Abdul et al., J Clin Case Rep 2019, 9:5
DOI: 10.4172/2165-7920.10001241

Journal of Clinical Case Reports

Case Report Open Access

Bronchial Artery Embolization in Tuberculosis Patient with Massive Hemoptysis: A Case Report

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Abstract

A 25-year-old male with history of mild asthma presents with 4-month history of productive cough and weight loss accompanied with progressive shortness of breath. Patient was admitted, his CXR and CT scan of the lungs suggested active TB in the right lung. An acid-fast bacillus smear was positive for TB, which confirmed the CXR findings. Patient experienced sever hemoptysis of 620 ml of blood within 24 hours and underwent successful bronchial artery embolization using polyvinyl alcohol spheres.

Keywords: Asthma; Embolization; Hemoptysis; Carcinoma

Introduction

Hemoptysis can be a serious condition that can result in death secondary to massive blood loss [1]. Pulmonary TB is one the most common causes of massive hemoptysis, which can be successfully treated with BAE (bronchial artery embolization). BAE is a procedure where X-rays are used to examine the bronchial arteries by injecting intravenous contrast material to define the intended arterial circulation (bronchial, pulmonary, or systemic) and thus identifying the potential bleeding site [2]. The next step is then inserting occlusive material into either the bleeding vessel itself or the proximal vessels that supply the bleeding vessel [2].

Case Report

A 25-year-old male with history of mild asthma presents with 4-month history of productive cough and weight loss accompanied with progressive shortness of breath. Five days prior to his admission, patient had hemoptysis of approximately 2 tablespoons of blood. In the ER, physical examination was pertinent positive for Right lung crackles; his CXR and CT scan of the lungs suggested active TB in the right lung (Figures 1 and 2). An acid-fast bacillus smear was positive for TB, which confirmed the CXR findings. Subsequently, patient was admitted and placed on proper isolation and TB medication was started.

In the second day of admission, patient experienced sever hemoptysis of 620 ml of blood within 24 hours. Patient was then transferred to ICU and scheduled for radiological guided embolization of the right bronchial arteries.

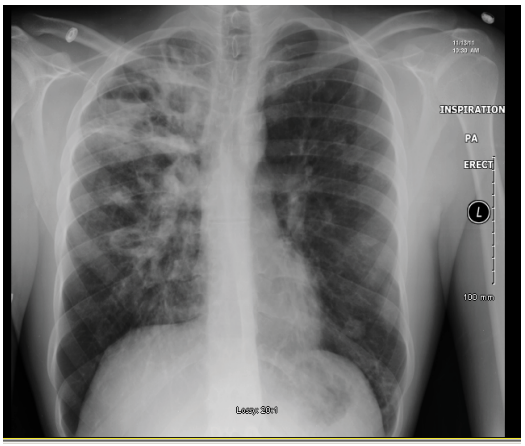

Figure 1: Chest X ray (PA) of the patient shows multifocal patchy opacities in and cavities the right upper lobe with thickening. These findings are consistent with and confirmed to be pulmonary tuberculosis.

Embolization was successful using polyvinyl alcohol spheres and the patient recovered with hemodynamic instability completing his TB medication treatment course. Figures 3a and 3b shows the right bronchial arteries before embolization and the Figure 4 shows the artery s/p embolization.

Discussion

Successful BAE improves symptoms, achieve success in controlling the bleeding and prevent mortality in emergency cases [3]. BAE has been the first line treatment for moderate to massive hemoptysis [2]. Recent studies have shown the BAE has up to 94% success rate [3]. It is safer and minimally invasive than emergency surgery and has been well established in the management of hemoptysis. The indications

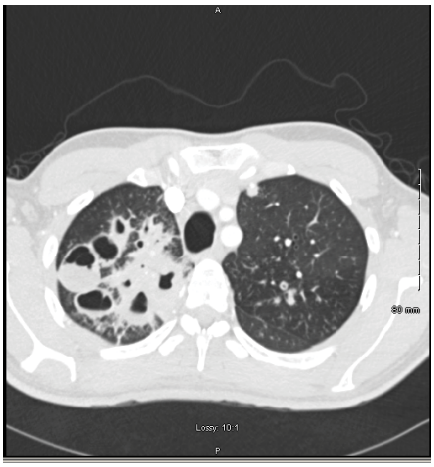

Figure 2: CT scan of the chest confirms the findings on the CXR with multiple irregularly, thick-walled cavity with some increased markings around it.

