

Replacement or repair of the mitral valve?

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Mitral valve repair remains as the golden choice for mitral valve regurgitation. While the highest repair rates are seen in degenerative disease, rheumatic etiology is always a surgical challenge. In this paper herein, several key points are discussed at depth in respect thereof.

Key words: Mitral valve; Mitral valve regurgitation; Mitral valve repair; Rheumatic mitral valve disease.

La reparación valvular mitral es la mejor opción para tratar la regurgitación valvular mitral. Mientras que para los casos de regurgitación mitral por enfermedad degenerativa la tasa de reparación es muy alta, para los casos de etiología reumática ésta permanece como un reto. En este artículo que presentamos aquí, se discuten varios puntos clave a este respecto.

Palabras claves: Válvula mitral; regurgitación valvular mitral; Reparación valvular mitral; Enfermedad valvular mitral reumática.

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I was deeply honored by the invitation, the second consecutive, of the President of the Sociedad Mexicana de Cirugía Cardíaca to participate in the XXVIII Congress of the Society recently held in Mexico City. Among my assignments, I was asked to discuss the subject of replacement or repair of the mitral valve (“¿Cambio o plastía de la válvula mitral?”).

For a surgeon originating from an European country, this question would predominantly apply to the degenerative mitral valve pathology, exclusively in the form of regurgitation, most frequently found as isolated posterior leaflet prolapse (P2). It is now widely accepted that in this particular case we are traveling towards a one hundred percent repair [1](Fig. 1). The techniques used today are well standardized and reproducible, and the long-term results are excellent, with an overall survival of well over 90% at 5 years and a freedom from mitral reoperation above 95%.

These results are currently being extended to patients with the more complex anterior (ALP) and bileaflet prolapse (BLP) who can be submitted to surgery with great probability of repair and low mortality in expert hands [2]. In the experience of my group, in 501 patients with ALP or BLP, the valve could be preserved in nearly 95% of them. After a mean follow-up of 10 years, only 4.6% required reoperation for recurrent mitral regurgitation [3]. Finally, some groups also reported excellent results in Barlow pathology, the extreme of the spectrum of degenerative mitral valve disease. It was found that “when

optimal surgical techniques are used, “long-term results of mitral valve repair in Barlow disease are essentially the same as in fibroelastic deficiency; the residual recurrence rate of mitral valve regurgitation remains between 2% and 3% per year and is related to progressive degeneration of the chordae and the leaflets” [4].

Consequently, current international guidelines suggest that patients with degenerative mitral valve regurgitation should be operated on at an early phase (asymptomatic or mildly symptomatic), because there is a higher probability of repair and greater benefit on long-term survival. The 2017 ESC/EACTS Guidelines for the management of valvular heart disease indicate that “mitral valve repair should be the preferred technique when the results are expected to be durable” (Class I Indication). They further suggest that “surgery is indicated in asymptomatic patients with LV dysfunction (LVESD \geq 45 mm and/or LVEF $<$ 60%)” (Class I) [5].

Hence, in this type of pathology, the answer to the question addressed to me of *when should we choose to replace the valve rather than repair?* is NEVER, if repair is possible and durable.

RHEUMATIC MITRAL VALVE PATHOLOGY

It thus becomes obvious that the challenge does not lie in this group of pathology, but in the mitral valve disease more common in the developing regions of the world, now termed

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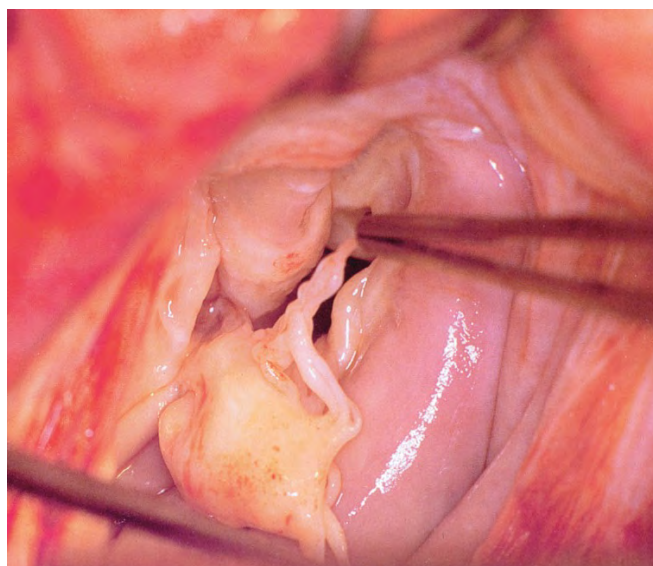


