



## Aortic dissection type-a in an elderly patient with myocardial infarction: A case report

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### Abstract

Aortic dissections and dissecting aortic aneurysms are among the most serious problems encountered in clinical practice. In this case report we describe our initial experience, expanding the indications for use of this novel technique for Aortic dissection type A. A therapeutic approach has evolved which utilizes both surgical and medical methods of management, depending upon the origin of the dissection. In reviewing the causes of severity from type A dissection in this case, it is clear that operation prevents proximal rupture. The present report describes this method of management and relates the experience at the Chengdu Second People's Hospital.

**Keywords:** aortic dissection, elderly patient, myocardial infarction

### Introduction

Aortic dissection is a serious condition in which there is a tear in the wall of the major artery carrying blood out of the heart (aorta). When this tear extends along the wall of the aorta, blood can flow in between the layers of the blood vessel wall (dissection) [1]. This can lead to aortic rupture and decreased blood flow (ischemia) to vital organs. An acute aortic dissection (<2 weeks) is associated with high morbidity and mortality rates. Mortality is highest in the first 7 days; indeed, many patients die before presentation to the emergency department or before diagnosis are made in the emergency department [2]. Patients with chronic aortic dissection (>2 weeks) have a better prognosis [3]. The mortality associated with aortic dissection is still high despite advancements in diagnostic and therapeutic modalities. Hospital-based mortality for aortic dissection is approximately 30% [4]. Without treatment, about 80% of people who have an aortic dissection die within the first 2 weeks [5]. With treatment, about 70% who have dissection of the first part of the aorta and about 90% of those who have dissection of the aorta farther from the heart survive to leave the hospital [6]. About 60% of people who survive the first 2 weeks are still alive 5 years after treatment, and 40% live at least 10 years. Of people who die after the first 2 weeks, about one third die of complications of the dissection, and the other two thirds die of other disorders. Patients with type A aortic dissection who undergo surgical treatment have a 30% mortality; patients who receive medical treatment have a 60% mortality [7].

### Case report

**Case presentation:** On March 6, 2020 a 79-year old male patient was emergency transferred to our hospital due to the local community hospital showed abnormal ECG and increased level of myocardial enzyme so he was referred to our hospital for diagnosis of "acute extensive anterior myocardial infarction". After admission two coronary stents were implanted in the anterior descending artery. The CTA of thoracic aorta was improved after operation which indicating "thoracic aortic aneurysm with intramural

hematoma". No surgical intervention was performed during this time. The patient's condition improved and discharged after symptomatic treatment. The patients were followed up regularly in the Department of cardiovascular medicine and he was given secondary prevention of coronary heart disease for a long time. One month ago, the patient reexamined the coronary angiography and showed "restenosis in the anterior descending artery". The patient was given drug balloon PTCA, and the thoracic aorta was reexamined. Thoracic aorta CTA was diagnosed as "aortic dissection". Surgical treatment was recommended. After consultation and obtained consent inform with the patient and his family's members, the patient underwent surgical treatment. During admission the patient's has normal spirit, appetite, urine and he has weight gain of 5kg. Physical examination: T: 36.7c, P: 59 times / min, R: 19 times / min, BP: 145 / 68mmhg, the heart boundary is small and regular. There is no pathological murmur in the auscultation area of each valve. There is no abnormal vascular sign. The abdomen is flat, no tenderness and rebound pain and muscle tension in the whole abdomen. The liver is not palpable, no moving murmur and lower limb edema. On August 27, 2019, the results of thoracic and abdominal CTA in our hospital showed that: thoracic and abdominal aorta has sclerosis, left external iliac artery lumen has occlusion; ascending aorta has huge perforating ulcer, descending aorta has intramural hematoma. Coronary angiography in our hospital on August 21, 2019 showed: no significant restenosis was found in the left main coronary artery, 90% stenosis in the proximal and middle segment of the left anterior descending artery, with TIMI grade 3 blood flow; no obvious calcification and stenosis in the circumflex branch, TIMI grade 3; no obvious calcification in the right coronary artery, irregular wall in the middle and distal segments, localized stenosis of 20%, TIMI grade 3 blood flow. On August 21, 2020, color Doppler echocardiography in our hospital showed that the left atrium and left ventricle were enlarged, the anterior wall, interventricular septum and left ventricular apex wall became thinner, the motion of inferior wall and posterior ventricular septum was

weakened, the aortic valve was slightly calcified with micro reflux, and the ejection fraction was 37%.

