Effective Control of Massive Haemoptysis in Pulmonary Tuberculosis Patients by Bronchial Artery Embolisation - A Report of 3 Cases

Rohit Vadala[1], Manjunath Desai[2], Akashdeep Arora[1], Uday Kakodkar[3]

ABSTRACT

Introduction: Massive haemoptysis is considered to be one of the medical emergencies which have a high mortality if no prompt treatment is initiated. Haemoptysis resulting from pulmonary tuberculosis is one of the commonest etiology in India. Haemoptysis usually originates from systemic arterial supply to the lungs and depending on the severity of the condition, management varies from Bronchial artery embolisation (BAE) to surgery.

Case report: Bronchial artery embolisation is a well-established, safe and effective form of medical management for massive and recurrent haemoptysis. In this article, we report our experience in 3 such cases of massive haemoptysis resulting from partially treated and treated pulmonary tuberculosis who were effectively treated with bronchial artery embolisation.

Conclusion: Bronchial artery embolisation is a safe and effective procedure to manage massive haemoptysis in pulmonary tuberculosis patients.

Keywords: Bronchial Artery Embolisation (BAE), Pulmonary Tuberculosis, Massive Haemoptysis, Mortality

INTRODUCTION

Tuberculosis remains to be a major killer disease in India accounting for an estimated 2.2 million of 8.6 million new cases of tuberculosis that occur each year globally which is estimated to be one-fifth of the global disease burden.[1] Haemoptysis resulting from either complication or as sequelae to pulmonary tuberculosis carries a high mortality rate if left untreated. Massive haemoptysis is defined as expectoration of more than 300 ml of blood in a 24 hour period.[2] Mortality rates of untreated massive haemoptysis can be as high as 50- 60%.[3] Death, in most cases, is secondary to asphyxiation rather than from bleeding itself.

Percutaneous transcatheter embolisation is a safe and effective method of vascular occlusion which has been used in every vascular territory to stop haemorrhage.[4] Bronchial artery embolisation is one such procedure that is being used frequently in cases of massive and recurrent haemoptysis with good success rates. (5)

We report our experience with bronchial artery embolisation for immediate management of massive haemoptysis resulting from partially treated and treated pulmonary tuberculosis.

CASE REPORT

Case 1: A 38 year old male presented with a massive bout of haemoptysis of more than 400 ml of blood to our facility. He gave history of taking anti-tubercular treatment 2 years back for sputum positive pulmonary tuberculosis and was declared cured. He was also diagnosed as having relapse of pulmonary tuberculosis 2 months back and was presently on intensive phase of Category 2 treatment under RNTCP. He was non-hypertensive, non-diabetic with no history of smoking, alcohol consumption or substance abuse.

He was initially managed with fluid resuscitation along with packed cell transfusion. Haemostatics were started along with empirical antibiotic therapy. Chest radiograph showed fibro-infiltrative lesions involving the mid zone and the lower zones of the right lung.

The decision to perform angiographic intervention was made based on chest radiograph review as patient could not be transported to CT scan room on account of massive and persistent, life threatening haemoptysis. Elisa for HIV and Hepatitis B surface antigen test were non-reactive. His renal function and coagulation profile were within normal limits.

Bronchial artery embolisation was done through right femoral artery. Initially non-selective aortogram was performed to localise bronchial artery using omnipaque contrast. Bronchial artery angiography revealed right lung bronchial angiogram showing a large hypertrophied bronchial artery which had a blush. It was later selectively engaged with a 5F RCA catheter and embolised with gel foam particles. Check angiogram revealed successful embolisation of right bronchial artery which was the main source of bleeding. Haemoptysis stopped immediately after the procedure. There were no complications related to the intervention. Patient did not report any haemoptysis at one month follow up.

