

# Chapter 3

## CURRENT TREATMENT MODALITIES OF AORTIC VALVE DISEASES

Ali GÜL<sup>1</sup>

### Introduction

Surgical aortic valve replacement is still considered as the gold standard treatment for patients. However recent studies showed that one in three patients is rejected for Aortic valve replacement (AVR), because of a too high operative risk (e.g. old age, increased surgical risk score such as Euro SCORE) or the presence of important co morbidities (pulmonary hypertension, porcelain aorta, etc.)(1).

With more than 100,000 implants worldwide, and more than 1600 cases per year in Turkey, TAVI (Transcatheter Aortic Valve Implantation) seems to change the paradigm in the treatment of aortic valve stenosis (2). Data from the recent U.S Core Valve Trial suggest, for the first time, that TAVI is associated with a significantly higher rate of survival at one year compared to surgical aortic valve replacement (SAVR) in the treatment of high-risk patients affected by severe aortic stenosis. Using TAVI in aortic regurgitation is also reported. (2)

The other promising technique is mini AVR. With not only cosmetic advantages, but less blood product use, less respiratory problems, less pain, and resource utilization advantages over full sternotomy, mini aortic valve surgery is becoming more popular among surgeons.

Recent advances in prosthetic valve technology such as sutureless and rapid deployment valves offer reduced cardiopulmonary bypass (CPB) and aortic cross-clamp time, opening gates to more complex operations and minimally invasive approaches.

### TAVI (Transcatheter Aortic Valve Implantation)

First non-surgical, percutaneous treatment of patients with severe symptomatic aortic valve stenosis was the introduction of balloon for aortic valvuloplasty in 1985. In 1986, Alain Cribier reported on balloon aortic valvuloplasty carried out in three elderly patients with acquired severe aortic valve stenosis. There was no complication and transvalvular systolic pressure gradient was decreased. Results were confirmed by echocardiography and angiography. However high rate of restenosis and aortic regurgitation discredited the balloon aortic valvuloplasty technique over years.

---

<sup>1</sup>Mersin City Training and Research Hospital, Department of Cardiovascular Surgery, Mersin, Turkey

The experts 10<sup>th</sup> and 11<sup>th</sup> recommendations were the perfect closing sentence for this chapter: use of sutureless and rapid deployment valves will lead to a higher adoption rate of minimally invasive approaches in aortic valve replacement and take respect to necessary, brief learning curves for both sutureless and minimally invasive programs.

## Acknowledgement

I'd like to thank to Doğa Gül for her helps in drawing the beautiful illustrations of this chapter.

## References

1. Lung B et al. Decision-making in elderly patients with severe aortic stenosis: why are so many denied surgery? *Eur Heart J*. 2005;26(24):2714-20.
2. Thielmann M, Tsagakis K, El Gabry M, Jakob H, Wendt D. Transcatheter aortic valve implantation (TAVI) in patients with aortic regurgitation. *Ann Cardiothorac Surg* 2017;6(5):558-560. doi: 10.211037/acs.2017.09.16
3. Holzhey DM, Hänsig M, Walther T, Seeburger J, Misfeld M, Linke A, Borger MA, Mohr FW. Transapical aortic valve implantation - The Leipzig experience. *Ann Cardiothorac Surg* 2012;1(2):129-137. DOI: 10.3978/j.issn.2225-319X.2012.06.09
4. Cheung A, Lichtenstein KM. Illustrated techniques for transapical aortic valve implantation. *Ann Cardiothorac Surg* 2012;1(2):231-239. DOI: 10.3978/j.issn.2225-319X.2012.07.12
5. Valérie Collas, Tine Philipsen, Inez Rodrigus, Christiaan Vrints, Bernard P. Paelinck, Johan Bosmans Transcatheter Aortic Valve Implantation: Review And Current State Of The Art. *EMJ Int Cardiol*. 2014;1:52-61
6. Mehmet Cengiz Çolak, Nevzat Erdil, Barış Akça, Olcay Dişli, Güzde Erkul, Ramazan Özdemir, Bektaş Battaloğlu. Vascular Complications After Transcatheter Aortic Valve Implantation in Patients with High-risk Aortic Stenosis. *Damar Cer Derg* 2015;24(3)
7. Shahzad G. Raja, Umberto Benedetto, Mohamed Amrani. Aortic valve replacement through J-shaped partial upper sternotomy *J Thorac Dis*. 2013 Nov; 5(Suppl 6): S662-S668. doi: 10.3978/j.issn.2072-1439.2013.10.02 PMID: PMC3831838
8. Gosev I, Kaneko T, McGurk S, McClure SR, Maloney A, Cohn LH. A 16-year experience in minimally invasive aortic valve replacement: context for the changing management of aortic valve disease. *Innovations (Phila)*. 2014 Mar-Apr; 9(2): 104-10; discussion 110. doi: 10.1097/IMI.0000000000000053. PMID: 24758946
9. Miceli A, Ferrarini M, Glauber M. Right anterior minithoracotomy for aortic valve replacement. *Ann Cardiothorac Surg* 2015;4(1):91-93. doi: 10.3978/j.issn.2225-319X.2015.01.02
10. Ranucci M, Frigiola A, Menicanti L, Castelvechio S, de Vincentiis C, Pistuddi V. Aortic cross-clamp time, new prostheses, and outcome in aortic valve replacement. *J Heart Valve Dis* 2012;21:732-9.
11. Glauber M, Moten SC, Quaini E, et al. International Expert Consensus on Sutureless and Rapid Deployment Valves in Aortic Valve Replacement Using Minimally Invasive Approaches. *Innovations (Philadelphia, Pa)*. 2016;11(3):165-173. doi:10.1097/IMI.0000000000000287.
12. Martinez-Comendador J, Castano M, Gualis J, Mart ~ in E, Maiorano P, Otero J. Sutureless aortic bio-prosthesis. *Interact CardioVasc Thorac Surg* 2017;25:114-21.