The Heart Surgery Forum 2022-5233
26 (2), 2023 [Epub March 2023]
doi: 10.1532/hsf.5233

Online address: http://journal.hsforum.com

Surgical Repair of Giant Asymptomatic Ascending Aortic Aneurysm Accompanied with Chronic Stanford Type A Aortic Dissection: A Case Report

Yao Wang,[1] Rong Ren,[1] Huapeng Li,[1] Gang Li,[1] Hongwei Guo[2]

[1]Department of Cardiovascular Surgery, Fuwai Hospital, Chinese Academy of Medical Sciences, Shenzhen, China;
[2]Department of Surgery, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

ABSTRACT

Background: Ascending aortic aneurysm accompanied with stanford type A aortic dissection is a life-threatening condition. The most common presenting symptom is pain. Here, we report a very rare case of giant asymptomatic ascending aortic aneurysm accompanied with chronic stanford type A aortic dissection.

Case presentation: A 72-year-old woman was founded to have ascending aortic dilation on a routine physical examination. On admission, CTA showed an ascending aortic aneurysm accompanied with stanford type A aortic dissection, the diameter of which was approximately 10 cm. Transthoracic echocardiography showed an ascending aortic aneurysm, aortic sinus and sinus junction dilation, moderate aortic valve regurgitation, left ventricle enlargement, left ventricular wall hypertrophy, and mitral and tricuspid valve mild regurgitation. The patient underwent surgical repair in our department, was discharged, and recovered well.

Conclusion: This was a very rare case of a giant asymptomatic ascending aortic aneurysm accompanied with chronic stanford type A aortic dissection that was successfully managed by total aortic arch replacement.

INTRODUCTION

Background: Ascending aortic aneurysm accompanied with stanford type A aortic dissection is a life-threatening condition, and the most frequent symptom is the sudden onset of severe chest or back pain, which is rare without clinical symptoms [Berretta 2016]. Early diagnosis is very important for timely intervention and improving the survival rate of patients because of its significant morbidity and mortality [Evangelista 2018]. Here, we report a very rare case of a giant asymptomatic ascending aortic aneurysm accompanied with chronic stanford type A aortic dissection.

CASE PRESENTATION

A 72-year-old woman was admitted to our hospital with ascending aortic dilation. The patient had a history of hypertension and sometimes chest tightness accompanied by shortness of breath for more than 10 years. One month prior to admission, the patient was found to have ascending aorta dilation on a routine physical examination, and it had not been treated.

On admission, the patient's blood pressure was 138/86 mmHg, pulse rate 81 beats per minute, and respiratory rate 20 per minute. Transthoracic echocardiography revealed an ascending aortic aneurysm, aortic sinus and sinus junction dilation, moderate aortic valve regurgitation, left ventricle enlargement, left ventricular wall hypertrophy, and mitral and tricuspid valve mild regurgitation (Figure 1A). (Figure 1) According to the concerning findings, the aorta computed tomography angiography (CTA) was ordered and revealed that an ascending aortic aneurysm accompanied with stanford type A aortic dissection (Figures 2A and 3A), and the diameter was approximately 10 cm. (Figure 4). (Figure 2)(Figure 3) (Figure 4) The dissection involved the arch, and the tear was localized in the sinus canal junction and near the left subclavian artery.

The patient underwent emergent total arch replacement repair. The total aortic arch replacement surgery was done, according to Sun's Procedure [Ma 2013]. Surgery was performed under general anesthesia with tracheal intubation and cardiopulmonary bypass (CPB). CPB was established by catheterization of the left femoral artery and right atrium. The ascending aorta was blocked, and intermittent cold blood cardioplegia solution (4 °C) was perfused through the left and right coronary arteries for myocardial protection. As the patient's nasopharyngeal temperature dropped to 25 °C, aortic root reconstruction or replacement immediately took place, the aortic valve was resected with continuous suture with 3-0 Prolene thread, and 23# Medtronic II biological valve was implanted. The CPB was stopped, and the left common carotid artery was intubated with low-flow unilateral selective cerebral perfusion.