### Diagnosis and treatment

After admission, vital signs were close monitored, blood pressure and heart rate were maintained, and low molecular weight heparin was used to replace clopidogrel and aspirin. ECG showed sinus bradycardia, left axis deviation, abnormal lead v1-v5, Q wave with ST segment elevation, T wave inversion, and indoor block. Color Doppler ultrasound showed ascending aortic aneurysm like dilation, multiple ulcers and hematoma formation, enlargement of left atrium and left ventricle, thinning of anterior wall, interventricular septum and left ventricular apex, disappearance of systolic activity, mild mitral and tricuspid regurgitation, mild calcification of aortic valve with mild regurgitation, and ejection fraction of 32%. The results of color Doppler ultrasound showed that the right common carotid artery had local thickening of intima-media, the formation of atherosclerotic plaques in bilateral common carotid sinus and left internal carotid artery, asymmetric development of bilateral vertebral artery, formation of atherosclerotic plaque of right subclavian artery, and formation of atherosclerotic plaque of innominate artery.

### Surgical procedure

The diagnosis and surgical indications of aortic dissection was clear, and there was no absolute contraindication. After adequate preoperative preparation, the surgeons performed the ascending aorta replacement + aortic hemiarch replacement + allogeneic bone transplantation + electric cardioversion + right thoracic closed drainage + fascial tissue flap formation were performed under general anesthesia and tracheal intubation under deep hypothermia under cardiopulmonary bypass. After opening the pericardium was a small amount of pericardial effusion, extensive adhesion between pericardium and ascending aorta, enlargement of left atrium and left ventricle was seen. The bare stent protruded about 0.5cm, the intima of aorta was fragile, the adventitia calcification and multiple ulcers were formed. The left common carotid artery, left subclavian artery and the abnormal development of left vertebral artery were reserved. The cardiopulmonary bypass was established by antegrade and retrograde perfusion of cardioprotective fluid. The brachiocephalic trunk, left common carotid artery, left subclavian artery and left vertebral artery were blocked. Deep hypothermic circulatory arrest was performed and the diseased aorta was excised. The distal end-to-end anastomosis was performed. Pericardial patch was used to strengthen the suture. No obvious blood leakage was found. After rewarming, the heart automatically returned to ventricular rhythm, and the sinus rhythm was restored by medication and electric defibrillation twice. At the right incision, fascia tissue flap was formed, a drainage tube was placed in the wound cavity, and No. 32 thoracic drainage tube was placed between the 7th intercostal spaces of the right axillary front line to connect the drainage bottle. The operation was successful, and the blood loss was 600 ml. due to the destruction of extracorporeal circulation, the patient suffered from anemia and abnormal coagulation function. The patients were given 1100ml autologous blood, 4U of a (RH +) red suspension, 600ml of the same type of plasma and 2 pieces of platelets. After the operation, the hemoglobin was

96g / L, and there was no adverse reaction of blood transfusion. After the operation, the patient was transferred to ICU safely and received intensive care, ECG monitoring and ventilator assisted breathing. The patient had hypertension and audible rales in the lung. Considering severe pneumonia and treated with anti-infection therapy which were given salbutamol, Pulmicort Respules (the first-line drug treatment was not effective), ethanol cysteine atomization inhalation was used to relieve phlegm and spasm, and doxofylline (previous aminophylline intolerance) was used for spasmolysis, Patients with endotracheal intubation, unable to take ambroxol tablets in that case were given intravenous drip of shunhuatan, epinephrine, urapidil, isosorbide and other vasoactive drugs to maintain circulation stability, omeprazole to prevent stress ulcer, glycerol fructose, methylprednisolone to reduce neurological complications, due to hypoalbuminemia (ALB 30.1 g / L), a total of 60 g human serum albumin was input for correction, and the activity was excluded After bleeding, clopidogrel and aspirin were given through gastric tube for antiplatelet therapy.

