

EPIDEMIOLOGY OF AORTIC VALVE DISEASE IN INDIA

Manik Chopra¹, Vyom Mori², Maqbool Sohil³, Sumit Dheer⁴

1. Consultant Cardiology, Clinical lead – Structural heart disease interventions, Narayana Multi-speciality hospital, Ahmedabad.
2. Consultant Cardiology, Narayana Multi-speciality hospital, Ahmedabad.
3. Consultant Cardiology, Narayana Multi-speciality hospital, Ahmedabad.
4. Consultant Cardiology, Narayana Multi-speciality hospital, Ahmedabad.

ABSTRACT: Aortic valve disease is the second most prevalent valvular heart disease in India while its more commoner in the western population. Rheumatic etiology is yet common and contributes to one third of valvular heart disease in India. The true prevalence of aortic valve disease in India is not known but as per western estimates it must be around 2-3% in the elderly subgroup. Indian population is still young so as it starts ageing there will be a significant increase in incidence of degenerative aortic valve disease.

INTRODUCTION: Aortic valve disease is the most prevalent valvular heart disease in those above 60 years of age.¹ The actual prevalence of it in the Indian population is not clearly known in absence of large scale multi centre studies. Aortic valve disease adds up significant morbidity and mortality in the elderly population with increased surgical risk being a hindrance for surgical aortic valve replacement.² Transcatheter aortic valve replacement has become a gold standard treatment for those with aortic stenosis and increased surgical risk with it becoming indication now also in those with low surgical risk and age >65 years of age.³ However till date TAVR is yet out of the reach of average Indian because of cost issues.

The epidemiology of aortic valve disease varies between the low income and high income countries with infective etiology (Rheumatic heart disease) being more common in low income countries and degenerative etiology more common in high income countries. The prevalence of AS in western population with age > 75 years of age has been 12.4% and those with severe AS being 3.4%.⁴ The prevalence of AS keeps increasing with increasing age. The prevalence is 0.2% in 50-59 year age group, 1.3% in 60-69 year age group, 3.9% in 70-79 year age group and 9.8% in those with 80-89 years with incidence of new AS being 5 in 1000 in those with mean age being more than 60 years of age.⁵ The prevalence of aortic regurgitation has been reported to be 0.5% for moderate to severe AR in total US population as well as African American cohort.⁶⁻⁷

Currently the Indian population stands at around 1.4 billion and this makes it second largest populous country in the world. Of this there is only 6.5% which are above 65 years of age and this are the ones with risk for degenerative aortic valve disease. Thus estimated prevalence of severe aortic stenosis would be around 0.9 million people that would require some form of intervention to improve the prognosis.

TRENDS OF VALVULAR HEART DISEASE IN INDIA: In Indian pretext the most commonly involved single valve was the mitral valve with mitral stenosis being most common lesion.^{8,9} Prevalence of aortic valve disease amongst VHD (Valvular heart disease) is 29% in rheumatic cohort where its mostly associated with other valves while it is 35% in the overall cohort.⁸ Isolated aortic stenosis has been reported to be around 7.3% and its third most common valve lesion.⁸ Etiology behind IAS (Isolated aortic stenosis) is degenerative calcification in 65%, BAV (Bicuspid aortic valve) in 33% and rheumatic in 1.1%. IAR (Isolated aortic regurgitation) constitutes 5.8% with etiology most commonly being rheumatic followed by BAV, Aortic root disease and degenerative calcification.⁸ In a single centre study from North-India, amongst all valvular heart diseases predominant aortic valve disease constituted about 16%.⁹ Of which there were 4.8% cases of IAS, 2% of IAR, and 9.4% with multivalvular involvement.⁹ Mean age of presentation in the study for IAS and IAR was 44 and 35 years respectively with >60% being males.⁹ IAS showed bimodal presentation in this study group with one peak in the age group of 0-10 years and other in the age group of 50-59 years.⁹ Etiology behind IAS was degenerative calcification in 58%, BAV in 25% and congenital AS in 24%. Rheumatic heart disease causing IAS was very rare only about 2%. In IAR the most common reason was BAV in 42%, Rheumatic heart disease in 36%, aortic root disease in 10% and 2.5% each for infective endocarditis and subaortic membrane.⁹

In European population when we look at the most common single valve involvement it has been found to aortic valve with aortic stenosis being the most common lesion around 33%.¹⁰ The etiology responsible for IAS was degenerative calcification in 82%, rheumatic in 11% and congenital in 5%. Mean age of the population was 64 years thus a decade later when compared to the Indian population.¹⁰ Similarly the proportion of aortic stenosis has been reported to be 16.5% in US population and 55% in Swedish population.^{6,11} IAR was reported to be around 10% with etiology being degenerative calcification in 50%, rheumatic heart disease in 15%, congenital in 15% and aortic root disease/infective endocarditis each in 7%.¹⁰ Proportion and etiological distribution of aortic valve disease in various studies has been shown in Figure 1.

