Case Report

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TANAFFOS

Bronchial Artery Embolization as a Treatment of Hemoptysis Induced by Pulmonary Metastasis from Malignant Melanoma

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Lung metastasis is a rare cause of hemoptysis. Bronchial artery embolization is an effective intervention for treatment of hemoptysis with various underlying etiologies.

A 28-year-old man with a known history of malignant melanoma in the neck from 6 years ago and lung metastasis from 1 year ago referred to the Emergency Department of our teaching hospital with the chief complaint of hemoptysis. Chest x-ray and pulmonary CT-scan showed multiple pulmonary nodules with different sizes in both lung parenchyma. The patient's hemoptysis did not resolve completely in spite of appropriate medical treatment. The patient was then referred to the endovascular unit of the vascular department in our hospital and underwent bilateral bronchial artery embolization. With this procedure his symptoms resolved completely and he was discharged after a week.

Key words: Hemoptysis, Embolization, Bronchial artery, Melanoma

INTRODUCTION

In spite of considerable progress in the diagnosis and medical treatments available for hemoptysis, it is still an important and potentially life-threatening condition (1, 2).

Any bleeding in the airways that is accompanied by breathing insufficiency or hemodynamic imbalance should be solemnly evaluated and treated. Surgery was the only available treatment in the past. Unfortunately, surgical procedures are accompanied by a high mortality and morbidity rates, especially in emergency situations. Likewise, conservative treatments usually do not have much impact on controlling the bleeding. Since the systemic circulation via the bronchial arteries is responsible for the majority of hemoptysis cases, bronchial artery embolization (BAE) which is a minimally invasive method, can control the bleeding by decreasing the pressure of the abnormal lung parenchyma (2,3). This method is recommended as the most important and the most effective procedure for treatment of hemoptysis.

Also in some cases, emergency control of bleeding with embolization makes it possible to perform a non- emergent surgical or bronchoscopic procedure for treating the underlying etiology of hemoptysis (1,4).

The underlying etiology of hemoptysis is variable. In developed countries like the United States, the usual cause of hemoptysis is chronic inflammatory conditions such as

infections (Tuberculosis, Aspergillosis) and non- infectious inflammations (Cystic fibrosis, bronchiectasis) (5).

The most common non-inflammatory causes of hemoptysis are lung cancer and congenital heart diseases. In Iran, based on a study by Attaran et al. on 92 patients with the chief complaint of hemoptysis, the most common etiologies were found to be bronchiectasis (25%), active tuberculosis (21.7%), bronchogenic carcinoma (15%), and unknown causes (7.6%) (6).

Lung metastases can rarely be the reason of hemoptysis. Renal cell carcinoma, thyroid cancer, testicular choriocarcinoma and rarely melanoma are the potentially responsible tumors (7-13).

In this case report we present a case of hemoptysis due to multiple pulmonary metastases from malignant melanoma which was successfully treated by BAE.

CASE PRESENTATION

A 28 year-old man referred to the emergency department of our hospital with recurrent episodes of hemoptysis in the past few weeks. He was a known case of cervical malignant melanoma from 6 years ago, and had pulmonary metastases from one year ago. He had received 5 complete chemotherapy courses; the last one was 3 months ago. The patient had recurrent episodes of hemoptysis and the amount of blood in the most severe episode was about 100cc.

Medical treatment was not effective for reducing the frequency or severity of hemoptysis. The patient also complained of malaise and fatigue as well as minor dyspnea and recurrent coughs with faint streaks of blood. He did not complain of fever, nausea or vomiting and did not give any history in favor of tuberculosis, but his father did have a history of tuberculosis.

Likewise, the history of tobacco addiction was negative in the patient. At the time of admission, there was no sign of hypoxemia in the pulse oximetry of the patient.

Vital signs were as follows: respiratory rate: 24/min, pulse rate: 88/min, blood pressure: 110/88mmHg and body temperature: 37.5˚ C.

Physical examination revealed no lymphadenopathy in the cervical region. The patient had normal heart sounds but reduced pulmonary sounds at the base of both lungs. There were no abnormal findings in the physical examination elsewhere. Laboratory results at the time of admission showed hemoglobin of 11.8mg/dl, hematocrit of 38.7% and normal coagulation tests. Electrolytes, blood gases and renal function tests were all normal. Primary supportive treatments were started right after admission and then a CXR and a pulmonary CT-scan were obtained.