In order to understand the lung condition, bronchoscopy and bronchoalveolar lavage were performed under general anesthesia on second and third day of surgery. Re-examination of chest CT shows mediastinum changes after operation, there is no patchy blood accumulation in mediastinum, and there may be a little gas accumulation; the above manifestations of ascending aorta should be considered as possible after operation; heart enlargement, a little effusion in pericardial cavity; thoracic aorta and coronary artery wall sclerosis; multiple pneumatosis in coronary artery wall; mass in right upper pulmonary apex; pulmonary emphysema, pulmonary bullae and multiple lung Infection; partial atelectasis of bilateral lower lobes; a little effusion in the left pleural cavity and a slight thickening and adhesion of bilateral pleura. Color Doppler echocardiography shows left atrium, left ventricular enlargement, anterior wall, interventricular septum and left ventricular apex wall thinning, systolic activity disappeared, ejection fraction 32%.

The indication of extubation was reached on forth post-surgical day. After the tracheal intubation was removed and the vital signs were stable, the patient was transferred back to the cardiothoracic surgery ward for further treatment. After the operation, the patient's hemogram was high. Endoscopy showed that there were many airway secretions, coughing and expectorating difficulty, and the sputum was thick. Rales were heard in both lungs and pulmonary infection was considered. Complete etiological examination showed that Klebsiella pneumoniae infection. Piperacillin sodium and tazobactam sodium antibiotics were given for his infection. Contact isolation was carried out and Ambroxol, doxofylline intravenous drip, beclomethasone, acetylcysteine atomization inhalation, were given for symptomatic support treatment. Because of the poor cardiac function before operation and the low ejection fraction indicated by color Doppler echocardiography after operation, furosemide, spironolactone diuretic, potassium chloride sustained-release tablets and intravenous electrolyte supplement were added. Postoperative pathological examination shows ascending aorta (surgical specimen) atherosclerosis with media calcification. The ECG showed sinus rhythm, 83 beats / min, left deviation of electric axis, abnormal Q wave, complete right bundle branch block and

ST-T change.

Blood routine analysis: WBC  $9.25 \times 10^9 / L$ , RBC  $2.89 \times 10^{12} / L$ , HGB 86g / L, HCT 25.9%, PLT  $448 \times 10^9 / L$ , PCT0.41%, Neut77.7%, lymph 9.7%; plasma calcitonin PCT 0.08ng/ml; electrolyk 3.1mmol, sodium 136mmol, Cal 1.93mmol, urea 3.5mmol, ua92umol / L; liver function TP58.3g / L; renal function: urea 3.5mmol, ua92umol / L. After one week his chest CT reexamination showed that there were still small pieces of blood or effusion in the mediastinum; a little pneumatosis was absorbed; a little pneumothorax was basically absorbed on the right side; a little effusion in bilateral pleural effusion was less than before; multiple pneumatosis in right chest wall was absorbed more than before; space occupying of upper lobe of right lung was almost the same as before; both lungs were scattered in the basic absorption of infection; partial atelectasis of bilateral lower lobes was improved. Color Doppler echocardiography showed that the artificial blood vessels were unobstructed, the left atrium and left ventricle were enlarged, the anterior wall, interventricular septum and left ventricular apex wall became thinner, the contractile activity disappeared, and the ejection fraction was 37%. After reaching the indication of stopping antibiotics, the patient stopped antibiotics after observation for 1 day, and the patient was discharged.

#### Discharge condition

The patient's was in good condition, no fever, no obvious cough and expectoration, no chest tightness, shortness of breath, no fatigue, no chest pain and discomfort. Physical examination: the respiratory sounds of both lungs were clear, the heart rhythm was regular, no heart murmur was heard, the wound dressings were clean and dry, no exudation, no stitches were removed, the abdomen was soft without tenderness, the lower limbs were not edematous, and the pulse of dorsalis pedis artery was good. Six months after discharge the patient's follow up examinations were normal.