Case 2: A 40 year old male presented with recurrent episodes of haemoptysis and cough for one year. The symptoms were not relieved with conservative medications. Patient gave history of taking anti-tubercular treatment for pulmonary tuberculosis 3 years back. He was also a diabetic on irregular treatment with oral hypoglycaemic agents. Computed tomography scan performed showed fibro-bronchiectatic lesions in the apical and posterior sub-segments of right upper lobe and superior basal segment of right lower lobe. Also, few calcific nodules were noted in anterior sub-segment of right upper lobe. He had a massive bout of haemoptysis in the ward. All initial workup

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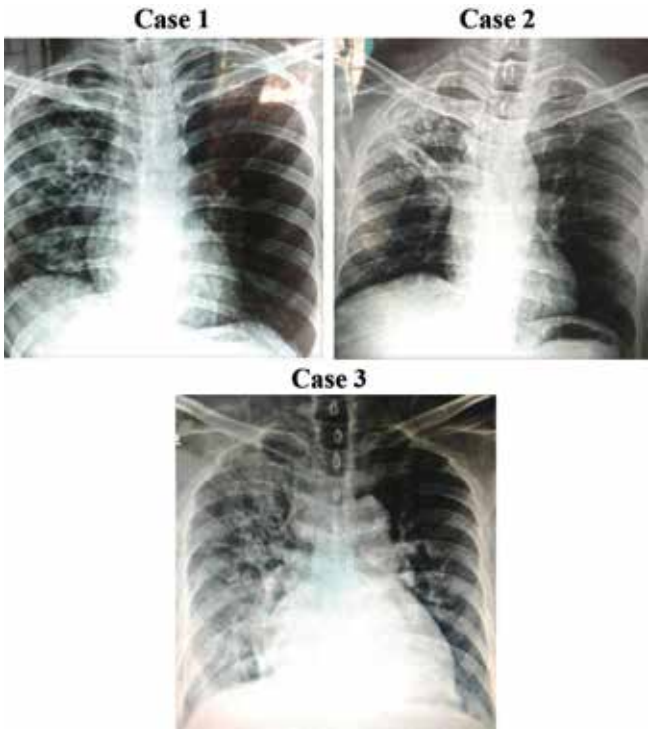
were within normal limits.

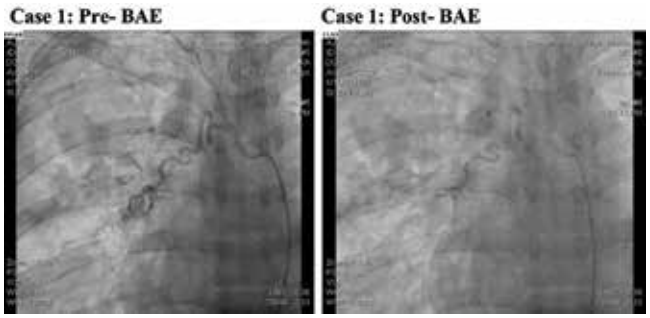
He was taken up for bronchial artery embolisation. Initial non-selective angiogram performed using omnipaque contrast showed a large dilated bronchial artery vascularising upper lobe of right lung and majority of the apical region of the right lung. Successful bronchial artery embolisation was done using gelfoam particles. Patient did not report any haemoptysis post-procedure.

Case 3: A 74 year old male presented with a massive bout of haemoptysis of more than 300 ml of blood to our facility. He had history of recurrent episodes of blood tinging of sputum for last 5 months and was on conservative medications for the same. He also had a history of taking anti-tubercular treatment 8 years back as a case of pulmonary tuberculosis. After initial resuscitation and stabilisation, he was worked up for bronchial artery embolisation.

Computed tomography scan performed revealed tubular and cystic bronchiectasis in the right upper lobe. There was a cavitary lesion noted in the right middle lobe with few centrilobular nodules in the surrounding lung parenchyma. Selective right bronchial angiogram performed using onipaque contrast revealed a large dilated and tortuous bronchial artery with multiple tortuous branches supplying the cavitary lesion in the right lung. Bronchial artery embolisation was done using gel foam particles with successful embolisation of the hypertrophied bronchial artery which was the source of the massive haemoptysis. Haemoptysis had stopped following bronchial artery embolisation.



