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Takeshi Kitai

Advances in Mitral Valve Repair for Degenerative Mitral Regurgitation: Philosophy, Technical Details, and Long-Term Results **175**

Benedetto Del Forno, Guido Ascione, and Michele De Bonis

Degenerative mitral valve disease represents the most common cause of mitral regurgitation in industrialized countries. When left untreated, patients with severe degenerative mitral regurgitation show a poor clinical outcome. Conversely, a timely and appropriate correction provides a restored life expectancy and a good quality of life. Therefore, in this scenario, surgical mitral valve repair represents the gold standard of treatment. This review aims to analyze the indications, timing, and contemporary surgical techniques of mitral valve repair for degenerative mitral regurgitation. Moreover, the value of heart team approach and centers of excellence for mitral valve repair are also deeply discussed.


The Role of Surgical Treatment of Severe Functional Mitral Regurgitation in Heart Failure **185**

Khalil Fattouch and Francesco Guccione

Patient selection is mandatory to successful mitral valve repair in functional mitral valve regurgitation. Preoperative echo evaluation is critical to better evaluate the anatomic modification of the mitral apparatus. In light of recent randomized trials, several patients could benefit from transcatheter mitral therapy. Mitral annuloplasty is not effective in all patients with functional mitral valve regurgitation; meanwhile, adding surgical techniques should be performed to improve the repair durability.

Role of Mitral Valve Repair for Mitral Infective Endocarditis **189**

Yukikatsu Okada, Takeo Nakai, and Takeshi Kitai

 Video content accompanies this article at <http://www.cardiology.theclinics.com>.

The 2 primary objectives of surgery in mitral valve infective endocarditis (IE) are total removal of the infected tissue and reconstruction of cardiac morphology, including repair or replacement of the affected valve. Single-institution series have suggested the feasibility and effectiveness of mitral valve repair (MVrep) over replacement in mitral IE in terms of in-hospital mortality and long-term event-free survival. This article reviews the history, details of the relevant repair techniques, and clinical results of MVrep for mitral IE.

Optimal Timing of Surgery for Patients with Active Infective Endocarditis **197**

Takeshi Kitai, Akiko Masumoto, Taiji Okada, Tadaaki Koyama, and Yutaka Furukawa

Infective endocarditis (IE) is a rare but serious condition with a dismal prognosis. One of the keys to improving outcomes is the prompt identification of high-risk patients who have intracardiac and extracardiac (systemic and neurologic) complications. However, as cardiac and extracardiac complications indicating surgery add to the

surgical risk for active IE, controversies surround the optimal indication and timing for surgery, especially in patients presenting neurologic complications. This article reviews the necessary evaluation for patients with suspected IE and proposes a state-of-the-art patient flow chart for evaluation of suspected IE.

Minimally Invasive Mitral Surgery: Patient Selection and Technique

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Daniel J.P. Burns, Per Wierup, and Marc Gillinov

In most patients, minimally invasive approaches to mitral valve surgery are technically possible. However, in practice, patient selection is critical to mitigate safety concerns when performing the procedure. In this article, we describe our approach to preoperative assessment for minimally invasive mitral valve surgery candidacy, as well as discussing the technical aspects of procedure execution.

Current and Future Application of Transcatheter Mitral Valve Replacement

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Vinayak Nagaraja, Samir R. Kapadia, and Amar Krishnaswamy

Mitral valve anatomy is complex, and one size does not fit all. More recently, percutaneous mitral valve interventions have revolutionized the management of primary and secondary mitral regurgitation (MR). However, edge-to-edge leaflet repair is not suitable for a large proportion of individuals including those with a failing bioprosthetic mitral valve/annuloplasty ring, and patients with significant mitral annular calcification resulting in mixed mitral valve disease/mitral stenosis. For this high risk cohort, transcatheter mitral valve replacement seems to be an attractive alternative.

