

# BRONCHIAL ARTERY EMBOLIZATION IN MASSIVE HEMOPTYSIS WITH A RARE CAUSE AND UNUSUAL BRONCHIAL ARTERY ANATOMY

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**Abstract-** Massive hemoptysis is one of the most important respiratory emergencies and pulmonary infiltrating diseases are among the rare causes of hemoptysis. Bronchial artery embolization (BAE) is a safe and effective treatment in these patients. Our case was a 45 years old woman with a 7 year history of Hodgkin's lymphoma who presented with massive hemoptysis of 20 days duration. CT scan revealed prebronchial infiltrating pattern. Diagnostic angiography showed hypervascularity in both hilar and perihilar areas and simultaneous opacification of both bronchial arteries from a right common trunk. BAE was successfully performed with 300  $\mu$  diameter polyvinyl alcohol. In follow up, hemoptysis did not recurred and patient was in good general health.

*Acta Medica Iranica*, 42(2): 307-310; 2004

**Key words:** Bronchial artery embolization , hemoptysis, massive hemoptysis

## INTRODUCTION

Management of patients with life threatening hemoptysis is a therapeutic problem because such patients are often poor surgical candidates. Bronchial artery embolization (BAE) is a useful and safe alternative procedure in these situations (1). Polyvinyl alcohol (PVA) is usually used for embolization, but microcoil may also be needed (2, 3). The common causes of massive hemoptysis are post tuberculous bronchiectasis, bronchogenic carcinoma, active tuberculosis and nontuberculous bronchiectasis.

Here we report a case with an unusual cause (peribronchial infiltrating type lesion) with rare bronchial artery anatomy.

## CASE REPORT

A 45 year old woman presented with hemoptysis and severe cough of 20 days duration. The patient had dyspnea and was complaining of weakness. She had a 7 year history of Hodgkin's lymphoma that was under treatment up to 3 years before present admission. In laboratory tests we found mild anemia and normal PT and PTT (Hb, 9 gr/dl; PT, 88%; PTT, 35 sec). In order to demonstrate the cause of hemoptysis, chest CT scan was performed. The CT showed infiltrating type lesions around the bronchial branches in both hilar and perihilar areas which was suggestive of a chronic inflammatory process or infiltrative Hodgkin's lymphoma. Also, a suspected cavitation was noted in left hilum (Fig. 1).

Bronchoscopic material examination was negative for Hodgkin's lymphoma so a chronic inflammatory process such as opportunistic infections was suggested for the patient. Meanwhile the patient suffered from massive hemoptysis that could not be controlled with conservative treatment and she was referred for BAE. Thoracic aortography was performed by transfemoral arterial approach with seven F pigtail catheter first.

Received: 27 Jan. 2003, Revised: 13 Apr. 2003, Accepted: 12 Nov. 2003

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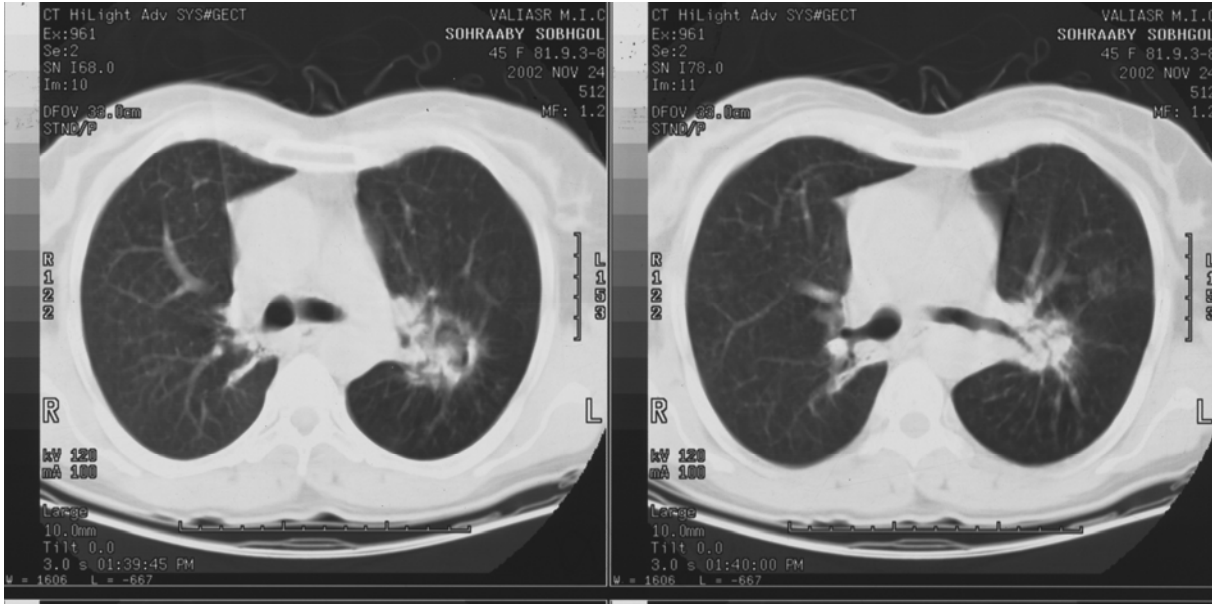
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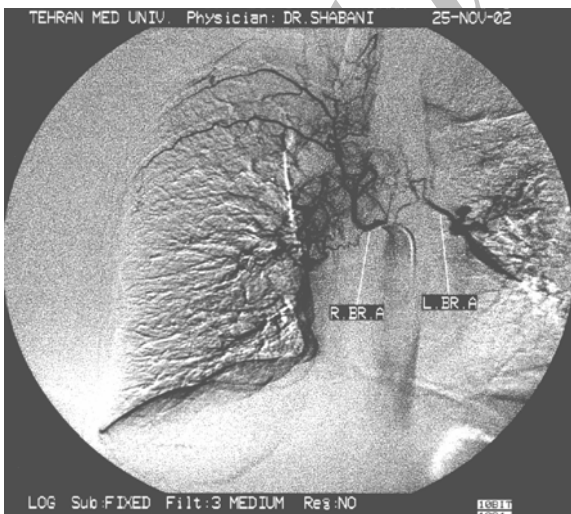
## BAE for massive hemoptysis