(a) CXR showing fibro-infiltative lesions in Right upper and mid-zone; (b) CXR showing bronchiectatic lesion Right upper zone, (c) CXR showing bronchiectatic lesion Right upper Zone with right mid and lower zone fibro-infiltrative lesions



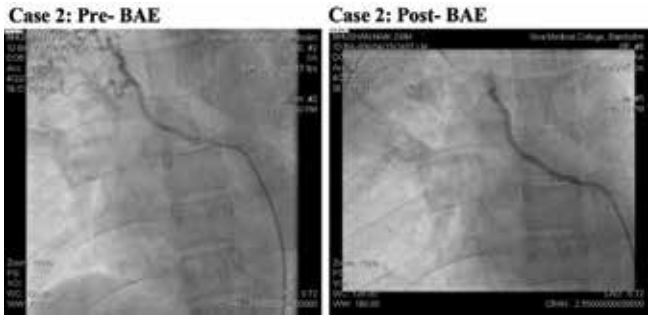
(a) Large hypertrophid Right bronchial artery showing blush, (b) Succesful embolisation of Right bronchial artery

DISCUSSION

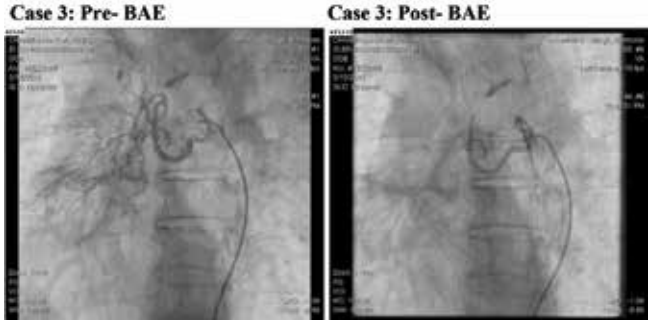
Tuberculosis remains to be a major killer disease in India accounting for an estimated 2.2 million of 8.6 million new cases of tuberculosis that occur each year globally which is estimated to be one-fifth of the global disease burden.[1] Haemoptysis resulting from either complication or as sequelae to pulmonary tuberculosis carries a high mortality rate if left untreated. Massive haemoptysis is defined as expectoration of more than 300 ml of blood in a 24 hour period.[2] Mortality rates of untreated massive haemoptysis can be as high as 50- 60%.[3] Death, in most cases, is secondary to asphyxiation rather than from bleeding itself.

Percutaneous transcatheter embolisation is a safe and effective method of vascular occlusion which has been used in every vascular territory to stop haemorrhage.[4] Bronchial artery embolisation is one such procedure that is being used frequently in cases of massive and recurrent haemoptysis with good success rates. (5)

The role of bronchial artery embolisation in massive haemoptysis was first established by Remy et al in 1973.[6] Pulmonary tuberculosis is one of the commonest causes of haemoptysis in India. It is seen that about 10-20% patients develop serious complication of pulmonary tuberculosis inspite of an effective



(a) Large dilated Right bronchial artery vascularising right upper lobe, (b) Succesful embolisation of bronchial artery using gel-foam particles



(a) Large dilated bronchial artery with multiple tortuous branches showing blush, (b) Succesful embolization of hypertrophied bronchial artery

anti-tubercular therapy.[7]

Arteriographic studies have also demonstrated that the major source of bleeding (92%) is systemic circulation due to necrosis of the wall of bronchial vessels, mucosal ulceration and calcified lymph nodes eroding into the vessels or rupture of Rasmussen aneurysm. Bronchial

circulation is the source of massive haemoptysis in 90%of cases.[8] The bronchial arteries are the main supply of the airways while the pulmonary arteries supply the lung parenchyma and the respiratory bronchioles. Bronchial arteries usually arise directly from the proximal descending aorta, and this knowledge of normal vascular anatomy and its variants is particularly very important for planning of embolisation.

The initial approach to managing life threatening haemorrhage involves resuscitation and protecting the airway, followed by localising the site and cause of bleeding, and the finally it involves the application of definitive and specific treatments to prevent recurrent bleeding. These may include bronchial artery embolisation, bronchoscopic management and surgical resection of involved lung.[9] However, it is seen that surgical option is not only feasible in patients with diffuse lung disease but also associated with a high morbidity and mortality rate.[10] All the cases described in this article continued to have significant bleeding despite optimum conservative management. Prior bronchoscopy was not done in view of significant bleeding which would have been difficult to control during a flexible bronchoscopy.

Bronchial artery embolisation is a safe, effective and at times may be an only option for the treatment of life threatening haemoptysis in patients who are unfit for surgery.

CONCLUSION

In an acute care setting, massive haemoptysis resulting from pulmonary tuberculosis can be effectively treated with bronchial artery embolisation after rapid initial resuscitation and proper patient selection. Gel foam particle is an easy to use and cost-effective embolising material with good success rate in the management of massive haemoptysis.

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