Received October 15, 2022; accepted November 15, 2022.

Correspondence: Hongwei Guo, Department of Surgery, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, 167# Beilishi Road, Beijing, 100037, China, Telephone +86-10-88322375, Fax +86-10-68313012 (e-mail: ghwdr@sina.com).

The descending aorta was implanted with a 26X100 mm elephant trunk stent and continuous sutured with 3-0 prolene thread. The distal of the 30# four-branches vessel was anastomosed with the elephant trunk stent and descending aorta, and restored half of the flow, one branch vessel was anastomosed the innominate artery, and one branch vessel was anastomosed the left common carotid artery to restore the full flow and start rewarming. Finally, the other branch vessel was anastomosed with the left subclavian artery. The proximal end of the four-branch vessel was continuously anastomosed with the proximal aorta using 3-0 prolene thread, and after exhausting, and then regained after defibrillation. The auxiliary shutdown, protamine neutralization of heparin, conventional closed chest, and the patient was returned to ICU.

CTA and transesophageal echocardiographic examination were performed before discharge. CTA showed the disappearance of the false lumen and recovery of the true lumen, and no space or blood flow surrounding the elephant trunk stent, and no endoleak (Figures 2B and 3B). Transesophageal echocardiographic examination showed that hemodynamics was stable and no re-dissection or rupture in the repaired aorta was found (Figure 1B). The dissected aortic pathology showed myxoid medial degeneration, disorders of smooth muscle arrangement in the media, and elastic fiber fracture without evidence of connective tissue disorders. The patient's postoperative all-exon gene detection showed no abnormalities related to aortic aneurysm.

DISCUSSION

Ascending aortic aneurysm is prone to dissection or rupture with the increasing aortic root diameter, which is a serious risk to the patient's life. Giant thoracic aortic aneurysm is considered when dilation exceeds 10 cm in diameter [Okura 1999]. Women with thoracic aortic aneurysm are more likely to have an aortic dissection or rupture and greater aneurysm growth rates than men, regardless of body size or other clinical variables [Cheung 2017]. The prognosis is worse in women although thoracic aortic aneurysms are more prevalent in men [Olsson 2006].

In this case, the patient had a history of hypertension and sometimes chest tightness accompanied by shortness of breath for more than 10 years before intervention, which constitutes the main risk factor predisposing for aortic aneurysms, aortic dissection and even rupture. The most frequent symptom of

