



Towards 100% Repair Rate In Mitral Valve Surgery Through Sternotomy Or Minithoracotomy As Individualized Approach: A Single Center Experience

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Objective: Despite Mitral valve repair has proved to give better results than replacement in degenerative disease, average repair rate remain suboptimal reaching about 70% of the cases. The preferred surgical approach whether sternotomy or minithoracotomy is usually institution or surgeon depending and not related to patient characteristics. Here we present how we individualized this choice in order to approximate 100% mitral repair.

Methods: From January 2010 we have introduced the right minithoracotomy to operate patients with degenerative mitral valve disease for posterior or bileaflets prolapse. We have chosen sternotomy in patients with persistent and long standing atrial fibrillation to perform right and left bipolar ablation or those with moderate aortic regurgitation or severe left ventricular dysfunction and in octuagenarians.

Results: From January 2010 to September 2018 among 854 patients with severe degenerative regurgitation addressed for surgery, 453 (53%) were operated through sternotomy and 401 (47%) via a right minithoracotomy. We have repaired 99% of the valves in the sternotomy group and 100% in the minithoracotomy group of patients. We observed 1% of hospital mortality in the first group and 0.56 % in the second. At a mean follow up of 46 months 98% of patients had no or trivial mitral regurgitation, 76% of freedom from atrial fibrillation in the ablation group.

Conclusions: A patient individualized surgical approach may be helpful to optimized the repair rate near 100% with a low hospital mortality. Sternotomy allows a complete treatment of atrial fibrillation and a shorter cross clamping time in patients with a poor left ventricular function. Minithoracotomy is more and more requested from patients for its less invasive and cosmetic advantage but full sternotomy is a good option in about half of the cases.



A Novel Technique to Measure Artificial Neochordae Length in Anterior Mitral Prolapse

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Objective: Anterior mitral prolapse is usually treated by artificial neochordae implantation from the tip of a papillary muscle to the free edge of the corresponding prolapsing scallop. A key point is how to measure the proper length of these new chordae. Different techniques have been proposed but still it remains a challenge in complex anterior leaflet disease.

Methods: Since 1998 we have adopted an echoguided system to assess the proper length of the artificial polytetrafluoroethylene neochordae. At the time of the intra-operative transesophageal echo before going on pump the cardiologist measures the distance between the free edge of each prolapsing scallop and the theoretical coaptation point. This is usually situated approximately 6 mm below the annular plane. So if the free edge of the prolapsing scallop is, for example, 4 mm above the annular plane, the neochorda must be 6 mm + 4 mm = 1 cm shorter than the native one. After fixing the neochorda from the tip of the papillary muscle to the free edge of the scallop we make it shorter of this figure compared to the adjacent native one.

Results: From January 1998 to January 2018 we have operated on 3086 patients with degenerative mitral prolapse. 743 of them (24%) had a prolapse involving at least one prolapsing scallop of the anterior leaflet. We have always treated with one or more artificial neochordae for a total of 1040 implanted (mean 1.4 % neochord per pts). 94% of the so measured neochordae had a proper length at the time of the saline test, 4% were immediately replaced and 2% of them needed a second cross clamping because they were too short.

Conclusions: Echoguided intraoperative artificial neochordae measurement is safe and reliable to treat anterior leaflet prolapse in complex mitral degenerative disease. Among different techniques of assessing neochordae length this one appears simple and more reproducible but needs a good cooperation and understanding between echocardiographers and surgeons in the operating room.



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A SIMPLE NEW TECHNIQUE TO TREAT MITRAL VALVE DISEASE WITH EXTENSIVE CALCIFIED ANULUS

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Objective: Extensive calcification of the mitral valve anulus is a more and more frequent finding in degenerative disease related to the aging of patient population. The treatment is always challenging for the severity of the calcium bar along the insertion of the posterior leaflet. The most used surgical technique already described is extensive decalcification and atrioventricular reconstruction but it is a long and cumbersome procedure and a major concern for many surgeons. Here we describe a simple new annular technique useful in degenerative insufficiency as alternative to the standard operation in extensive calcified anuli.

Methods: The rationale is to reduce the anteroposterior distance of the mitral valve in this setting where is not possible to implant a standard prosthetic ring without removing the calcium bar. As the calcification is always along and beneath the insertion of the posterior leaflet with different pattern of extension and the insertion of the anterior leaflet is free, we address this area to the surgical repair. An incomplete flexible prosthetic ring is then implanted at the base of the anterior leaflet fixed at the extremities of the calcium bar to reduce the anteroposterior distance and so improving the leaflet coaptation. The calcium is left in situ untouched and some additional procedures are performed in the prolapsing scallop as triangular resection for posterior leaflet or artificial neochordae for the anterior one. From January 2011 we have operated with this technique 11 patients for degenerative mitral regurgitation, mean age 74 years old and none with the standard technique.

Results: All patients survived. 9 patients had a trivial or mild residual regurgitation after the operation. In one case it was moderate and corrected immediately with an edge to edge stitch at a second pump run. One patient was discharged with a moderate residual insufficiency not corrected for its old age. At a mean follow up of 34 months all patients are alive with a stable result and no one need of a new mitral procedure.

Conclusions: An extensive calcified mitral anulus is difficult to treat with complete decalcification and reconstruction for many surgeons. Here we present an alternative technique, easier and reliable although probably less complete than the standard one. A larger experience and a longer follow up is necessary to apply this procedure extensively.



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VIDEOASSISTED COMPLEX MITRAL VALVE REPAIR THROUGH RIGHT MINITHORACOTOMY

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Objective: mitral valve repair through minithoracotomy is a demanding procedure related to the difficulties to work in a small access and a suboptimal visualization of the subvalvular apparatus.

Videoassistance can help surgeons to perform even complex repairs.

Methods: Among 407 minimally invasive degenerative mitral valve repair 108 (26%) had an involvement of the anterior leaflet demanding a complex surgical procedure with one or more artificial neochordae implantation concomitant to the posterior leaflet triangular resection repair.

Results: 108 patients (100%) had a successful repair through a right minithoracotomy in the third intercostal space with videoassistance.

Conclusions: Videoassistance may enhance mitral valve visualization and it is helpful in complex repair namely in positioning artificial chordae between the papillary muscles and anterior leaflet.

FROM STERNOTOMY TO SIMPLIFIED MINITHORACOTOMY FOR MITRAL VALVE REPAIR

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Objective: Mitral valve repair is the operation of choice in degenerative disease and can be performed either through sternotomy or minithoracotomy. The second approach is more demanding for some difficulties in cannulation, aortic clamping and repair the valve through the small incision. Here we present a minimally invasive simplified technique that reproduce the standard one.

Methods: The operation start with a single endotracheal intubation, a percutaneous double stage venous cannulation at the groin, a small minithoracotomy in the right third intercostal space to allows a direct aortic cannulation and direct aortic cross clamping with a flexible clamp. A video-endoscope is inserted in a fourth space port. Custodiol Cardioplegia is delivered in the aortic root and mitral repair is performed with standard technique with endoscopic instruments either in direct vision or video assisted.