Endovascular treatment for ruptured aortic aneurysm complicating hemoptysis

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ABSTRACTS

Introduction: Aortic disease has a high mortality rate, especially when complications include - hemoptysis. Treatment includes surgery and endovascular intervention with its own advantages and disadvantages. Endovascular intervention is associated with good early and medium-term outcomes.

Subjects – Methods: We report 03 cases of hemoptysis due to ruptured thoracic aortic aneurysm who underwent endovascular intervention at Dong Nai General Hospital.

Result: In all three cases, endovascular grafts were placed in the descending thoracic aorta, the number of grafts used was 1, the time to stop hemoptysis was 4-5 days, the hospital stay was from 6 to 8 days. No intravascular fistula was noted in the three patients. There were no cases of premature death, renal failure, prolonged mechanical ventilation and other major cardiovascular events.

Conclusion: The implementation of this technique at regional hospitals helps to improve prognosis, reduce mortality and complications, and contributes to improving the quality of hospital expertise. (consider: contributes to improving the quality of hospital expertise.)

***Keywords**: Hemoptysis, ruptured aortic aneurysm, endovascular*

INTRODUCTION

Aortic disease is a severe, sudden-onset disease with a high mortality that often occurs in elderly patients. The entity consists of a spectrum that includes the following conditions: aortic aneurysm, aortic dissection, intramural hematoma, penetrating atherosclerotic ulcer, pseudoaneurysm and genetic abnormalities (Marfan syndrome), and certain congenital pathologies (bivalve aortic valve, aortic ependymal stenosis). [1]

Today, with the development of endovascular intervention, the treatment of aortic pathology has improved dramatically, helping to ameliorate the short-term prognosis. This approach provides an additional treatment option for patients, in particular those at high-risk.

Hemoptysis due to ruptured aortic aneurysm into the lung parenchyma is one of the rare but life-threatening complications. This complication can be caused by an atherosclerotic or infective aneurysm [2]. Endovascular intervention is a minimally invasive technique, and the treatment of this disease is also quick and relatively simple.

OBJECTIVES AND METHODS

Our objective was to evaluate the indications, techniques, and initial results of a

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relatively novel technique in a regional hospital. We report 3 cases of endovascular intervention to treat hemoptysis due to ruptured thoracic aortic aneurysm at Dong Nai General Hospital

CASE DESCRIPTION

CASE 1

A 73-year-old patient started coughing up blood about 4 to 5 times, the total blood volume was about 100ml. On the morning of admission, the hemoptysis worsened, so the patient was taken to Dong Nai General Hospital for examination. Contrast-enhanced computed tomography scan (CT scan) revealed a low descending aortic aneurysm which ruptured into the left lower lobe parenchyma. This is the source of the hemoptysis. Afterwards, the patient was immediately taken to the digital subtraction angiography (DSA) room.

The procedure was performed in 30 minutes. Right femoral artery was used as the approach for the device. Under local anesthesia, a straight, extended non-bared Medtronic Valiant Capitivia with the size of 36 x 36 x 200 mm was deployed successfully. The patient was transferred to the ward after one day in the ICU.