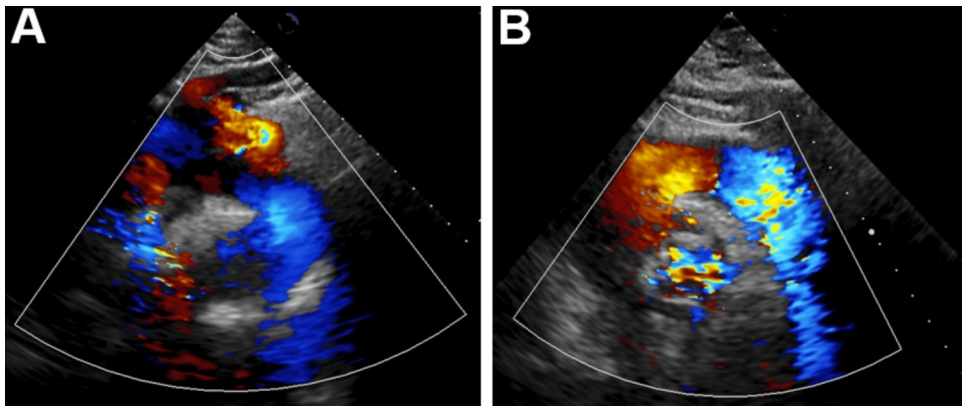

Figure 1. Preoperative and postoperative transesophageal echocardiogram

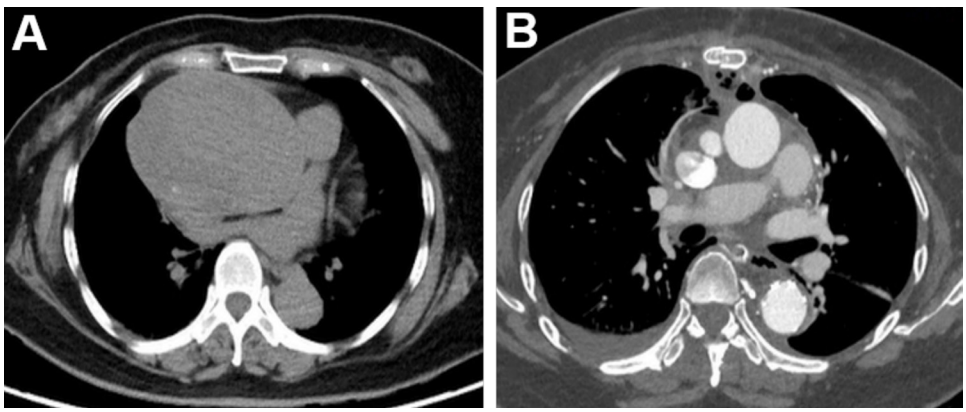

Figure 2. Preoperative and postoperative computed tomography angiography. (A) The ascending aortic aneurysm measured 10 cm, and the tear was localized in the sinus canal junction and near the left subclavian artery. (B) The ascending aortic aneurysm was removed after total aortic arch replacement.

giant ascending aortic aneurysm accompanied with stanford type A aortic dissection is the sudden onset of severe chest or back pain, which is rare without clinical symptoms. In this patient, even though the thoracic aortic aneurysm had dilated to such rare giant scale (10 cm) and accompanied with stanford type A aortic dissection, it remained stable and the clinical symptoms were mainly sometimes chest tightness and shortness of breath, due to cardiac dysfunction secondary to aortic regurgitation.

Patients with ascending thoracic aortic aneurysm accompanied with stanford type A aortic dissection generally are candidates for surgery. If the tear is localized in the root, ascending or proximal aorta, hemi-arch replacement is usually adequate to save the patient's life [Uchida 2011]. Bentall procedure has become a low-risk and durable operation with 5- and 10-year survival rates of 84% and 75%, respectively [Gott 1999]. However, when the intimal tear is located near the origins of supra-aortic vessels, total aortic arch replacement might be necessary to be performed; Sun's procedure is the most widely used in China and has been shown to be safe and effective with low operative mortality [Ma 2014]. In this case, the patient had a giant ascending aortic aneurysm accompanied with stanford type A aortic dissection, and the dissection involved aortic arch, which was performed by Sun's procedure. The surgery was very successful, the patient was discharged home on postoperative day 7.