CXR showed multiple nodules and masses of different sizes scattered in both lung parenchyma (Figure 1).

Figure 1. CXR shows multiple bilateral well defined pulmonary nodules and masses.

CT-scan showed right-sided pleural effusion as well as nodules which were also found on CXR. There was evidence of consolidation and alveolar infiltration around one of the nodules at the posterior segment of the right upper lobe (Figure 2 A,B,C).

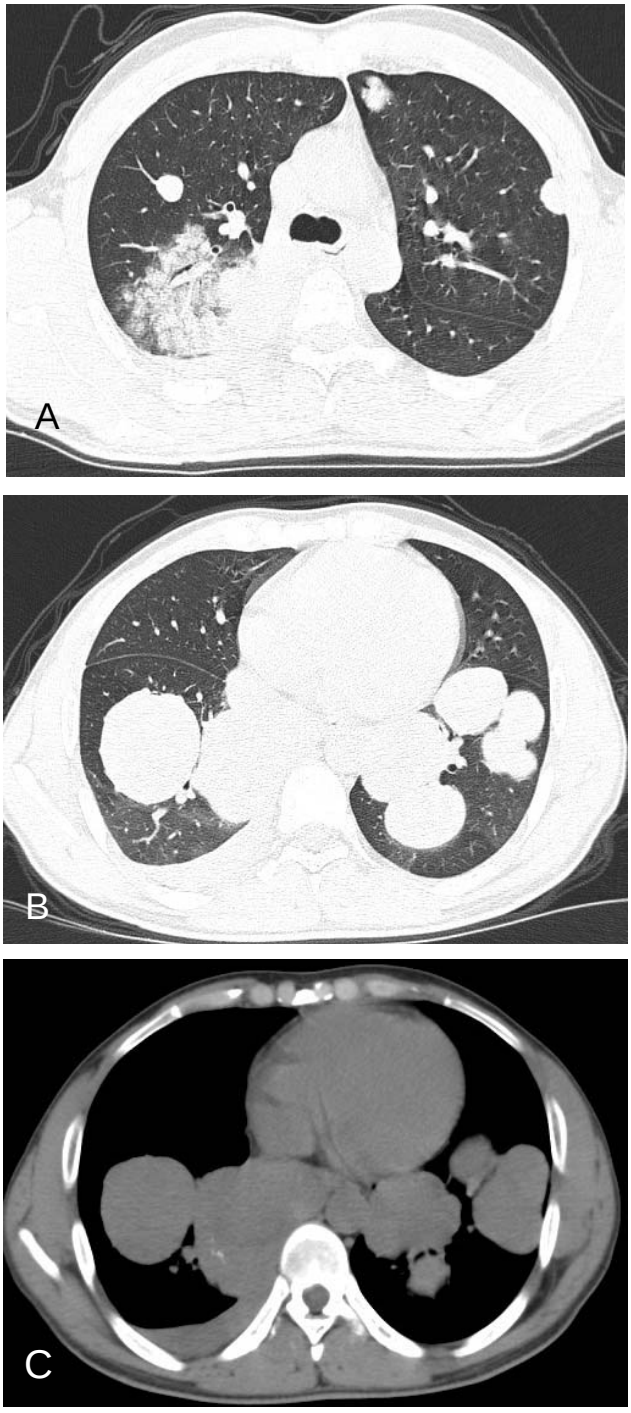

Figure 2 (A,B,C): CT sections of the lungs and mediastinal windows; alveolar infiltration in RUL associated with pulmonary masses and pleural effusion

The patient then underwent bronchoscopy which revealed bloody exudates in the orifice of the right main bronchus. No endobronchial lesion was detected. In cytological evaluation of bronchial exudate, there was no evidence of atypical cells. The culture of this exudate was negative as well, and there was no sign of acid fast bacilli. Laboratory data after a week showed hemoglobin of 10mg/dl and hematocrit of 34%. With regard to the recurrence of hemoptysis during hospitalization, the patient was considered for BAE and transferred to the endovascular unit of our teaching hospital. After prepping the patient under heart monitoring, and local anesthesia, right femoral artery was punctured using Seldinger's technique and a 5-French arterial sheath was introduced. Non-selective angiography was preformed after putting a guide wire and a pigtail catheter into the aortic arch. No abnormal finding was detected in aortogram but the approximate anatomical situation of bronchial artery was revealed. After changing the pigtail catheter, and with the use of a 4-French Cobra (C1) catheter, the common trunk of the right and left bronchial arteries was selectively catheterized at the vicinity of the 5th thoracic vertebra and along the left main bronchus. Bronchial arteries had normal diameter and course. There were also fine vessels and abnormal blush along the right and left bronchial arteries coinciding with the location of metastatic pulmonary nodules in both lungs (Figure 3).