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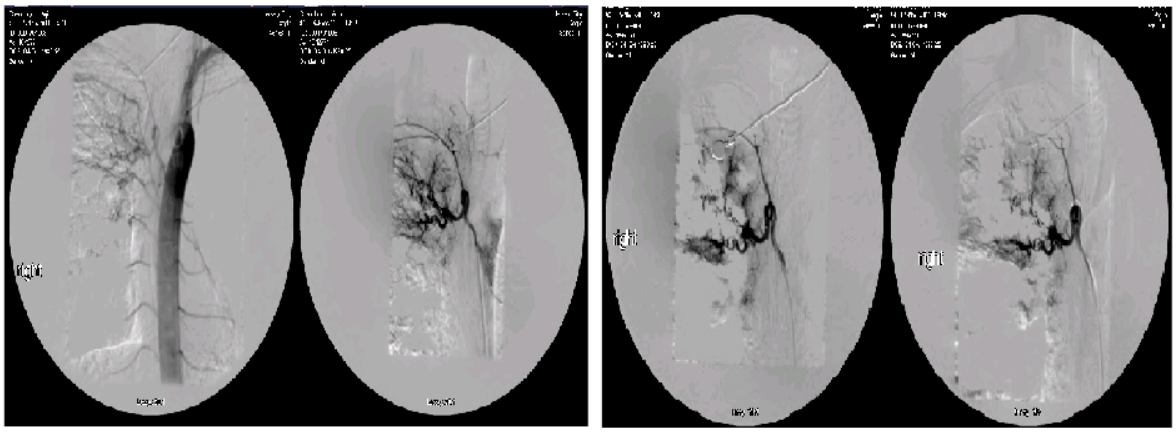
Received April 20, 2019; **Accepted** May 02, 2019; **Published** May 09, 2019

Citation: Abdul W, Mikilinenni R, Gonzalez F (2019) Bronchial Artery Embolization in Tuberculosis Patient with Massive Hemoptysis: A Case Report. J Clin Case Rep 9: 1241. doi: 10.4172/2165-7920.10001241



3A 3B

Figure 3: (A and B) shows the bronchial artery bleeding and attempt to embolize it.

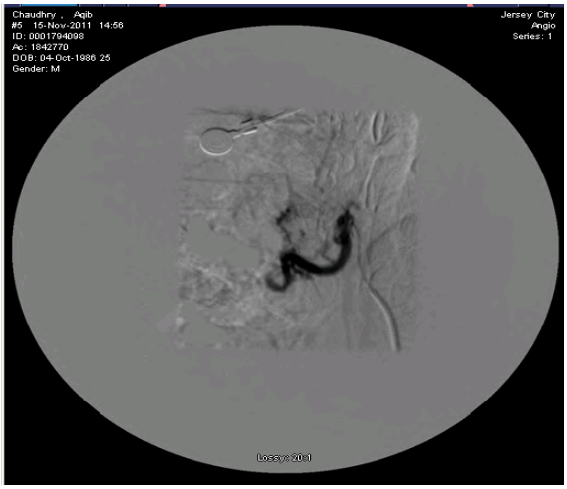


Figure 4: The bronchial artery s/p embolization; the artery has stopped bleeding.

for BAE are failure of conservative or bronchoscopic treatment to control the bleeding, hemoptysis of ≥ 300 ml within a 24-hr. period or three or more-episode 100 ml hemoptysis within a week or recurrent hemoptysis [4]. The patient in our case report had an episode of hemoptysis of more than 300 ml within 24 hrs.

One of the major drawbacks of BAE is the variable recurrence rate of between 10-45% in TB patients [3]. Recent study by Shin et al., showed recurrence rate of 29.6% [3]. Other high recurrence rates occur in cavitating lung lesions (Aspergilloma), systemic artery collaterals, systemic to pulmonary venous shunts and bronchial carcinoma [3]. Multiple studies have shown that there is no correlation between hemoptysis volume and recurrence [5,6]. Hayakawa et al., reported bleeding recurrence in two peak times [7]. The first one is about 1-2 months post embolization contributing to unsuccessful embolization. The second recurrence is after 1-2 years and that is due to recruitment of blood supply and revascularization by TB progression or chronic inflammation.

The most common complication of post embolization is nausea, vomiting and fever most likely secondary to ischemia and inflammatory response. Serious complications are subintimal dissection, spinal cord ischemia, arterial perforation by guide wire and reflux of material into the aorta. Cannulation or proximal embolization of the bronchial artery may block flow to the anterior spinal cord resulting in paraplegia [2]. This is a not very common complication as anterior spinal artery arises from a bronchial artery in only 5% of the population [2].

Some common materials used in closure of bronchial artery are Gelfoam, polyvinyl alcohol (PVA). Gelfoam is associated with recurrent bleeding whereas PVA provide permanent occlusion. Although, targeted embolization using polyvinyl alcohol foam particles ≥ 355 µm have demonstrated to be safe, rapid, and effective in achieving occlusion but in patients with pulmonary tuberculosis is not very well documented in the literature and the results are variable [2,3].

Conclusion

In conclusion, BAE in TB patients with life threatening hemoptysis controls the bleeding but the long-term outcome is not well defined as the recurrence bleeding is in variable high rates. The experience that we obtained from the present case may serve as a preamble for upcoming studies trying to evaluate this technique in this group of patients.

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