The diseased aorta in Takayasu’s arteritis features areas of ectasia and stenosis; the aorta is left with very little elastic tissue due to diffuse fibrosis of the intima, media, and externa.\(^1\)\(^2\) Stent-supported endovascular aortoplasty and surgical revascularization are associated with higher complication and recurrence rates,\(^3\)\(^4\) even with regular immunomodulation follow-up.\(^5\) Unlike atheromatous disease, the inflexible artery is vulnerable to dissection, and is as “brittle as glass” during balloon angioplasty.\(^7\) Therefore, some authors suggest self-expanding stent or stent-graft supported angioplasty for this condition, with high-pressure dilation\(^8\)\(^9\) to overcome fibrosis caused by panarteritis. However, the incidence of dissection in this situation appears to be under-reported.

**CASE REPORT**

A 38-year-old female with known Takayasu’s arteritis was referred to us for uncontrollable hypertension because of middle aortic syndrome. She was under regular treatment with immunosuppression. On examination, she had abdominal bruit and weak femoral pulses. Her blood pressure was 210/110 mm Hg in both arms and 120/70 mm Hg in the lower limbs in supine position. Investigations
showed inactive phase of disease as suggested by normal level of erythrocyte sedimentation rate and C-reactive protein. The pull-back gradient across the distal thoracic aorta revealed a significant gradient of 110 mm Hg (Figure 1). Aortogram confirmed areas of diffuse stenosis and ectasia in the thoracoabdominal aorta, with significant stenosis of the aorta at the level of intervertebral disc between T-11 and T-12 (Figure 2, Video 1). Informed consent for aortoplasty to control secondary hypertension was obtained. Using right femoral arterial access, the occluded segment was crossed using a straight-tip, exchange-length wire (Terumo) and 5 Fr multipurpose diagnostic catheter. The aortic lesion was dilated using an 8 mm x 4 cm Ravel balloon (Bard Peripheral Vascular) at 4 atm; this size was chosen because the narrowest lesion diameter was 5.2 mm (balloon to lesion ratio of 150%). The patient had mild back pain during and after dilation. The pull-back gradient reduced to 50 mm Hg. A dose of 100 mg intravenous tramadol was given. Immediately, a 12 mm x 6 cm E•Luminex self-expanding stent (Bard Peripheral Vascular) was deployed, as we had no covered stent available at the time of intervention. The pull-back gradient reduced further to less than 20 mm Hg. Repeat aortogram by pigtail catheter revealed extensive dissection of the aorta beyond the disease segment (Figures 3 and 4; Videos 2 and 3). No further dilation was attempted. The patient continued to have mild back pain. Beta-blocker was further reinforced by increasing the dose of atenolol to 100 mg twice daily. Her further hospital course was uneventful. At 12-month follow-up exam, the patient continued to be asymptomatic and her hypertension was under control.

DISCUSSION

Angioplasty was first performed for aortoarteritis by Yagura et al in 1984. The literature is now robust with a learning curve of more than three decades. It is generally considered that aortoplasty is safe and effective for aortoarteritis, with a low incidence of aortic dissection or rupture (which is associated with high mortality). We feel the true incidence of aortic dissection or rupture after aortoplasty in Takayasu’s arteritis is under-reported because the
studies reporting dissection are available mostly in the form of case reports. The inelastic vessel wall is tough, non-compliant, and rigid because of panarteritis, and healing occurs by extensive fibrosis. It requires prolonged and repeated balloon dilation at a higher pressure as compared with congenital coarctation or atherosclerosis. Balloon angioplasty without a stent in Takayasu’s arteritis is a double-edged sword in that dissection can be the cost of overdilation. However, underdilation invites faster restenosis. The ideal profile of the balloon and the optimum dilation (lesion to reference diameter) are unknown for this condition. The recommendations for balloon sizes in different interventional procedures have been based on guidelines or larger experiences (Table 1). However, we could not find proper answers for the balloon type (compliant vs non-compliant), balloon diameter, balloon length (for diffusely narrowed aorta with some areas of critical stenosis as in our case), or staging of the procedure. We feel it is better to limit the length of balloon to the critically stenosed segment. The size of the balloon chosen for angioplasty is two or more times the size of the coarctation segment, but no larger than the size of the descending aorta at the level of the diaphragm, as measured from a frozen video recording. Coarctation of aorta Coronary artery disease Percutaneous transluminal angioplasty (atherosclerosis) Fibromuscular dysplasia Takayasu’s arteritis

CONCLUSION

Aortic dissection is an inherent risk of aortoplasty for patients with Takayasu’s arteritis. We suggest limiting the length of balloon to the critically stenosed segment and a staged procedure when the aorta is diffusely involved with areas of stenosis and aneurysm. Ensure that a covered stent is available for cases of complex lesions. We hope the proper definition of the balloon used for aortoplasty in Takayasu’s arteritis with respect to nature (compliant or non-compliant), size (length and diameter), and inflation pressure will be elucidated by future observations.

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REFERENCES


