

## DELAYED PRESENTATION OF AN ASCENDING AORTIC ANEURYSM FOLLOWING AORTIC VALVE REPLACEMENT

M Jamil Akhtar<sup>a</sup>, Khalid Rehman Yousaf<sup>b</sup>, Adila Iqbal<sup>b</sup>

### ABSTRACT:

**A**neurysm of ascending Aorta subsequent to valve surgery is rare. This is a case of ascending aortic aneurysm in a 29-years-old male, who had aortic valve replacement 10 years ago, after surgery for aortic regurgitation due to congenital bicuspid abnormality of aortic valve.

### INTRODUCTION:

Bicuspid aortic valve has two in place of normal three cusps. These valves are predisposed to complications i.e. stenosis as well as leak and even replacement surgery does not preclude gradual dilatation of aorta and vulnerability to aneurysm formation. Though it is very rare to find huge aneurysm of ascending aorta subsequent to aortic valve replacement but it is a fatal complication and aortic is at risk of dissection or rupture. Here we have presented a case of aneurysm of ascending aorta developed subsequent to AVR. Management of such aneurysms is a difficult and has a great morbidity as well as mortality<sup>1</sup>.

### KEYWORDS:

Aneurysm, Ascending aorta, Bicuspid aortic valve

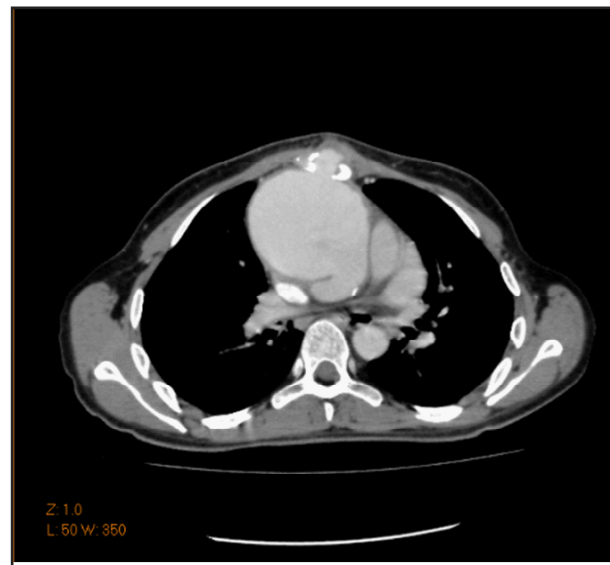
### ABBREVIATIONS:

CECT (contrast enhanced computed tomography), BAV (Bicuspid aortic valve), AVR (Aortic valve replacement)

### CASE:

A 29-year-old male patient with bicuspid aortic valve and regurgitation experienced aortic valve replacement surgery and had mechanical prosthetic valve almost 10 years back. At the time of procedure entire thoracic aorta was unremarkable. Now he presented to our department with complain of chest pain for 7 months. There was widening of superior mediastinum on frontal chest radiograph, which was followed by contrast-enhanced computed to-

**Figure 1: (a) CECT image displaying aortic dilatation up to 8-cm representing aneurysm of ascending aorta. This inhabited most of space in pericardial cavity.**



(J Cardiovasc Dis 2013;11(4):107-8)

mography and revealed a large aneurysmal mass measuring 7x8cm in anterior mediastinum with extension into mid sternal gapping. Its connection with ascending aorta is established at aortic root level anteriorly with neck of aneurysm measuring 1.5cm. Aortic arch was however intact. Prosthetic valve and rest of cardiac as well as mediastinal structures were unremarkable.

### DISCUSSION

Complications subsequent to aortic valve replacement (AVR) surgery consist of dissection, aneurysm of ascending aorta or root, as well as coarctation<sup>1-4</sup>. Our patient had history of previous surgery for regurgitation of aortic valve due to congenital bicuspid valve. Bicuspid valve of aorta (BAV) is common congenital abnormality of cardiac valves, having frequency laying from 1% to 2% of the whole population<sup>2</sup>. Statistics from multiple studies<sup>3,4</sup> confirmed that abnormalities of walls of aorta not only take place in patients with BAV, but patients having replacement surgery of

<sup>a</sup> Punjab Institute of Cardiology, Lahore-Pakistan

<sup>b</sup> SIMS, Services Hospital, Lahore

\* Corresponding author:

