A Very Unusual Cause of Hemoptysis

Pablo Loarte, MD¹ Geraldo Holguín, MD² Ronny Cohen, MD, FACC^{3,4}

¹Division of Nephrology and Hypertension, Brookdale University Hospital and Medical Center, Brooklyn, New York

²Division of Pulmonary/Critical Care and Infectious Disease, University of Mississippi Medical Center, Jackson, Mississippi

³Medicine Division, NYU School of Medicine, New York, New York

⁴Division of Cardiology, Woodhull Medical Center, Brooklyn, New York

Address for correspondence: Pablo Loarte, MD, Division of Nephrology and Hypertension, Department of Medicine, Brookdale University Hospital and Medical Center, 1 Brookdale Plaza, Suite 169, Brooklyn, NY 11212 (e-mail: ploratec@bhmcny.org).

Int J Angiol 2016;25:e60–e62.

Abstract

Keywords

- tuberculosis
- Lucite spheres
- hemoptysis
- embolization

The use of Lucite balls or spheres played a role in the management of tuberculosis during the first decade of the 20th century. Several complications have been reported with the use of this surgical technique, but are rarely seen nowadays. The availability of effective oral regimens has forced to abandon this approach. Calcification of these spheres within the lung cavity produced a series of late complications result of the migration of these foreign bodies to adjacent structures, causing erosion of blood vessels and nerves. Herein, we present a case where the aforementioned complication caused significant bleeding with hemodynamic instability. The source of the profuse hemoptysis was identified and was resolved with the combined use of noninvasive approaches such as bronchoscopy and angiographic embolization.

Pulmonary tuberculosis is an infectious disease with a significant worldwide prevalence. It is estimated that around 2.2 billion of people are infected with *Mycobacterium tuberculosis* and there are about 8 to 9 million of new cases worldwide yearly with more than 80% occurring in underdeveloped countries. One of the early treatments was a surgical approach, consisting of various lung-collapsing techniques. This procedure had a peak in the mid-1950s, but subsequently was substituted by new effective drug regimens.¹

Case Presentation

An 80-year-old man presented to the emergency with profuse hemoptysis. He suffered from hypertension, was a smoker, and had pulmonary tuberculosis that was treated at an early age with a partial right lung resection. He claimed that he had a chronic dry cough for a period of 1 year that had worsened within the last month before presentation. The day before admission he was coughing the entire day and night, and suddenly noticed profuse bleeding from his mouth and nose. Upon arrival to the emergency, he was hypotensive with a blood pressure of 92/55 mm Hg, heart rate of 103 bpm, and respiratory rate of 32. The physical exam revealed profuse

bleeding from the nose and mouth and had to be intubated for airway protection. Initial laboratory examination showed hemoglobin of 6.2 g/dL, hematocrit of 20%, and white blood cell count of $12 \times 10^3/\mu\text{L}$. The prothrombin time was 6 seconds, partial thromboplastin time 13 seconds, and international normalized ratio of 1. An immediate blood transfusion was initiated along with intravenous fluids. While he was under mechanical ventilation, blood was noticed within the endotracheal tube. The chest radiograph (► Fig. 1) initially ordered to confirm the endotracheal tube position showed multiple calcified round foreign bodies occupying the right upper lobe. The chest computed tomography (► Figs. 2 and 3) was done to obtain more anatomical information. This study again demonstrated the presence of multiple round foreign bodies in right upper lobe, but the presence of mass or hematoma was ruled out. Once in intensive care unit, an immediate bedside bronchoscopy was performed and revealed an intact bronchial tree with a bleeding vessel in the right upper bronchial branch.

A right bronchial artery embolization (BAE) was performed by the interventional radiology team (► Fig. 4). The bleeding vessel appeared ectatic and was successfully embolized with the use of polyvinyl alcohol microspheres. This

Fig. 1 Chest radiograph. Spheres can be seen occupying the right upper lobe.

procedure induced complete cessation of the bleeding and the patient was able to be weaned from mechanical ventilation in the following days. The presence of Rasmussen aneurysm was ruled out during this angiography.