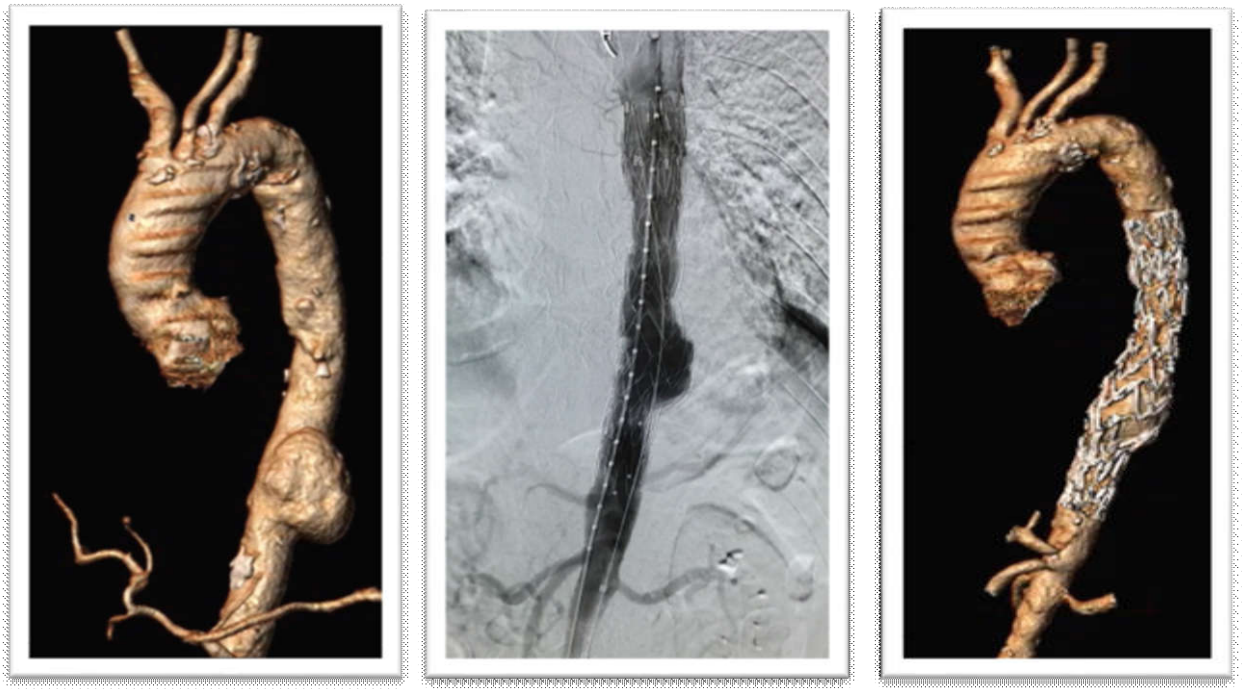

Figure 1. 3D reconstruction and post procedural angiogram showed successful result in case 1

The hemoptysis decreased and resolved after 5 days of intervention. The patient was discharged uneventfully at postoperative day (POD) #7.

CASE 2

A 92-year-old man was admitted to the emergency department (ED) due to abrupt hemoptysis of approximately 100 ml. The patient had a history of smoking (30 pack years), hypertension, and coronary artery disease. CT scan demonstrated a mid descending aortic aneurysm that had ruptured

into the lower lobe of the left lung.

The patient was transferred to the catheterization lab for emergency endovascular treatment. General anesthesia was chosen to protect the airway from ongoing hemoptysis. A 32 x 32 x 200 mm Medtronic Valiant Captivia was successfully placed after the origin of the left subclavian artery. No endoleak was reported on the controlled angiography.

Hemoptysis decreased right after the intervention and stopped completely at POD #6. Patient was discharged at POD #7.

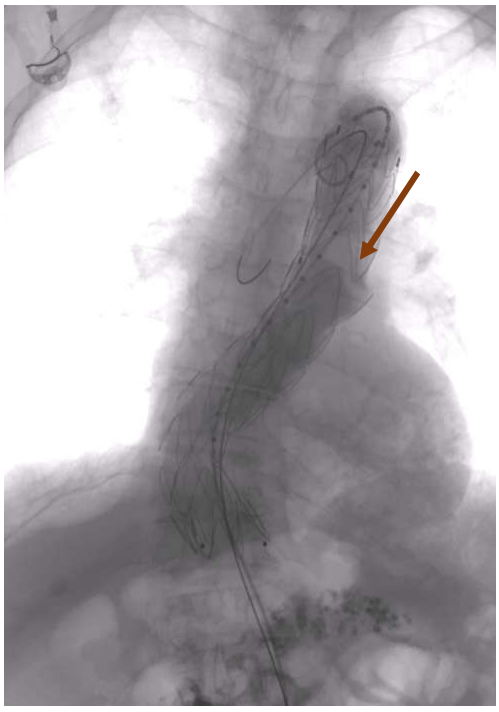

Fig 2. Intraoperative angiogram showed aneurysmal position covered by stent graft (arrow)

CASE 3

A 68-year-old woman was admitted to the ED due to recurrent hemoptysis. One week before admission, the patient coughed up blood stained sputum several times a day. She consulted at a pulmonary hospital, where an bronchial bronchoscopy was performed. The latter showed a new thrombus at the level of upper lobe bronchial but no active bleeding was seen at that moment. On admission day, hemoptysis occurred twice, with the amount of blood of 50 ml/time. Emergent CT Scan showed a sacciform descending aortic aneurysm ruptured into the upper left lobe, with active bleeding detected.

At the cath lab, under local anesthesia, we performed the endovascular treatment for the patient. A 32 x 28 x 150 mm Medtronic Valiant Captivia was deployed right after the origin of the left subclavian artery. No endoleak and other complications were seen during the procedure. The resolution of hemoptysis lasted for 4 days. The patient was discharge at POD 7.