Under continuous fluoroscopy and after confirming the suitable location of the catheter tip, embolization of the common trunk of both bronchial arteries was concomitantly performed using 300-500 micron polyvinyl alcohol (PVA) particles. A control arteriography was performed afterwards which showed embolization of all of the end branches of both bronchial arteries (Figure 4 A,B).

The catheter was then removed and after withdrawing the arterial sheath, hematoma at the puncture site was controlled.

After 4 hours, the patient was transferred to the ward without any problem and was discharged after 2 days.

There was no recurrent episode of hemoptysis during hospitalization and in the next 2 months after embolization.

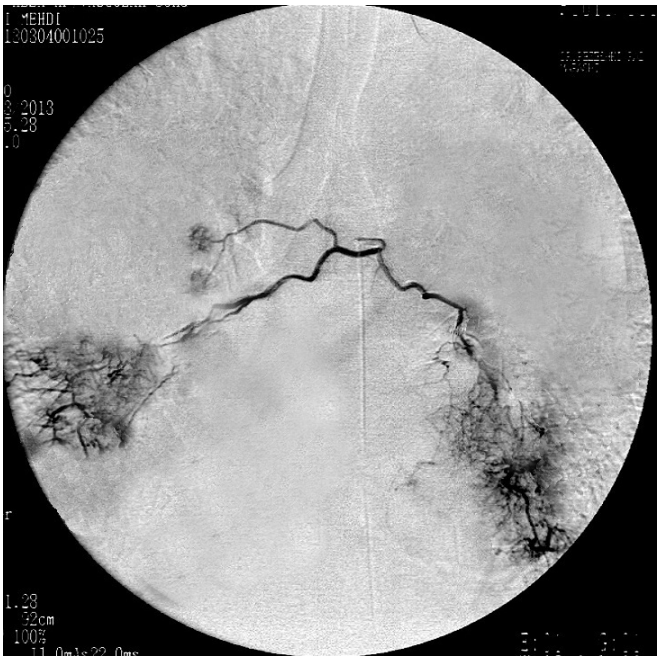

Figure 3. Bronchial artery angiography showing the common trunk of bronchial arteries. Bilateral fine vessels and abnormal blush coinciding with the location of metastatic nodule

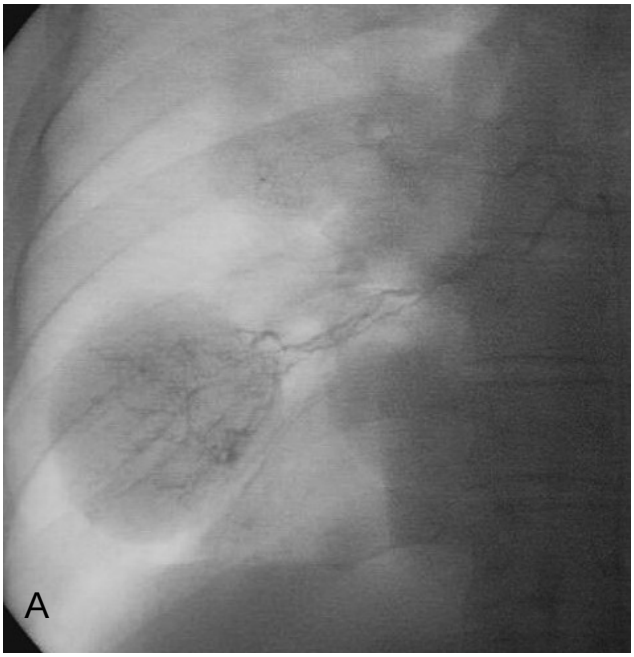

Figure 4 A. Pre embolization magnified view showing abnormal blush and fine vessels.