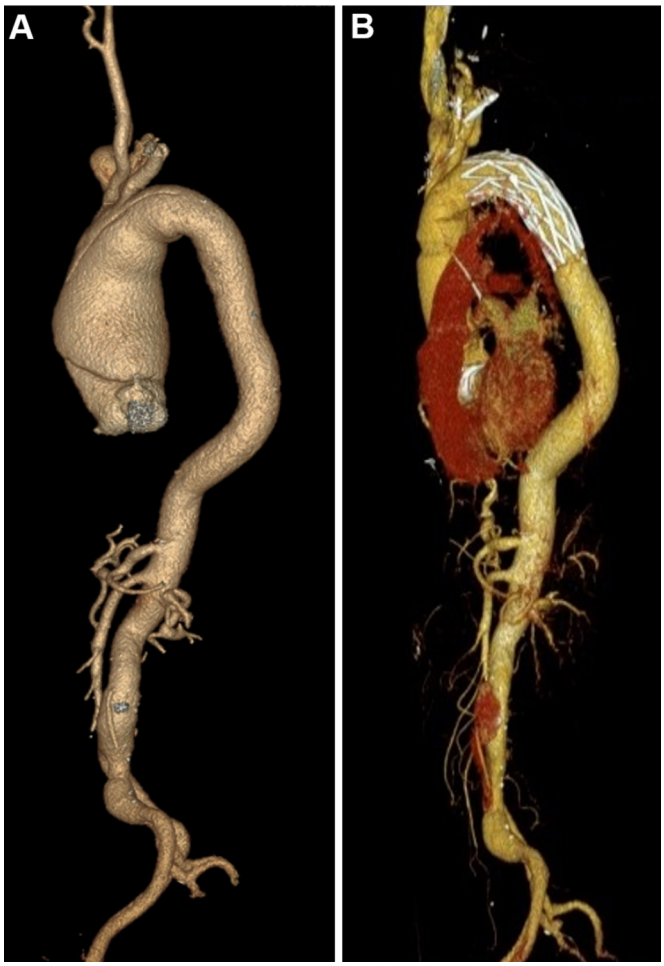

Figure 3. Preoperative and postoperative three-dimension computed tomography angiography. (A) The giant ascending aortic aneurysm. (B) The ascending aortic diameter was recovered after total aortic arch replacement.

CONCLUSION

Giant ascending aortic aneurysm accompanied with stanford type A aortic dissection is rare without clinical symptoms. It can successfully be managed with total aortic arch replacement.

Figure 4. Intraoperative view of the ascending aortic aneurysm.

ACKNOWLEDGEMENT

Funding: This work was supported by the Shenzhen Key Medical Discipline Construction Fund [SZXK019] and the Fund of "Sanming" Project of Medicine in Shenzhen [SZSM201911018].

REFERENCES

Berretta P, Patel HJ, Gleason TG, Sundt TM, Myrmel T, Desai N, et al. 2016. IRAD experience on surgical type A acute dissection patients: results and predictors of mortality. Ann Cardiothorac Surg. 5:346–351.

Cheung K, Boodhwani M, Chan KL, Beauchesne L, Dick A, Coutinho T. 2017. Thoracic Aortic Aneurysm Growth: Role of Sex and Aneurysm Etiology. J Am Heart Assoc. 6(2): e003792.

Evangelista A, Isselbacher EM, Bossone E, Gleason TG, Eusanio MD, Sechtem U, et al. 2018. Insights From the International Registry of Acute Aortic Dissection: A 20-Year Experience of Collaborative Clinical Research. Circulation. 137(17):1846-1860.

Gott VL, Greene PS, Alejo DE, Cameron DE, Naftel DC, Miller DC, et al. 1999. Replacement of the aortic root in patients with Marfan's syndrome. N Engl J Med. 340(17):1307–1313.

Ma WG, Zheng J, Zhang W, Sun K, Ziganshin BA, Wang LF, et al. 2014. Frozen elephant trunk with total arch replacement for type A aortic dissections: Does acuity affect operative mortality? J Thorac Cardiovasc Surg. 148(3):963-702.

Ma WG, Zhu JM, Zheng J, Liu YM, Ziganshin BA, Elefteriades JA, et al. 2013. Sun's procedure for complex aortic arch repair: total arch replacement using a tetrafurcate graft with stented elephant trunk implantation. Ann Cardiothorac Surg. 2:642–648.

Okura T, Kitami Y, Takata Y, Fukuoka T, Arimitsu J, Hiwada K. 1999. Giant Unruptured Aneurysm of the Thoracic Aorta, Angiology. 50(10):865-869.

Olsson C, Thelin S, Stahle E, Ekbom A, Granath F. 2006. Thoracic aortic aneurysm and dissection: increasing prevalence and improved outcomes reported in a nationwide population-based study of more than 14,000 cases from 1987 to 2002. Circulation. 114: 2611–2618.

Uchida N, Katayama A, Tamura K, Sutoh M, Kuraoka M, Ishihara H. 2011. Frozen elephant trunk technique and partial remodeling for acute type A aortic dissection. Eur J Cardiothorac Surg. 40(5):1066-1071.