Email: drjamilakhtar@gmail.com



bicuspid aortic valve are prone to complications, and can occur even years after AVR surgery, since histological alterations in ascending aorta, leading to dilatation, aneurysm formation and dissection. As in patients of BAV there is a reduced amount of elastic tissue in comparison to normal aortic valve<sup>3</sup>. Particularly, patients of BAV have thin elastic lamina in aorta media and at greater distance in comparison to normal<sup>2,3</sup>. So, patients of BAV are more prone to complications of aorta and even valve replacement surgery cannot protect gradual dilatation of aorta<sup>3,5</sup>. Previously it was thought that those patients of BAV who have aortic diameter greater than 4cm and undergoing replacement surgery of aortic valve were at increased risk of aneurysm formation. So, in all cases of AVR during surgery, ascending aorta should also be replaced if it is greater than 4cm. In another study done by Borger et al.<sup>6</sup> proposed the idea of concurrent replacement of aorta particularly of ascending segment if its size is more than 4.5 cm. New advices according to American Heart Association/ American College of Cardiology approve this approach<sup>7</sup>. Though, not all cases of BAV progress to dilatation of aorta. Nistri et al.<sup>8</sup> discovered a 52% incidence

of dilatation of aorta in younger patients having other wise normally working BAV.

Laplace Law states that, wall pressure rises as area of aneurysm grows. It is hence natural that bigger aneurysms are more prone to rupture. Coady and his coworkers have comprehensively described the natural course of aneurysm of thoracic aorta. Progression rates is about 0.082 cm for every year for aneurysms if it is not more than 4.02cm and 0.162cm for each year if size of aneurysm is bigger than 8.02 cm and risk of rupture of aneurysm increases about 4.3 times for size greater than almost 6cm<sup>9</sup>. However, in post-operative cases as in ours, factor which prevents rupture though, having greater size may be fibrotic bands which are developed in mediastinal and Para-aortic area due to previous surgery.

### CONCLUSION:

We consider that patients who undergo replacement surgery for BAV should be monitored frequently due to risk of aortic dilatation and aneurysm formation. Prompt and precise diagnosis of aneurysm formation at relatively smaller size is necessary for early surgical management so, to lessen the morbidity as well as mortality.

## REFERENCES

1. V. Agarwal, C. Yaliwal, E. Ofo, and S. Kolvekar, "Giant ascending aortic aneurysm—a case report and review," *Heart Lung and Circulation*, vol. 16, no. 5, pp. 385–388, 2007.
- [2] H. Yasuda, S. Nakatani, M. Stugaard, et al., "Failure to prevent progressive dilation of ascending aorta by aortic valve replacement in patients with bicuspid aortic valve: comparison with tricuspid aortic valve," *Circulation*, vol. 108, no. 10, supplement 1, pp. II291–II294, 2003.
- [3] M. P. Vallely, C. Semsarian, and P. G. Bannon, "Management of the ascending aorta in patients with bicuspid aortic valve disease," *Heart Lung and Circulation*, vol. 17, no. 5, pp. 357–363, 2008.
- [4] Michelena HI; Khanna AD, Mahoney D, Bicuspid Aortic Valve Disease. *The Journal of American Medical Association*—September 14, 2011; Vol 306, (10):
- [5] K. Matsuyama, A. Usui, T. Akita, et al., "Natural history of a dilated ascending aorta after aortic valve replacement," *Circulation Journal*, vol. 69, no. 4, pp. 392–396, 2005.
- [6] M. A. Borger, M. Preston, J. Ivanov, et al., "Should the ascending aorta be replaced more frequently in patients with bicuspid aortic valve disease?" *Journal of Thoracic and Cardiovascular Surgery*, vol. 128, no. 5, pp. 677–683, 2004.
- [7] R. O. Bonow, B. A. Carabello, K. Chatterjee, et al., "ACC/AHA 2006 guidelines for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 1998 Guidelines for the Management of Patients with Valvular Heart Disease)—developed in collaboration with the Society of Cardiovascular Anesthesiologists," *Circulation*, vol. 114, no. 5, pp. e84–e231, 2006.
- [8] S. Nistri, M. D. Sorbo, M. Marin, M. Palisi, R. Scognamiglio, and G. Thiene, "Aortic root dilatation in young men with normally functioning bicuspid aortic valves," *Heart*, vol. 82, no. 1, pp. 19–22, 1999.
- [9] M. A. Coady, J. A. Rizzo, L. J. Goldstein, and J. A. Elefteriades, "Natural history, pathogenesis, and etiology of thoracic aortic aneurysms and dissections," *Cardiology Clinics*, vol. 17, no. 4, pp. 615–635, 1999.