This patient underwent a thoracic plombage many years ago when the treatment of cavitary tuberculosis was in its early stages of development. Hemoptysis in our patient could have been caused by migration of one of these foreign bodies. The presence of cough could have induced the migration of the implanted material, causing damage and erosion of the blood vessel. Within the following 2 weeks, the patient remained stable and the hemoptysis did not recur.

Discussion

The use of various lung-collapsing treatments had a therapeutic and diagnostic purpose based on the concept that

Fig. 3 Computed chest tomography (axial view).

Fig. 4 Embolization of the right bronchial artery via angiography.

Fig. 2 Computed chest tomography (coronal view). Spheres are seen in a better definition. No mass or other lesions are identified.

collapsing the affected lung portion would limit the spread of infection to uninvolved lung parts and at the same time, some recovery might occur in the resting infected area.² This surgical modality was the initial therapeutic approach for the treatment of tuberculosis during the latest 1890s and the beginning of the 1900s. Several materials were used to collapse the affected areas, but around the 1940s, Lucite balls made of polymerized methyl methacrylate were used for plombage. This material offered an advantage in terms of being lightweight, radiolucent, and was supposed to be

nonirritating. But early troubles resulted from migration or erosion of these “ping pong” size balls.³

The Lucite spheres have caused numerous types of complications. Among them, hemoptysis, vascular erosion, tracheal compression, intestinal obstruction, and malignancy.⁴ In our patient's case, we suspect that the acute hemoptysis episode was caused by erosion of a pulmonary vessel.⁵ One can suppose that the acute episode of hemoptysis in our case was precipitated by persistent cough, which induced migration of one of the spheres. Although this hypothesis has not been described in the previously published case reports, in one of them, hemoptysis was the initial presentation but further radiological evaluation revealed the presence of a communicating fistula and empyema that required surgical resection through an open thoracotomy.⁶

In our case, the approach was minimally invasive and highly successful. As mentioned above, one of the complications of the Lucite spheres is its migration with vascular erosion and bleeding. The use of a minimally invasive technique such as BAE has high rate of success. Some studies mentions that the use of rigid bronchoscopy for bleeding localization, followed by BAE is associated with successful outcomes including in cases of severe life-threatening massive hemoptysis. In the same study, a significant percentage of patients who presented with hemoptysis had underlying pulmonary tuberculosis.⁷

Conclusion

The use of collapsing techniques in tuberculosis management is rarely used or not used at all nowadays. This case illustrates one rare complication from these spheres and delineates a

rapid noninvasive approach that carried a highly successful rate, even in patients with hemodynamic instability.

Note

This is an original article presented for review and publication for advancement of medical education. It has not been submitted to any other journal. There are no financial interests tied to this original research, neither is there any other side support. The authors originally prepared all materials. The authors have contributed to, read, and approved the article. The authors have no conflicts of interest.

References

- 1 Pezzella AT, Fang W. In brief. Historical indications for the surgical treatment of tuberculosis. *Curr ProblSurg* 2008;45(11):766–769
- 2 Chagari C, MacDermid D, Tardo-Dino PE, Castadot P, Magne N. Cannon ball lucencies from last century: lucite balls used to treat pulmonary tuberculosis. *Indian J Chest Dis Allied Sci* 2010;52(1):59
- 3 Horowitz MD, Otero M, Thurer RJ, Bolooki H. Late complications of plombage. *Ann ThoracSurg* 1992;53(5):803–806
- 4 Yadav S, Sharma H, Iyer A. Late extrusion of pulmonary plombage outside the thoracic cavity. *Interact Cardiovasc ThoracSurg* 2010; 10(5):808–810
- 5 Openshaw PJ, Winterton SJ. Late results of plombage. *Thorax* 1986; 41(6):494–495
- 6 Bollmann T, Hegenscheid K, Busemann A, et al. Spontaneous haemoptysis as a late complication of plombage in a tuberculosis patient. *Wien Med Wochenschr* 2011;161(7-8):217–221
- 7 Shigemura N, Wan IY, Yu SC, et al. Multidisciplinary management of life-threatening massive hemoptysis: a 10-year experience. *Ann ThoracSurg* 2009;87(3):849–853