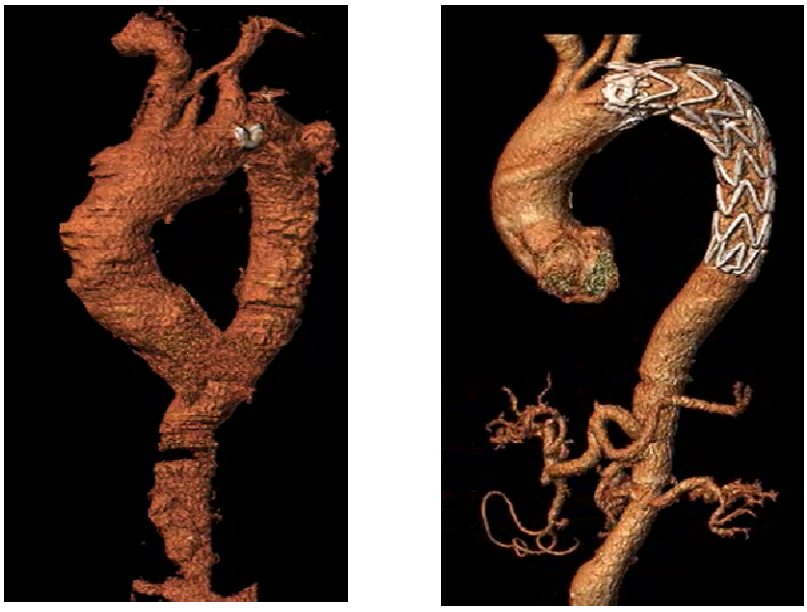

Fig 3. Pre and postoperative CT scan showed successful isolation of the aneurysm

DISCUSSION

The aortic stent graft was developed more than three decades ago. In 1987, Volodos, a Ukrainian surgeon, successfully performed the world's first successful endovascular graft intervention to treat thoracic aortic aneurysms. In 1990, Parodi et al. successfully conducted the world's first case of endovascular graft for abdominal aortic aneurysm at the Cardiovascular Institute of Buenos Aires, Argentina [3]. In 1994, the stent graft was applied in the treatment of descending thoracic aortic aneurysms and aortic arch. Since then, endovascular interventions have been performed by many surgeons in many parts of the United States. In 1999, the US Food and Drug Administration (FDA) officially recognized the circulation of endovascular graft products in the US.

For the thoracic aorta, Cheng et al. conducted a study and showed that endovascular intervention had better short-term mortality, fewer complications: Renal failure, spinal cord ischemia, reoperation due to bleeding, cardiovascular complications, pneumonia, and shorter hospital stay compared with surgery group [4]. This can be explained because the majority of thoracic aortic surgery, even with a simple descending thoracic aorta aneurysm, requires the operation of the heart-lung machine. Prolonged use of extracorporeal circulation may lead to serious complications such as cerebrovascular accident, renal failure, pneumonia, prolonged mechanical ventilation and nosocomial infections, these complications will increase the early mortality of patients undergoing aortic surgery. However, the rate of endoleaks of TEVAR is relatively high compared with that of the EVAR. Parmer et al showed that 29% of TEVAR had endoleaks, including 40% type I, 35% type II, 20% are type III, and 5% have multiple types of endoleaks [5].

All 3 patients were reported to require intervention in an emergency situation. For the

thoracic aorta, Jonker et al also compared surgery and endovascular intervention in cases of ruptured thoracic aortic aneurysms. Out of a total of 166 cases, 92 patients received endovascular intervention and 69 patients underwent open surgery. The rate of mortality and complications in the intervention group was 21.7% compared with 36.2% in the surgery group [6]. Thus, the authors also showed that the early mortality rate in patients undergoing emergency surgery on the thoracic aorta was very high, particularly in the surgical group.

Hemoptysis is a rare complication of a thoracic aortic aneurysm. Typically, sacral descending thoracic aortic aneurysms or infectious aortic aneurysms are the more commonly reported causes [2]. Endovascular treatment of sacral descending aortic aneurysm has proven to be safe, simple, and effective, especially in urgent emergencies such as hemoptysis because of its rapid access to the aorta. The procedure time is quick and short usually only 15 to 30 minutes [7].

In order to implement aortic interventions at Dong Nai General Hospital, in addition to having well-trained personnel in aortic endovascular intervention, we have invited leading experts in this field to minimize the possible complications for the patient. Endovascular treatment for hemoptysis due to ruptured thoracic aortic aneurysm in regional hospitals can help improve patient prognosis, reduce mortality, and contribute to improve the professional quality of the hospital.

CONCLUSION

Aortic disease leads to many complications and a high mortality rate, both with surgery and with endovascular intervention. With the advantage of being less invasive and faster, the latter improves early mortality, but the long-term results of this method may not be equal to surgery in terms of mortality and reintervention rates. The implementation of this technique at regional hospitals helps to improve prognosis, reduces mortality and complications, and contributes to improve the quality of hospital expertise.

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