Figure 1. Intraoperative view of a mitral valve with isolated posterior leaflet prolapse. Repair is possible in nearly 100% of cases

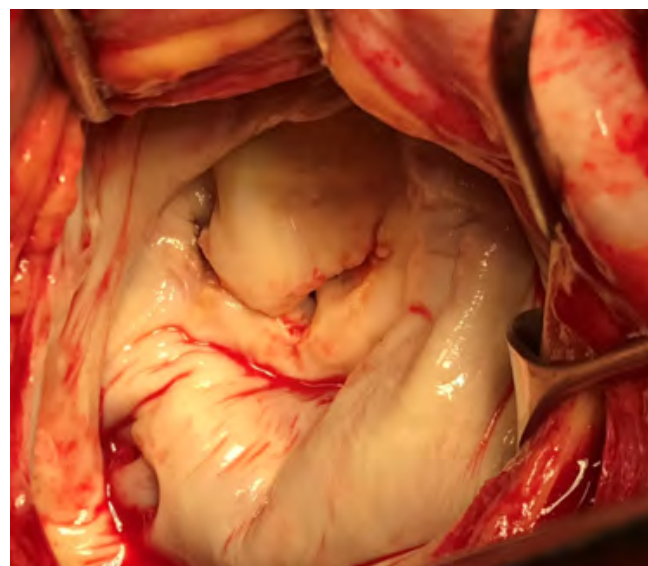


Figure 2. Intraoperative view of a rheumatic mitral valve in an adult patient. Note the marked thickening of both leaflets. Repair is more difficult than in degenerative pathology, but possible in the majority of cases.

low/mid income countries (LMICs) from Central and South America, Southern Africa and South East Asia – acute rheumatic fever (ARF) and rheumatic heart disease (RHD). It is here that the concept of ‘repair possible and durable’ gains a different perspective. Because the demography of the population is completely different. In these countries, “the combination of lack of resources, lack of infrastructures, political, social and economic instability, poverty, overcrowding, malnutrition and lack of political will contribute to the persistence of a high burden of rheumatic fever and rheumatic valvular heart diseases” [6].

Here, the patients characteristically are young, poor, non-instructed, have difficult access to medical care, and are usually non-compliant to prophylaxis and therapy, which result in an increased incidence of complications with valve prostheses, whether mechanical or biological, the former with higher rates of thromboembolic complications and the latter with faster degenerative processes. Besides, the anatomical characteristics of the native valves are much different from those of degenerative etiology, often with stenosis and fibrosis, which makes mitral valve repair a surgical challenge [7] (Fig 2). Nonetheless, the European Guidelines (ESC/EACTS) prescribe that “MV repair may be considered in patients with rheumatic mitral valve disease when surgical treatment is indicated if a durable and successful repair is likely or if the reliability of long-term anticoagulation management is questionable” (class IIb) [5].

IS MEXICO DIFFERENT?

The question that arises now is how important is this problem in Mexico and surrounding countries? Perhaps, this is a question that should not be answered by an outsider like me, but a study of the incidence of rheumatic fever in the 5-year period of 1994-1999 in Mexico hospitals came to the conclusion that “although the incidence has decreased, ARF has not been eradicated; it is (still) a public health problem in developing countries. The absence of clinical suspicion, pro-

phylaxis and compliance to treatment influence this situation. It is essential to reinforce the education in health, early diagnosis, and primary and secondary prophylaxis” [8]. And an analysis by the WHO attributes Mexico an incidence of RHD of 4-10 case/thousand inhabitants [9].

Naturally, this incidence is variable in different regions of the country and, above all, there has been a substantial improvement of the economic conditions of the population, but the disease is still there, albeit with fewer cases of ARF in children; but there must be a considerable number of patients in their forties or fifties who had ARF in their infancy and youth, 2 or 3 decades ago. These two age groups have clinical and anatomically different types of disease. The younger, because the disease is still in the acute and more evolutive phase, more difficult to repair (Fig. 3). Still, in my experience in South Africa, these patients have superior long-term survival after valve repair (90% at 5 years) than after replacement (76% and 62%, respectively for mechanical valves and bioprostheses) [10].

This experience has repeatedly been confirmed by other surgical groups from the regions affected by RHD. A study with patients under 20 years, from Auckland, New Zealand, showed that “MV repair is superior to replacement for RHD in the young, with a follow-up to 19 years [11]. Repair offered a survival advantage, greater freedom from valve-related morbidity, and long-term durability that equaled that of MVR”. Similar conclusions were derived by Dr Khumar’s group in New Delhi, India, in a group of 278 children (mean age, 11.7 years) [12]. In conclusion, “rheumatic mitral valves must be repaired when it is technically viable, accepting the risk of reoperation, to maximize survival and to reduce morbidity”. In our experience, it was possible to repair 1,201 mitral valves of 1,491 patients (80.5%) of all age groups who had surgery for rheumatic mitral valve disease in a 20-year period.