#### Discussion

The mortality of patients with type A aortic dissection who underwent conservative management was much higher than that of patients with type B aortic dissection. Therefore, we recommend that clinicians first consider active open surgery or endovascular treatment for patients with type A aortic dissection<sup>5</sup>. There was no significant difference in mortality between patients who underwent open surgery and endovascular treatment. The repair of spontaneous dissecting aortic aneurysms or iatrogenic aortic dissections can be very complex because of the extreme friability of the aortic tissue, the extent of damage to structures, and in many cases, secondary organ involvement<sup>6</sup>. Bleeding from this graft- "sandwiched" aorta can be troublesome. Aortic dissection divided two types according to the ruptured part. The type A aortic dissection has a high mortality rate and life-threatening disease which usually needs to emergency treatment no matter in surgical or conventional therapy. The mortality rate of surgical procedure is about 30%, as contrasted to 60% mortality when treated medically. The patient has type A combined with acute myocardial infarction was reported and will reduce the survival rate dramatically no matter underwent surgical procedure or medical treatment. A plan for management is described which was performed before and after the surgery to treat

acute myocardial infarction and improve the patient's physical capability.

#### Conclusion

We recommend this simple technique to repair dissecting aneurysms, because it has changed our perception and approach to this highly complex problem. Our experience is small; thus, it is difficult to draw meaningful conclusions about the universal applicability of the technique and long-term results.

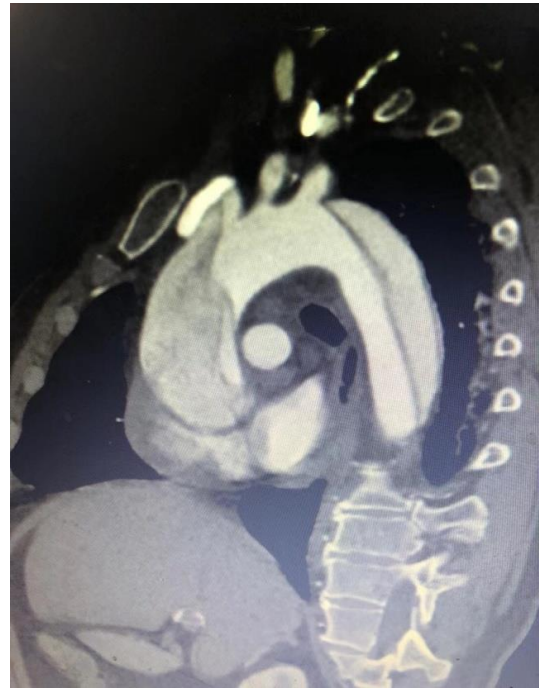


Fig 1: CTA of Type-A aortic dissection

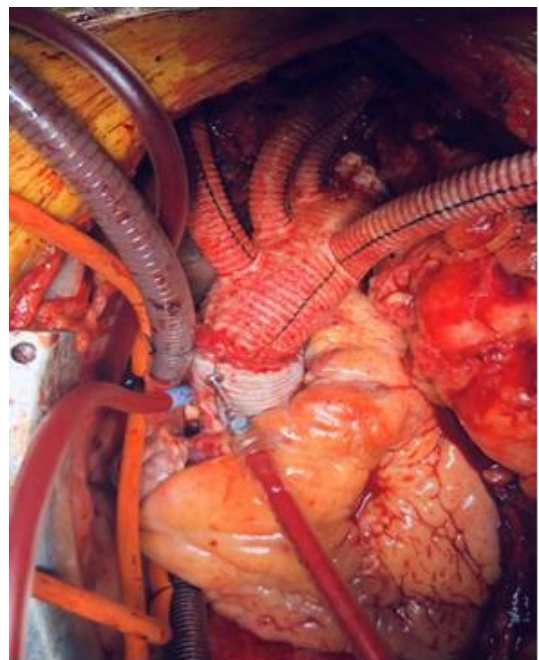


Fig 2: Surgical repair of aortic dissection

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