Case Report

Coronary Artery Bypass Grafting in a Patient with Unstable Angina Pectoris and Bronchiectasis

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Bronchiectasis is characterized by the abnormal and permanent dilatation of bronchi. Clinical manifestations of bronchiectasis include persistent or recurrent cough, purulent sputum, hemoptoecum, and hemoptysis. A 75-year-old man with bronchiectasis required coronary bypass grafting for unstable angina pectoris with severe stenosis of the left main trunk. Computed tomography showed fistulae between the dilated bronchial arteries and the left pulmonary artery. Cardiac catheter examination showed significant left-right shunt and left ventricular dilatation. To avoid perioperative massive hemoptysis, embolizations of 2 bronchial arteries and an inferior phrenic artery were performed preceding the coronary artery bypass grafting. Both transcatheter embolization and coronary artery bypass grafting were successfully performed without any complications. Herein, we illustrate a very rare case of bronchiectasis in a patient with unstable angina pectoris who underwent transcatheter embolization for a systemic-pulmonary shunt preceding coronary artery bypass grafting with cardiopulmonary bypass.

Keywords: bronchiectasis, embolization, coronary artery bypass grafting

Introduction

Bronchiectasis is an uncommon disease with the potential to cause devastating illness, including repeated respiratory infections requiring antibiotics, shortness of breath, and occasional hemoptysis.1) Although reports of hemoptysis during cardiopulmonary bypass (CPB) have been infrequent, massive hemoptysis during CPB has often been reported to be life threatening.2) Transcatheter artery embolization (TAE) is a well accepted and widely used treatment modality for the management of massive and recurrent hemoptysis.3) We report the case of a patient who was treated with TAE for bronchiectasis preceding triple coronary artery bypass grafting (CABG) for angina pectoris.

Case report

A 75-year-old man was referred to our hospital for chest pain. Coronary computed tomography (CT) indicated triple vessel disease, including significant left main trunk stenosis. Therefore, CABG was scheduled in order to treat the coronary artery disease. This patient also complained of hemoptoecum. Enhanced chest CT showed bronchiectasis at the left lower lobe, dilated bronchial arteries, and multiple arteriovenous communications from the bronchial and inferior phrenic arteries to the left lower pulmonary arterial branches (Fig. 1). A selective angiogram of 2 bronchial arteries and an inferior phrenic artery confirmed developed communications with the left pulmonary artery (Fig. 2A and 3A). The oxygen

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Fig. 1  Enhanced chest computed tomography showing a shunt between the brachial arteries and left pulmonary artery.

Fig. 2  To decrease the shunt flow from the bronchial arteries to the left pulmonary artery, embolizations of bronchial arteries were successfully performed by using a microcatheter.
CABG for UAP with Bronchiectasis

Saturation of the left pulmonary artery was elevated to 92%. A transthoracic echocardiogram revealed that the left ventricular end-diastolic, end-systolic, and left atrial dimensions were 63, 50, and 41 mm, respectively. On the basis of these findings, this patient was diagnosed with bronchiectasis. A cardiac catheter examination demonstrated that the pulmonary-to-systemic flow ratio (Qp/Qs) and the end-diastolic volume index (EDVI) of the present case were 1.73 and 107 mL/m², respectively. In order to avoid hemodynamic instability at the distal anastomosis to the left circumflex coronary artery of the distended left ventricle at surgery, on-pump beating CABG was scheduled, although off-pump CABG is better with respect to bleeding.

In order to prevent perioperative severe hemoptysis, TAE was conducted by radiologists before the CABG. While the patient was under local anesthesia, 2 bronchial arteries (Fig. 2) and an inferior phrenic artery (Fig. 3) were embolized using absorbable particles of gelatin sponge (Spong; Yamanouchi; Tokyo, Japan). Two days after the TAE, on-pump beating CABG (left mammary artery to left anterior descending artery, right internal mammary artery to diagonal branch, saphenous vein graft to left circumflex) was performed successfully. No complications, including hemosputum or hemoptysis, were seen perioperatively. He was discharged from our hospital on the 16th postoperative day.

Discussion

Massive hemoptysis is a life-threatening symptom of bronchiectasis. In particular, it is extremely difficult to control hemoptysis during cardiac surgeries with CPB. In order to avoid severe hemoptysis, some surgeons have chosen off-pump CABG because this procedure does not require full heparinization. However, the cardiac catheter data of the present patient showed a high Qp/Qs and large EDVI, which meant that hemodynamic instability was expected, especially during the distal anastomosis to left circumflex if off-pump CABG was chosen. Therefore, on-pump CABG, rather than off-pump CABG, was scheduled for this patient. On-pump CABG requires full heparinization, which might cause severe hemoptysis. Hence, TAE was planned to precede the on-pump CABG. TAE is a well accepted and widely used treatment modality for the management of massive and recurrent hemoptysis. Spinal infarction due to invisible anastomotic connections between the bronchial circulation and the anterior spinal artery is the most important complication of bronchial artery embolization (BAE). To lower the
incidence of spinal cord injury, superselective BAE is performed using a microcatheter inserted into the bronchial arteries beyond the spinal or mediastinal branches. An inferior phrenic artery was also embolized using a superselective catheter through the celiac artery. Superselective embolization is safer and more effective to control hemoptysis than the nonsuperselective method. Absorbable gelatin sponge is widely used because it is inexpensive, easy to handle, and has a controllable embolic size. The main disadvantage of it is the resolvability, which leads to recanalization of the embolized artery. Even though recanalization occurred, it would be acceptable because our main purpose was to avoid perioperative massive hemoptysis, especially during CPB. Therefore, CABG was performed 2 days after the TAE. Concomitant pulmonary resection with cardiac surgery is a definitive treatment of hemoptysis because it removes the source of bleeding. In contrast, Ulicny et al. advocated that pulmonary resection performed with CPB leads to excessive bleeding and pulmonary complications. In this case, we concluded that concomitant lobectomy with on-pump CABG would not be needed, and preoperative TAE was thought to be enough to prevent perioperative severe hemoptysis. In summary, we treated a 75-year-old man with bronchiectasis and unstable angina pectoris who underwent TAE for a systemic-pulmonary shunt preceding CABG with CPB.

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Disclosure Statement

The authors have no conflict of interest to declare.

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