Aorto-Cutaneous Fistula after Surgical Treatment of Stanford Type A Aortic Dissection
A Case Report

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Summary

An aorto-cutaneous fistula is a rare complication that occurs after aortic surgery. Due to its rarity, postoperative complications are usually not taught in medical school. Here, we describe a case in order to emphasize the importance of the indication when attempting to establish a shunt from the embedding cavity of the aortic root to the right atrium.

Case Report

A 67-year-old male diagnosed with Stanford type A AD underwent an ascending aorta and total arch replacement with a 4-branched graft combined with the stented elephant trunk procedure 4 years ago in 2012 (Figure 1A). Because of proximal anastomosis bleeding, a shunt from the embedding cavity of the aortic root to the right atrium was established at that time. During follow-up, his blood pressure was about at 140-150/80-90 mmHg under control of antihypertensive drugs (nifedipine 10 mg and metoprolol 47.5 mg once a day). In 2013, the patient was diagnosed with severe right heart dysfunction and readmitted to undergo percutaneous transcatheter closure of the shunt, which ultimately failed. Thirty months later, he noticed a mass in the upper-middle of his chest, which was pulsatile, but ignored it. Over the next 3 months, the patient reported that the mass had started bleeding. The amount of bleeding was about 200 mL per day even when compressed with gauzes. He came to our department for further treatment.

On admission, the patient was afebrile, with a blood pressure of 132/76 mmHg, and his oxygen saturation with supplemental oxygen was 90%. A physical examination found ulceration and bleeding in the skin around the sternal angle that was about 10 × 8 mm in size (Figure 1B). Bilateral edema of the lower extremities and jugular venous distention were noticed. The remainder of his physical examination was normal. Laboratory data included: prothrombin time (PT) 12.9 seconds, fibrinogen degradation product (FDP) 55.2 ug/mL, brain natriuretic peptide (BNP) 139 pg/mL, hemoglobin 80 g/L, platelets 80*10^9/L, glutamic-pyruvic transaminase (GPT) 190 u/L, glutamic-oxalacetic transaminase (GOT) 150 u/L, and total bilirubin (TIL) 30 mmol/L. Cardiac enzymes were negative. Echocardiography showed continuous flow on color Doppler from the ascending aorta fistulating into the right atrium, moderate tricuspid insufficiency, and an enlarged right atrium (80 × 60 mm), right ventricle (26 mm), and left ventricle (56 mm). Abdominal ultrasonography revealed hepatic congestion and splenic congestion. Aortic CTA showed that the hematoma located in the anterior mediastinum was approximately 80 × 72 mm (Figure 1C) and also clearly a shunt between the embedding cavity of the aortic root and right atrium, which was significantly enlarged (Figure 1D). Based on these results,
The patient was diagnosed with an aorto-cutaneous fistula. Emergency surgery was immediately performed. A cardiopulmonary bypass (CPB) was established through cannulation of the right femoral artery and right femoral vein before a sternotomy was performed. After a repeat sternotomy, a large hematoma appeared between the 2th and 4th intercostal spaces. We then found two leaks approximately 2 mm from the anastomosis of the greater curvature of the ascending aortic graft and stented graft (Figure 2) after the hematoma was removed, and closed the leaks with Dacron patch by 5/0 prolene directly without cardiac arrest. After bicaval clamping, we incised the right atrium, and confirmed a shunt that was approximately 20 mm wide and had a large amount of blood flow. Finally, the shunt was closed with an auto-pericardial strip by interrupted mattress suture and a continuous suture using 4/0 prolene. Afterwards, tricuspidplasty was also conducted. The weaning off of CPB was supported with a continuous infusion of dopamine (5 ug/kg/minute) and nitroglycerin (0.5 ug/kg/minute). After errythsis stopped, the operation was finished.

Figure 1. A: Preoperative 3D image in aortic CTA revealed the previous surgical method included an ascending aorta and total arch replacement with a 4-branched graft combined with a stented elephant trunk. B: Area of ulceration and bleeding in the skin around the sternal angle was approximately 10 x 8 mm. C: Aortic CTA showed sternal erosion (white arrow) and a hematoma in the anterior mediastinum (*) which was caused by the leak (black arrow). D: Maximum intensity projection (MIP) clearly showed the shunt from the embedding cavity of the aortic root to the right atrium (black arrow), an enlarged right atrium (white arrows), and the hematoma (*).
The postoperative course was eventful. The patient woke up in our ICU 8 hours after the surgery, but suddenly lost consciousness at the 30th hour postoperatively. Cranial computed tomography revealed encephalorrhagia. The patient’s families decided to decline therapy at the 3rd p.o.d.

Conclusions

Stanford type A AD is a life-threatening situation with a spontaneous mortality of 1% to 3% per hour within the first 48 hours. Ascending aorta and total aortic arch replacement combined with the stented elephant trunk procedure is the most commonly used procedure to treat it. Bleeding is an intractable problem for the procedure. In 1978, Cabrols introduced a method which aimed to control bleeding by establishing a shunt from the embedding cavity to the right atrium. This is a widely used method in clinics nowadays. However, this method needs to be applied deliberately. In terms of our case, because of the continued and vast left-to-right shunt, the pressure load and volume load of the right ventricle gradually increased, which ultimately lead to severe right heart failure. Therefore, we believe that the method should be applied only when there is no significant bleeding, otherwise it can lead to a severe event. Hussain, et al. reported that they had successfully achieved transcatheter closure of a shunt using a double-disc occluder. In our case, doctors tried to close the shunt by using this method but finally failed, and what is even worse is the guide wire injured the artificial vascular graft, causing significant bleeding. Therefore, another valuable lesson of this case is that in patients with an artificial vascular graft, the guide wire should be softer and be conveyed more gently when performing interventional therapy.

Disclosures

Conflicts of interest: None.

References

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