The true prevalence of aortic valve disease is not yet known but looking at global data it appears to be around 2% in those above age of 65 years. Average Indian population is still young when compared to the western demographics. So with passing time as the population starts ageing there will also be significant increase in patients with aortic valve disease. With country developing there is clear transition of etiology behind aortic valve disease changing from infective to degenerative. The most commonly affected single valve also changes from mitral to aortic as aortic is most commonly affected valve in degenerative etiology.

FIGURE 1: PATTERNS OF AORTIC VALVE DISEASE IN VARIOUS STUDIES.

| | Manjunath et al 2014 ⁸ | | Sahu et al 2020 ⁹ | | Lung et al 2003 ¹⁰ | |
|----------------|-----------------------------------|-----------|------------------------------|---------|-------------------------------|------------|
| | IAS(7.3%) | IAR(5.8%) | IAS(4.8%) | IAR(2%) | IAS(33.9%) | IAR(10.4%) |
| DEGENERATIVE | 65% | 8.2% | 58.1% | 5.2% | 81.9% | 50.3% |
| BICUSPID VALVE | 33.9% | 15.7% | 25% | 42.7% | 5.4% | 15.2% |
| RHD | 1.1% | 47.8% | 2.9% | 36% | 11.2% | 15.2% |
| CONGENITAL | - | 15.7% | 24.1% | 2.7% | - | - |
| AORTIC ROOT | - | 12.9% | - | 10.7% | - | 7.7% |
| IE | - | - | - | 2.7% | - | 7.5% |

*IE-Infective endocarditis, IAS- Isolated aortic stenosis, IAR- Isolated aortic regurgitation, RHD- Rheumatic heart disease.

REFERENCES:

1. Coffey S, Cairns BJ, Iung B. The modern epidemiology of heart valve disease. *Heart*. 2016 Jan;102(1):75-85.
2. Ross J Jr, Braunwald E. Aortic stenosis. *Circulation* 1968;38:61-7.
3. Otto CM, Nishimura RA, Bonow RO, Carabello BA, Erwin JP 3rd, Gentile F, Jneid H, et al. 2020 ACC/AHA Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*. 2021 Feb 2;143(5):e72-e227.
4. Osnabrugge RL, Mylotte D, Head SJ, Van Mieghem NM, Nkomo VT, LeReun CM, Bogers AJ, Piazza N, Kappetein AP. Aortic stenosis in the elderly: disease prevalence and number of candidates for transcatheter aortic valve replacement: a meta-analysis and modeling study. *J Am Coll Cardiol*. 2013;62:1002-12.
5. Eveborn GW, Schirmer H, Heggelund G, Lunde P, Rasmussen K. The evolving epidemiology of valvular aortic stenosis. the Tromsø study. *Heart*. 2013 Mar;99(6):396-400.
6. Nkomo VT, Gardin JM, Skelton TN, Gottdiener JS, Scott CG, Enriquez-Sarano M. Burden of valvular heart diseases: a population-based study. *Lancet*. 2006;368:1005-11.
7. Fox ER, Wilson RS, Penman AD, King JJ, Towery JG, Butler KR, McMullan MR, Skelton TN, Mosley TH, Taylor HA. Epidemiology of pure valvular regurgitation in the large middle-aged African American cohort of the Atherosclerosis Risk in Communities study. *Am Heart J*. 2007;154:1229-34.
8. Manjunath CN, Srinivas P, Ravindranath KS, Dhanalakshmi C. Incidence and patterns of valvular heart disease in a tertiary care high-volume cardiac center: a single center experience. *Indian Heart J*. 2014 May-Jun;66(3):320-6.

9. Sahu AK, Sagar P, Khanna R, Kumar S, Tewari S, Kapoor A, Garg N, Goel PK. Etiology and distribution of isolated aortic stenosis in Indian patients - A study from a large tertiary care hospital in north India. *Indian Heart J.* 2020 Jul-Aug;72(4):272-277.
10. Lung B, Baron G, Butchart EG, Delahaye F, Gohlke-Bärwolf C, Levang OW, et al. A prospective survey of patients with valvular heart disease in Europe: The Euro Heart Survey on Valvular Heart Disease. *Eur Heart J.* 2003 Jul;24(13):1231-43.
11. Andell P., Li X., Martinsson A. Epidemiology of valvular heart disease in a Swedish nationwide hospital-based register study. *Heart.* 2017;103(21):1696–1703.