

SHORT REPORT

Endovascular Stent-graft Treatment of Type A Dissection: Case Report and Review of Literature

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We report a successful endovascular stent-graft treatment of a patient with type A dissection with primary entry tear at the ascending aorta. Simultaneous coronary stenting was performed. A literature review was performed and the possible use of endovascular treatment for ascending aortic dissections is discussed.

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Dissection of the ascending aorta is associated with a high mortality when treated medically. Standard management is open surgical repair however this approach also has a significant mortality especially in patients with multiple comorbidities.¹ Endovascular techniques have gained wide acceptance as an effective treatment option for various diseases of the aorta including pseudoaneurysms, true aneurysms, transections, ruptures, type B dissections, coarctations and penetrating ulcers.^{1–6} We report a successful endovascular treatment of a patient with type A dissection and significant comorbidities.

Case Report

A 66 year old man was referred to our center after investigations for chest pain diagnosed a type A dissection. He had undergone a right superior lobectomy for lung cancer in another institution 4 years previously. Computed tomography (CT) demonstrated a type A aortic dissection with an intimal flap arising above the right coronary artery and extending to the origin of the innominate artery (Fig. 1a). The maximum diameter of ascending aorta was 62 mm and

the false lumen diameter was 43 mm. An entry tear was found in the ascending aorta. The preoperative angiogram confirmed the dissection and also demonstrated a critical stenosis (90%) of left anterior descending coronary artery (Fig. 1b,c). A conventional repair was considered to be a very high risk and the option of stent-graft placement was discussed with the patient. The patient agreed to undergo this procedure and written informed consent was obtained.

At the interventional cardiology theatre, successful coronary stenting was firstly performed (Mustang coronary stent) (Fig. 1d). Under general anesthesia, the right femoral artery was exposed. A 5 French pig-tail catheter was inserted via the right femoral artery to localize the site of dissection and supraaortic branches. A delivery system was advanced to the ascending aorta. The proximal end of the graft (Medtronic endovascular stent graft TC4646B100X; 46 mm) was placed distally to the sinus of valsalva. The stent-graft was deployed distal to the coronary arteries and proximal to the brachiocephalic trunk. Completion angiography confirmed total exclusion of the aortic tear and the false lumen, with antegrade flow into the right coronary and innominate arteries (Fig. 2a). The patient's initial recovery was uneventful. He was extubated on the 3rd postoperative hour. A CT scan before discharge of the patient confirmed a patent stent with minimal endoleak and most of the false lumen was thrombosed (Fig. 2b). Coronary ostia

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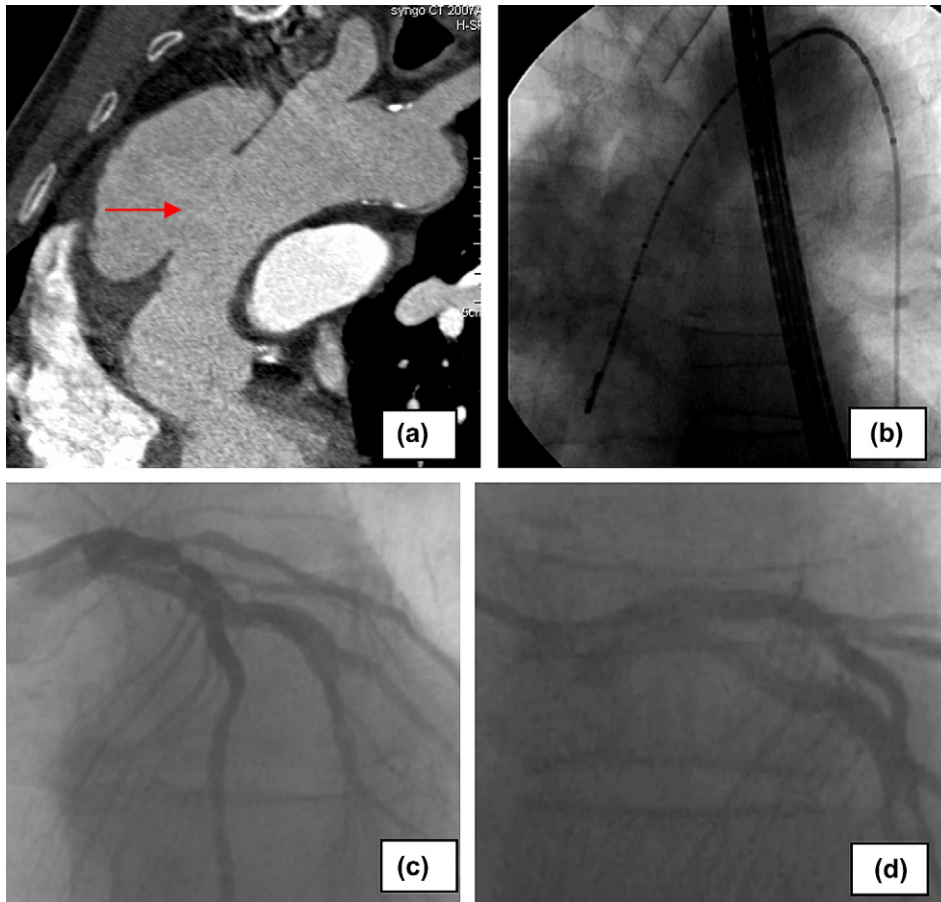


Fig. 1. (a) Computed tomographic scan of type A dissection. Note the large entry tear. (b) Aortogram showing the type A dissection. (c) Critical stenosis at the left anterior descending coronary artery. (d) Left anterior descending coronary artery after stenting.

and brachiocephalic arteries were well perfused (Fig. 2b,c). The patient was discharged on the 5th day after the procedure. No complications have been identified during regular follow-up.

