



Disseminating valve repairs—a clarion call

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More ink than blood has been spilt in eulogising the advantages of valve repair and that it should be the default procedure, and replacement of the valves should only be done by design. Yet, reparative surgery of valve remains a laggard, more so in the developing world. Partly, it may be due to the underlying substrate of rheumatic pathology in the developing world as against the more conducive degenerative variety in the developed world, but in no smaller measure, this is attributable to reticence on the part of the surgeons to take to repairs. Even the techniques for repair are more suited for the garden variety degenerative and functional pathologies, rather than the rheumatic origin mitral regurgitation seen in developing world. Even in experienced centres, the latter is technically more demanding and the results not quite as salutary as for the former variety. Inadequate training, non-availability of intra-operative transesophageal echocardiography (TEE) universally, non supportive administration of the hospital, and the fear of failure and need for a repeat surgery, specially in poor nations, where cost becomes a major determining factor too, play an important role in making matters worse.

In the beginning, valve repair was more an art, than a science, and required astute intra-operative decision making. However, as the experience gained and with the availability of preoperative three and four dimensional echocardiographies and intra-operative TEE back up, a lot of objectivity has been provided to the repair procedures. Virtually, the entire operation can be planned preoperatively, including the length and number of the chordae required. Pre-configured subvalvular apparatus with pre decided chordal lengths are now available, so that the surgeon's role is reduced merely to one that of a technician, rather than of the tactician. Yet

despite all these developments, rates of valve repair surgery in the developing world is still below par. In Latin America, it is 30% in Colombia, 32% in Chile, 39% in Mexico, and 42% in Brazil during 2013 [1]. We do not have an authentic database in India but according to the industry sources, roughly 9.2% of valves are being repaired, most of which are tricuspid valve repairs (59%) followed by mitral valve (40%). Situation for aortic valve repair is dismal at 1% (Table 1).

This also brings us to the second conundrum as to who should be repairing the valve. Should it be a generalist cardiac surgeon or should this be the prerogative of only a reference mitral surgeon in a heart valve centre of excellence—ideally, the latter. In fact, Tirone David once said, 'It is unrealistic to expect that we all can be experts in mitral valve repair ...' [2]. However, for practical purposes, I am afraid, a generalist cardiac surgeon would have to be trained, and his skill sets upgraded to a reasonable level to be able to repair at least single leaflet prolapse (posterior leaflet or limited anterior leaflet prolapse) and regurgitation due to annular dilatation. For complex/bileaflet repairs, patients may be referred to advanced centres. But going by the human psyche, as also the fact that financial remuneration is involved, I do not foresee the magnanimity of a relatively novice valve repair surgeon referring a patient to a more accomplished surgeon, rather than replacing the valve himself. Moreover, the logistics of non-state sponsored patient transfer to a higher centre makes it a mission 'Cupitor Impossibilium'. Therefore, the only worthwhile solution would be to simplify and standardise techniques sufficient enough to be within the realms of an average cardiac surgeon.

These simplified and standardised valve repair techniques then should be widely disseminated to the cardiac surgical community in peripheral areas. The various professional associations may have to take a lead in this, and the way Indian Association of Cardiovascular and Thoracic Surgeons has taken upon itself to train the surgeons in wire skills and Transcatheter Aortic Valve Implantation (TAVI), it will

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Table 1 Valvular heart surgeries in India in 2018 (Medtronic Inc., Personal Communication)

Valve replacement	52,000
Mechanical	40,000
Bioprostheses	12,000
Valve repairs	5300
Tricuspid valve	59%
Mitral valve	40%
Aortic valve	1%

