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The Evolution of Mitral Valve Repair in India

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The Evolution of Mitral Valve Repair in India

Varun Bansal^α & A. Sampath Kumar^σ

Abstract- This is a review of the evolution of Mitral valve repair in India. Because of the prevalence of Rheumatic heart disease in India most of the techniques have been developed for this etiology. There was a need to adapt these techniques for the poor patients in order to reduce cost. As a consequence this review does not allude to the commercially available rings. Also this review does not cover the areas of ischemic and degenerative Mitral regurgitation because these techniques were not developed in India and only a couple of publications mention results in these two etiologies.

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I. THE BEGINNING

Closed Mitral valvotomy (CMV): Mitral Valve surgery came to India in the early 50's, Reeve Betts and Gopinath in Vellore^{1,2} Leigh Collis in Aundh near Pune and PK Sen in Bombay began to perform CMV with immense success. Although confined to Rheumatic Mitral Stenosis it was an operative procedure easily applicable to most patients. Rheumatic Heart Disease (RHD) was rampant and the leading cause of mitral valve disease. Patients with significant Mitral regurgitation (MR) had to wait longer to be treated by surgery^{3,4}.

II. MITRAL VALVE REPLACEMENT (MVR)

It was in early 60's that open heart surgery become possible. Christian medical college (CMC), Vellore 3,4,5, King Edward memorial (KEM) hospital in Bombay, Madras Medical College in Chennai, All India Institute of Medical Sciences (AIIMS)6,7 in Delhi and few other centres began MVR for Rheumatic mitral regurgitation⁷. This step actually began the procedure of MV surgery. Surgeons from KEM in Bombay and AIIMS in Delhi began a program of stented homograft MVR. The stents were imported and cadaver Aortic valves were carefully sutured and used as substitute for the mitral valve. It was evolutionary and also revolutionary since it helped these poor patients by reducing the expense as well as avoiding anticoagulation. It was only applicable to patients with isolated mitral valve disease (MS or MS+MR). Patients with additional Aortic valve disease could not benefit from these stented valves.

III. MITRAL VALVE REPAIR

Realising the hardships of patients, especially children and adolescents, women in child bearing age, few surgeons introduced mitral valve repair (1968) in highly selected patients. Dr. Gopinath in Delhi and Nemish Shah, and K N Dastur in Bombay Began to repair the MV in a few patients. There was no Echocardiography and on table and postoperative assessment depended on intuition, clinical examination and immediate postop left atrial (LA) pressure tracing. The results were quite unpredictable and unsatisfactory. In the late 70's M mode Echocardiography became available for assessment of the mitral regurgitation pre and postoperatively. This actually dampened the enthusiasm for repair since the results appeared unsatisfactory. The techniques used were only the Wooler Commissural plication and a circular suture (akin to the DeVega Technique). The Duran and Carpentier annuloplasty rings were expensive. Surgeons in Bombay used a piece of Teflon felt to mould the posterior mitral annulus with limited success in selected patients.

The introduction of 2D and Doppler Echocardiography in the early 80's made the assessment of mitral regurgitation more accurate. It also provided additional and vital information on MV morphology such as thickening, prolapse, rupture of chordae and perforation in endocarditis. Mitral regurgitant jets were visible and degree of MR could be assessed more accurately. Surgeons were now more careful in selection of patients for MV repair and postoperative assessment was more frequently performed non-invasively.

The MV Repair program took a giant leap in the year 1982 at AIIMS⁸⁻¹⁶. Expertise in Echocardiography combined with a modified Denton Cooley technique (C ring annuloplasty) in addition to other Carpentier techniques of cleft suture, chordal shortening/transfer improved the results greatly. Cardiologists who were reluctant to refer patients for repair were now more enthusiastic and recommended repairs. Postoperative Echo assessment and careful follow up of these patients added to the enthusiasm to repair the Mitral¹⁷⁻²⁴, Tricuspid and even the Aortic valves in patients with RHD²⁵⁻²⁸.

A second technical procedure introduced at the AIIMS, of Cusp thinning¹⁹ by peeling off the fibrous layer of deposit from the Anterior Mitral Leaflet (AML) and Posterior Mitral Leaflets (PML) made the leaflets larger, thinner and more pliable providing a more successful correction of MR with better co-optation.

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Another simple technique for Chordal shortening at the cusp level proved useful in correcting prolapsed chordae 21.

By 1990, Trans Oesophageal Echo27 (TEE) was introduced and proved extremely useful in on table assessment of morphology, severity of regurgitation and assess the effects of the above technical modification. Postoperative assessment on table improved the learning and correction of residual MR at one operation 14,27-29. This reduced the complications and satisfied the cardiologists in the postop assessment. MV repair had reached the goal of a routine procedure and was taught to residents in training.

Workshops, Video clips, live demonstrations and publication of good results extended to children, adolescent and childbearing women encouraged surgeons to learn and apply these techniques. It benefitted a large number of patients by reducing cost, improving survival, avoiding anticoagulation and its consequences for up to 15-20 years following the procedure.

MV repair had come to stay. Patients are seeking repair and surgeons are applying these techniques both in India and abroad. South East Asian surgeons are recognised the world over 30-35as experts in repair of rheumatic mitral valves.

Ethical statement: Not applicable

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