Echocardiographic Evaluation of Successful Mitral Valve Repair or Need for a Second Pump Run in the Operating Room

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Mitsuhiko Ota and Takeshi Kitai

Detailed preoperative and intraoperative echocardiographic assessment of the mitral valve apparatus is critical for a successful repair. The recent advent of 3-dimensional transesophageal echocardiography has added an extra pivotal role to transesophageal echocardiography in the assessment of mitral apparatus and mitral regurgitation. Because surgeons must rapidly decide whether cardiopulmonary bypass should be continued to be weaned off or a second pump run should be selected, the echocardiographer conducting intraoperative transesophageal echocardiography is required to be trained according to a certain algorithm. This review summarizes the current clinical role of intraoperative transesophageal echocardiography in mitral valve repair in the operating room.

Multimodality Imaging for the Assessment of Mitral Valve Disease

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Dae-Hee Kim

Mitral valve disease is the most common valvular heart disease. Imaging determines the etiology (anatomic assessment), valve function and severity of valvular heart disease (hemodynamic assessment), remodeling of the left ventricle and right ventricle, and preplanning and guidance of percutaneous intervention. Although roles of computed tomography and magnetic resonance are increasing, echocardiography serves as the first-line imaging modality for the diagnosis and serial follow-up in most cases. This review summarizes the roles of multimodality imaging currently available from research fields to daily clinical practice.

Revisiting the Role of Guideline-Directed Medical Therapy for Patients with Heart Failure and Severe Functional Mitral Regurgitation 255

Shun Kohsaka, Mike Saji, Satoshi Shoji, Keisuke Matsuo, Shintaro Nakano, Yuji Nagatomo, and Takashi Kohno

Patients with heart failure often have mitral regurgitation, which can generate a vicious cycle. Medical therapy remains the cornerstone of their treatment in this setting. This review revisits the role of medical therapy and its optimization for severe functional mitral regurgitation in the contemporary era.

Periprocedural Echocardiographic Guidance of Transcatheter Mitral Valve Edge-to-Edge Repair Using the MitraClip 267

Jay Ramchand and Rhonda Miyasaka

Transcatheter edge-to-edge mitral valve repair is a minimally invasive treatment option for selected patients with moderate to severe or severe mitral regurgitation. Although transcatheter edge-to-edge mitral valve repair offers a significant step forward in the management of mitral regurgitation, the rate of procedural-related complications is not trivial. High-quality periprocedural imaging is important for optimal patient selection and procedural success. In this review, we present a step-by-step approach of the recommended echocardiographic views for transcatheter edge-to-edge mitral valve repair.

Looking into the Mechanistic Link Between Mitral Regurgitation and Atrial Fibrillation 281

Yukio Abe, Yosuke Takahashi, and Toshihiko Shibata

Atrial functional mitral regurgitation (AFMR) can occur in patients with atrial fibrillation despite a preserved left ventricular systolic function. AFMR has received attention as a cause of heart failure; it is a therapeutic target in patients with heart failure with atrial fibrillation. Mitral annular dilatation from atrial fibrillation-induced left atrial dilatation is necessary for the generation of AFMR. Posterior mitral leaflet hamstringing also relates to the generation of AFMR. Further mitral annular dilatation owing to progressive left atrial and left ventricular dilatations, with mitral regurgitation-induced volume overload, worsens AFMR.

Mitral Annular Disjunction—A New Disease Spectrum 289

Tomoko Tani, Toshiko Konda, Takeshi Kitai, Mitsuhiro Ota, and Yutaka Furukawa

Mitral annular disjunction is a structural abnormality of the mitral annulus fibrosus, which has been described by pathologists to be associated with mitral leaflet prolapse. Mitral annular disjunction is a common finding in patients with myxomatous mitral valve diseases. The prevalence of mitral annular disjunction should be checked routinely during presurgical imaging. Otherwise, mitral annular disjunction itself might be an arrhythmogenic entity, irrespective of the presence of mitral valve prolapse (MVP). Therefore, we should check echocardiography keeping in mind mitral annular disjunction. Further prospective studies are needed to address whether a causative mechanistic link exists between mitral annular disjunction and arrhythmic MVP.