed TL. A 44-year-old man with hemoptysis: a review of pertinent imaging studies and radiographic interventions. Cleve Clin J Med. 2008;75:601–7. [PubMed] |