**Fig. 1.** CT scan of the lung. Infiltrating type lesions around the bronchial branches in both hilar and perihilar areas.

Angiography showed simultaneous opacification of both bronchial arteries from a right common trunk. Hypervascularisation in both hilar and perihilar areas was the angiographic abnormality that correlated with CT findings. Selective angiography from right

common bronchial artery with four F cobrahead catheter showed those abnormalities clearly (Fig. 2). BAE was performed with 300  $\mu$  diameter PVA successfully and postembolization angiography showed no abnormal bronchial circulation (Fig. 3).



**Fig. 2.** Selective angiography before embolization showing hypervascularization in both hilar and perihilar areas.



**Fig. 3.** Angiography after bronchial artery embolization. Abnormal bronchial circulation has been disappeared.

The immediate success was achieved after BAE with cessation of hemoptysis and cough without any complication. After two months the patient did not have any problem and was in good general condition.

## DISCUSSION

Hemoptysis is a frightening and potentially life threatening symptom. The most common causes are post tuberculous bronchiectasis, bronchogenic carcinoma, active tuberculosis, non-tuberculous bronchiectasis, AVM and cystic fibrosis (4, 1). Most cases can be managed effectively with conservative treatment but surgery may be needed in severe hemorrhage. BAE is an alternative safe and effective nonsurgical treatment for patients with massive hemoptysis which can be done simultaneously on both sides. Success rate is about 88% (5).

Bronchial circulation is the source of massive hemoptysis in 90% of cases (6). If the selective catheterization of bronchial artery is not successful, the embolization can not be carried out. Nonbronchial systemic arteries such as a branch of intercostal arteries may be the source of bleeding in 10% of cases (2). Our case is an unusual case, regarding bronchial artery anatomy. Interventional radiologist should be familiar with variants of bronchial artery anatomy (Table 1).

Many researchers currently suggest that CT should be performed prior to bronchoscopy in all cases of massive hemoptysis (6).

Fiberoptic bronchoscopy before BAE is unnecessary in patients with hemoptysis of known causation if the site of bleeding can be determined from radiographs and CT scan (4). Abnormality is bilateral in 57% in patients with inflammatory diseases (such as our patient) (5).

The majority of BAEs are performed by using PVA (3). The larger bronchial artery branches are embolized with a combination of PVA particles and microcoils (2). Small size (100-300  $\mu$ ) PVA particles are very suitable for occlusion of small size vascular beds. We used 300  $\mu$  diameter PVA in our patient to protect spinal artery from occlusion since this artery has a diameter smaller than 300  $\mu$ .

**Table 1.** Bronchial artery anatomy

<b>Type I</b>	Two left, single right bronchial arteries (41%)
<b>Type II</b>	Single bronchial arteries bilaterally (25%)
<b>Type III</b>	Two left and two right bronchial arteries (21%)
<b>Type IV</b>	Single left and two right bronchial arteries (10%)
<b>Other</b>	Right or left common bronchial trunk (very rare)

Interventional radiologist should also be familiar with the possible complications of BEA. Recurrent bleeding may occur that needs second embolization. Proximal portion of bronchial arteries should be preserved for second embolization (7). About 5% of patients may require lobectomy as an emergency procedure and angiographic procedure due to BAE can show the site of bleeding for lobectomy (7). Severe but rare complications are neurological deficiencies and pulmonary necrosis (2). Neurological deficiencies due to spinal artery embolization are often transient because occlusions are partial. In one report there was only one procedural complication in 87 patients (5) and in another report, there was only a transient paraparesis in 16 patients (1). These complication rates are very low, especially in patients with pulmonary inflammatory disease who are not surgical candidates and are able to tolerate BAE well. We performed BAE with PVA successfully without any complication or discomfort. After two months, the patient had not any hemoptysis and was in a good general condition.

Percutaneous BAE is safe and successful in controlling massive hemoptysis. In experienced hands this is a safe and potentially life-saving procedure.

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### **BAE for massive hemoptysis**

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