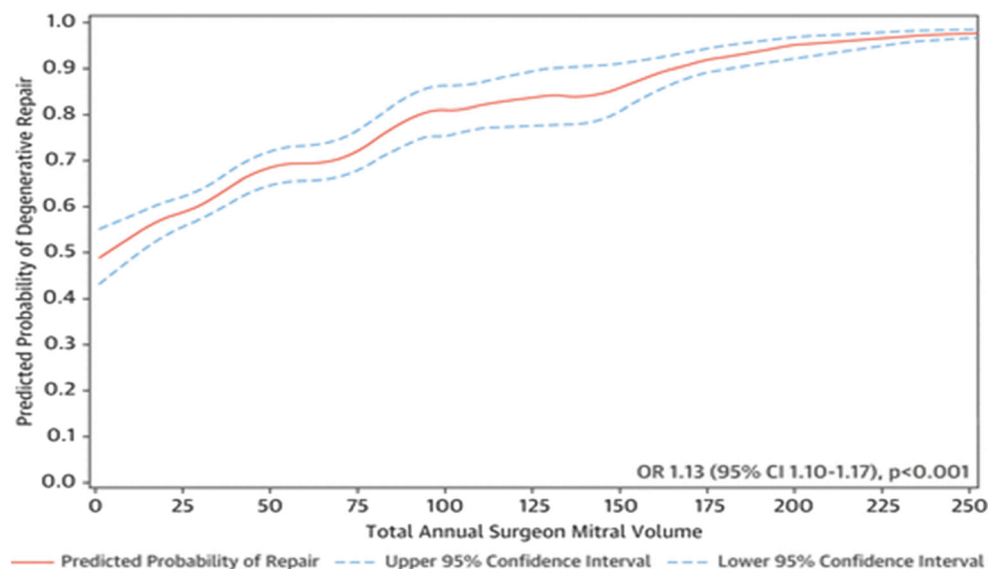
serve them well to do the same for valve repair techniques. However, the main problem would be that the industry sponsorship, which is so readily forthcoming for TAVI programmes, may not be so for valve repair techniques, for the industry gains very little, if at all, from valve repairs. In fact, they lose, as the cost of the valves, especially tissue bioprosthesis, is certainly more than the repair disposables, which is essentially an annuloplasty ring. I think industry too will have to rise above the mundane to support these laudable educational initiatives.

Lastly, is there a minimum threshold of numbers to be able to qualify for performing valve repairs?—Answer is a categorical ‘Yes’. Chikwe et al. showed that there is a minimum threshold of 25 mitral operations in a year, which is necessary for maintaining and developing further expertise [3]. Besides the advantages of ‘Economy of scales’ here, there is ‘Efficiency of scales’ too. The surgical volume not only influences the rate of mitral valve repair (Fig. 1), but also perioperative mortality, long-term survival, and the reoperation rates [3]. Words of wisdom from Tirone David, ‘I believe that mitral valve repair is not an operation for all cardiac surgeons because a large number of cases per year are needed to acquire and maintain the skills necessary to consistently provide good results’ [2], may not be applicable to the developing world

where rheumatic valvular heart disease is endemic, and numbers on waiting list for surgery are enormous. Numbers thus may not be a limiting factor.

Through this Special Issue on ‘Reparative Surgery of the Valves’, we have tried to contribute our two pence in furthering the cause of valve repairs. I am extremely thankful to Dr. P Chandrasekar for his taking the lead as the Guest Editor in bringing out this issue. I sincerely hope, this venture helps in creating the awareness for the possibilities with reparative surgery of the valve and the limits to which the experts are going, breaching conventional barriers. I hope it serves the purpose of exciting the cardiac surgical community at large to take to repairs with gusto and zeal. Just as I appeal to my surgical colleagues, I make a fervent plea to the hospital administrators and our cardiology brethren to be willing to accept failures, and less than ideal results, in the process of learning curve and to provide necessary incentive and level playing field for the beginners wanting to take to this field. It is only the lessons from failures and repeated practice that is likely to make them perfect. ‘The Jack of all trade cardiac surgeon represents an outdated, unattainable ideal’, wrote Gillinov et al. in an Editorial comment in the Journal of the American College of Cardiology [4]. This may be valid for the USA, but certainly is not applicable to the developing world. I agree, ideally mitral valve surgery should be a stand-alone speciality with reference mitral surgeons doing the procedure, but that’ is probably a ‘Platonic Utopian’ idea not likely to fruition in the under-served world. Here, generalists will have to pull their socks up, albeit with a caveat—it is important for a surgeon not only to know what he is capable of doing, but doubly important to know what he is incapable of doing. Probably, a valve replacement surgery may still be a better option to an ill-performed valve repair surgery.

Fig. 1 Predicted probability of mitral repair for degenerative operations according to total annual surgeon mitral valve volume [3]



References

1. Adademir T, Alp M. Should a cardiac surgeon blame himself for replacing a mitral valve? *Braz J Cardiovasc Surg.* 2016;31:VI–VII. <https://doi.org/10.5935/1678-9741.20160074>.
2. David TE. Mitral valve repair: is the cheese factory moving? *J Thorac Cardiovasc Surg.* 2016;151:1455–6 Editorial.
3. Chikwe J, Toyoda N, Anyanwu AC, et al. Relation of mitral valve surgery volume to repair rate, durability and survival. *J Am Coll Cardiol.* 2017;69:2397–406.
4. Gillinov M, Mick S, Suri RM. The specialty of mitral valve repair. *J Am Coll Cardiol.* 2017;69:2407–9 Editorial comment.

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