Discussion

Endovascular procedures are emerging as an effective treatment modality for dissection. This approach avoids sternotomy and circulatory arrest. For type A dissections however there are a number of issues to consider in endovascular management:

1) Patients often have inadequate landing zones leading to a considerable risk of obstruction of the coronary and supraaortic branches. Hybrid approaches combining surgical debranching of the supra-aortic trunks with endovascular stent-graft placement have been used successfully in high-risk cases for

other pathologies of the ascending aorta to compensate for inadequate landing zones.⁴ In our patient, we were able to position the stent-graft by marking the site of entry tear accurately and determining an adequate length of the stent before deployment and successfully excluding the intimal tear and the false lumen without covering the coronary or innominate arteries. It can be quite difficult to ensure tracking of the stent graft around the curve of the aortic arch to the ascending aorta without extending the dissection. In some cases right carotid access may be more appropriate for the deployment of the endovascular stent. But this technique involves a high risk of embolization and it is not routinely recommended.

2) Aortic valve insufficiency may be detected after endovascular repair of type A dissection² possibly due to aortic dilatation by the stent-graft. The TAG device (WL Gore) may be more suitable because of its accurate deployment. The selection of

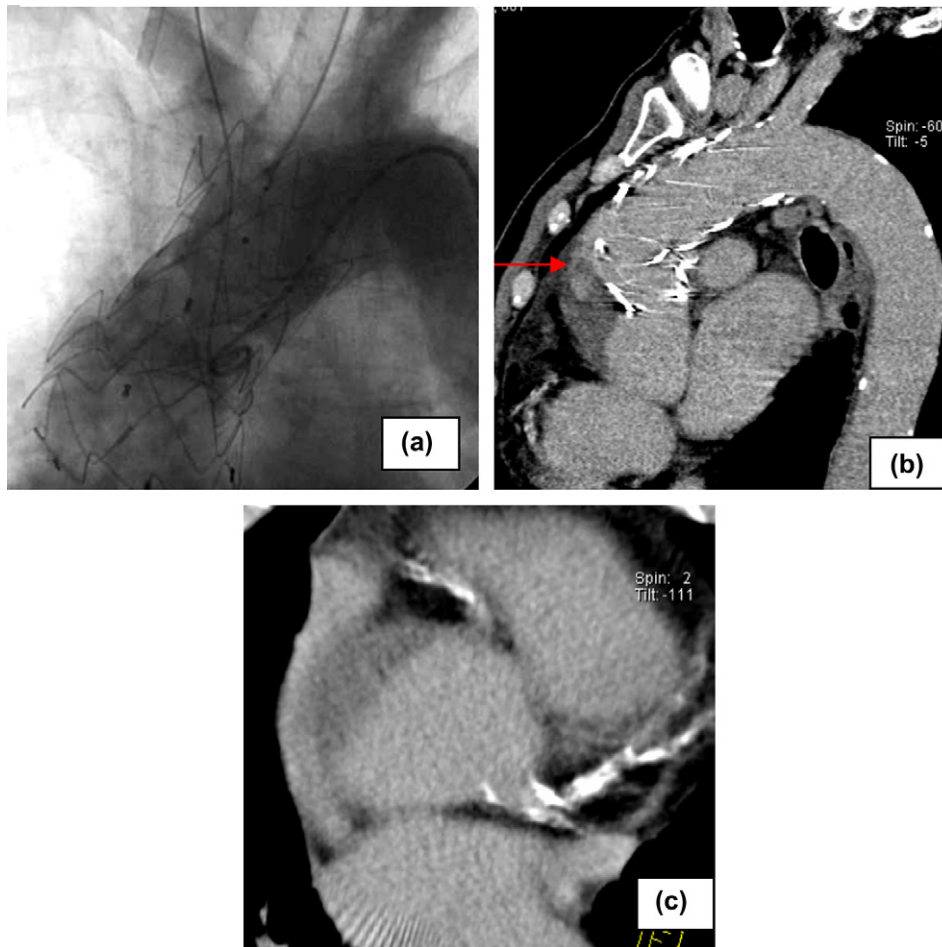


Fig. 2. (a) Endovascular stent deployment at the ascending aorta with no evidence of endoleak. (b) Control computed tomographic scan image. Note the minimal endoleak, but total occlusion of the entry tear. Supraaortic branches are regularly perfused. (c) Control computed tomographic image. Coronary arteries are regularly perfused. The coronary stent at the left anterior descending coronary artery is intact.

stent should be made following careful measurement of the diameter of the ascending aorta. Preoperative uncompromised aortic valve function is required if endovascular management is to be considered. Post-procedural echocardiographic examination is also needed. The use of TEE is recommended to confirm sac exclusion if possible.

- 3) Simultaneous coronary or cerebral artery pathology may be detected in patients with aortic dissection. Pre-existing stenosis can be treated with stenting, as in our case. Malperfusion of aortic branches due to intimal flap can also be treated with endovascular techniques.^{5,7} But in order to obtain a sufficient landing zone an entry tear well above the coronary ostia is needed.
- 4) At present the long-term outcome of endovascular treatment of aortic dissection is unclear.¹

In conclusion endovascular treatment of type A aortic dissection is a promising treatment option at least for the patients with multiple comorbidities who are not suitable for conventional surgical repair. Preoperative accurate assessment of the ascending aorta, aortic valve and the localisation of the primary entry tear may help to provide superior procedural results.

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