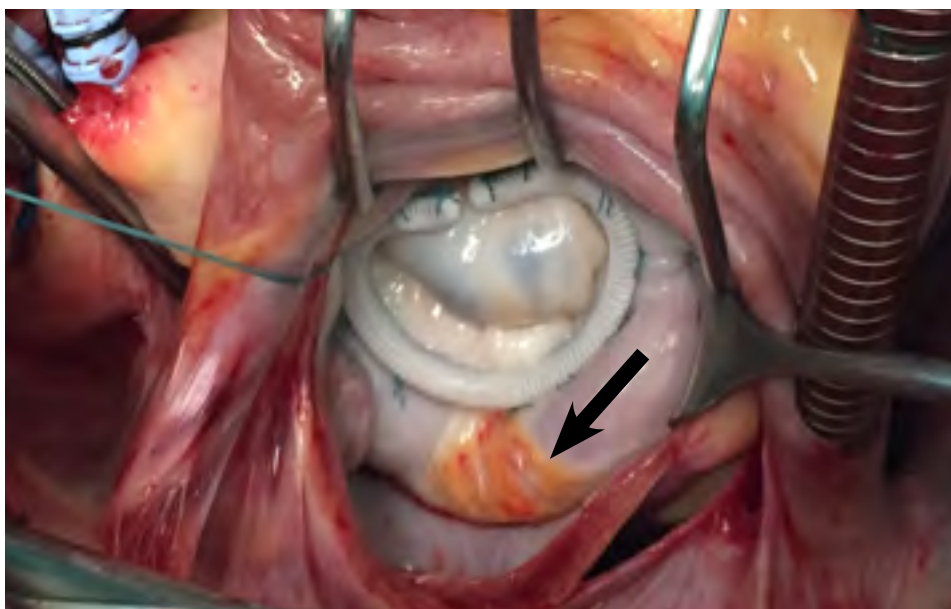


Figure 3. Rheumatic mitral valve repaired. Note the marks of the posteriorly directed jet of regurgitation caused by anterior leaflet prolapse (arrow).

After a maximum of 22 years of follow-up, the survival free from reoperation was 63% and 44%, respectively for repair and replacement; this difference was even greater for younger patients [13].

TECHNICAL ASPECTS

One technical question that arises is the preservation of the subvalvular apparatus during mitral valve replacement. This has been shown to be advantageous in patients with

non-rheumatic disease [14], but we have found that in rheumatic valves, non-preservation of the subvalvular apparatus did not affect long-term survival. Furthermore, it did not influence perioperative mortality and morbidity [15]. However, it must be stressed that we routinely preserve the basal chordae of the posterior leaflet, which appear to have the greatest impact on the annulus to left ventricle continuity, thus with a greater influence in the ventricular function.

To finalize the answer to the question initially placed to

Table 1. Intraoperative score system to determine the reparability of complex rheumatic mitral valves with predominant stenosis.

POINTS*	ANTERIOR LEAFLET MOBILITY	LEAFLET THICKENING	SUBVALVULAR (CT) THICKENING	CALCIFICATION
1	Mobile/minimal restriction	Absent / minimal	Absent / minimal	Absent / minimal
2	Mild/moderate restriction	Mild/moderate	Mild/moderate	Body of leaflet/ commissure
3	Severe restriction (immobile)	Severe (whole leaflet)	Severe (shortening and/or chordal fusion)	Free edge

*Maximum possible – 12 points

me, I should be making clear which valves can and cannot be repaired. This is, in my view, mainly dependent on the willingness of the surgeon to “risk” repair and, naturally, the respective experience with this pathology [16]. But because the characteristics of the valve have a crucial importance, we sought to develop an intraoperative score system to determine the reparability of complex rheumatic mitral valves with predominant stenosis, demonstrating superior durability of

the repair in patients whose score was < 9 (of a maximum of 12) points [13] (Table 1). A similar project was developed by Mejia et al [17].

CONCLUSION

The controversy goes on about the choice of the best method of treatment of rheumatic mitral valve disease [18].

Rheumatic valves can be repaired in more than three quarters of young patients. Valve calcification and poor anterior leaflet mobility should prompt replacement. Preservation of the complete submitral apparatus does not appear to improve results in this particular pathology. Age, per se, must not be an indication to replace the valve. Finally, the most important factor influencing valve repair is the surgeons' willingness to do it. And their experience can only be accumulated with practice!

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