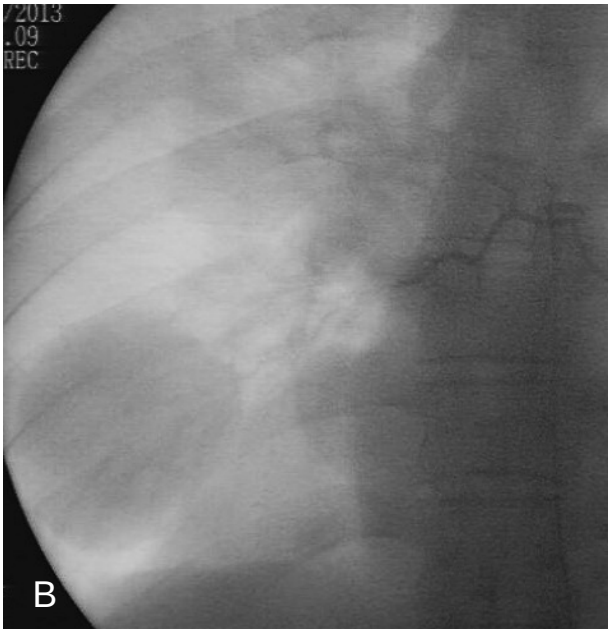

Figure 4 B. Post-embolization: showing only the proximal portion of bronchial artery with no abnormal vessels.

DISCUSSION

Hemoptysis is the expectoration of bloody sputum originating from the tracheobronchial tree or pulmonary parenchyma. Expectoration of more than 300 cc of blood within 24 hours is called massive hemoptysis (14).

Common causes of hemoptysis include chronic bronchitis, bronchiectasis, pneumonia, fungal infections, tuberculosis and malignancy. Although most of the causes of hemoptysis are benign, life-threatening conditions and probably malignant pathologies should be ruled out in any patient with hemoptysis (5).

Bronchial arteries are responsible for hemorrhage in more than 90% of cases which will need surgery or bronchial artery embolization (BAE) (15).

Before introducing BAE, conservative or emergency surgical methods were used to control hemoptysis (1).

Presently, BAE is considered as an effective method with fewer complications for the management of massive hemoptysis due to common causes (2, 3). Moreover, this method has been used for controlling non-massive or recurrent hemoptysis due to less common causes (14-16).

Different materials and devices are used for BAE including polyvinyl alcohol (PVA), glue or N-butyl cyanoacrylate, Onyx and coil. The most commonly recommended material is PVA (2).

Malignant melanoma is the most fatal skin tumor. Patients with malignant melanoma usually develop metastasis in other cutaneous sites, lymph nodes and lungs (11). Pulmonary metastases are usually asymptomatic and multiple and are discovered incidentally during imaging evaluation of patients with melanoma.

Our case is interesting from two aspects. First, presentation of pulmonary metastasis with hemoptysis is a rare occurrence and is due to invasion of pulmonary metastasis to airways (9, 11, 12) .

Surgical excision is suggested in cases of single pulmonary metastasis from malignant melanoma (12).

Our patient was a known case of malignant melanoma under treatment for more than 6 years and had a history of incidentally found lung metastasis with new unset of recurrent and retractable hemoptysis.

The second interesting aspect is that, we did not find any report on controlling the hemoptysis due to metastasis of malignant melanoma by BAE in the literature.

This is probably due to the fact that embolization techniques are usually used for controlling hemoptysis due to primary lung tumors and benign etiologies.

We used 300- 500 µ PVA particles and patient's hemoptysis was successfully controlled in one session.

The most serious complication of BAE is cord ischemia due to unintentional embolization of anterior and posterior spinal arteries through radiculomedullary arteries. It is reported in 1.4-6.5% of cases. Other complications are due to the damage of other organs supplied by bronchial vessels. These include; odynophagia, esophageal necrosis, temporary chest wall pain, myocardial infarction due to vascular anastomosis with coronary arteries and air way necrosis(17). In spite of these complications in rare cases, BAE is considered as a cost effective method with minimal complications for management of hemoptysis. (18)

Fortunately our patient did not develop any complication and was discharged in a very good condition.

CONCLUSION

In this report, we presented bronchial artery embolization (BAE) as a treatment for hemoptysis due to metastatic malignant melanoma in the lungs. Bronchial artery embolization is an interventional radiologic procedure, which effectively controls hemoptysis due to various etiologies, both benign and malignant, such as multiple pulmonary metastases from melanoma.

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