Latest Treatments for Mitral Valve Disease 2.0

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Boulder Heart
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Background

• Trained in New York at Columbia Presbyterian Medical Center
• 21 years in Wisconsin
  • Mostly heart valve work, widely published
  • 65 cardiologists and 10 surgeons
  • Health care system 15 hospitals and 120 clinics
  • Case experience U.S. and International >6,000
• Boulder Heart October 2018
  • Director Cardiac Surgery
  • Chairman Operating Committee, BCH/BH
  • Cardiac Robotics Team/ Heart Team
  • Medical Director, Cardiovascular Service Line
Outline of Discussion 2.0

• **Why** should we pay attention to the mitral valve? Especially if I feel fine?

• **What** is the mitral valve and how does it fail?

• **How** is it remedied?

• **When** is the right time?

• **Where** do I go?
Why are we here?

- Avoid **heart failure** and **early death** from mitral valve disease

- ...but won’t I know if I’m dying or headed for heart failure?
Quantitative Determinants of the Outcome of Asymptomatic Mitral Regurgitation

Maurice Enriquez-Sarano, M.D., Jean-François Avierinos, M.D., David Messika-Zeitoun, M.D., Delphine Detaint, M.D., Maryann Capps, R.D.C.S., Vuyisile Nkomo, M.D., Christopher Scott, M.S., Hartzell V. Schaff, M.D., and A. Jamil Tajik, M.D.

Kaplan–Meier Estimates of the Mean (±SE) Rates of Overall Survival among Patients with Asymptomatic Mitral Regurgitation under Medical Management, According to the Effective Regurgitant Orifice (ERO).

What is the Mitral Valve Anatomy?
Mitral Valve Anatomy
Mitral Valve Anatomy

- Aorto-mitral curtain
- NCC
- RCC
- LCC
- Membranous septum
- Anterolateral trigone
- Projection of atrio-valvular junction
- Anterior leaflet
- Ventricular view
What is the Cause of Mitral Valve Disease?

Carpentier’s Functional Classification:

- Normal motion
- Excess motion
- Restricted motion
How...Mitral Valve Repair
Understanding Surgical Approach

• Standard
  • Translation “sternotomy”

• Mini Mitral
  • Translation “thoracotomy”

• Robotic
  • Translation “endoscopic”
Clinical Case 1. History

- Moderate/severe MR 2017
- No follow-up appointment
- 2019 went to elevation
- Profound shortness of breath
  - Admission to hospital for Heart Failure
Careful Planning
Ports for Scope and Instruments
P2 Segment, posterior mitral leaflet
Follow-up Boulder Heart Clinic
Figure 2  Long term postoperative survival according to the preoperative echocardiographic ejection fraction. Note the excess mortality in patients with ejection fraction < 50% but also with "low normal" ejection fraction 50–59%. Reproduced with the authorisation of the American Heart Association.
The Effect of Proper and Timely Treatment
Patients (with severe mitral regurgitation) have a significantly increased risk of death and cardiac events and should promptly be considered for cardiac surgery since surgery considerably…
Reduces the rate of death from cardiac causes

Decreases the risk of heart failure

Normalizes life expectancy.
Echocardiographic Prediction of Survival After Surgical Correction of Organic Mitral Regurgitation

Maurice Enriquez-Sarano, MD; A. Jamil Tajik, MD; Hartzell V. Schaff, MD; Thomas A. Orszulak, MD; Kent R. Bailey, PhD; Robert L. Frye, MD

**Background** Left ventricular dysfunction is a frequent cause of death after successful surgical repair of mitral regurgitation. The role of preoperative echocardiographic left ventricular variables in the prediction of postoperative survival and thus their clinical implications remain uncertain.

**Methods and Results** The survival of 409 patients operated on between 1980 and 1985 for pure, isolated, organic mitral regurgitation and with a preoperative echocardiogram (within 6 months of operation) was analyzed. The overall survival was 75% at 5 years (90% of expected), 58% at 10 years (88% of expected), and 44% at 12 years (75% of expected). Operative mortality was 6.6% and markedly improved from 1980 to 1984 (10.7%) to 1985 to 1989 (3.7%). Multivariate analysis showed that age (P = .0003), date of operation (P = .003), and functional class (P = .016) but not left ventricular function were predictors of operative mortality. In the most recent period (1985 to 1989), operative mortality was 12.3% in patients age 75 years or older and 1.1% in patients younger than 75 years. Late survival was analyzed in the operative survivors. Multivariate analysis showed that the most powerful predictor was echocardiographic ejection fraction (EF) (P = .0004), followed by age (P = .0031), creatinine level (P = .0062), systolic blood pressure (P = .0164), and presence of coronary artery disease (P = .0027). The late survival at 10 years was 32±12% for patients with EF < 50%, 33±29% for EF 50% to ≤ 60%, and 72±4% for EF ≥ 60%. The hazard ratio compared with EF ≥ 60% was 2.79 (95% confidence interval, 1.66 to 4.72) for EF < 50% and 1.81 (95% confidence interval, 1.11 to 2.95) for EF 50% to 60%. Echocardiographic EF remained the best predictor of late survival, even when combined with left ventricular angiographic variables. The survival of patients with EF ≥ 60% was 100% of expected at 10 years but was better in patients in class I or II than in those in class III or IV (82±6% versus 59±6%, respectively, at 10 years; P = .0021). The preoperative predictors of operative and late mortality remained significant independent of the type of surgical correction performed in combined multivariate analyses.

**Conclusions** In organic mitral regurgitation, (1) operative mortality has markedly decreased recently, being at a low 1.1% in patients younger than 75 years, and is predicted by age and symptoms and not by left ventricular function, and (2) left ventricular EF measured by echocardiography is the most powerful predictor of late survival. These results suggest that surgical treatment should be considered early, even in the absence of severe symptoms, in patients with severe mitral regurgitation, before left ventricular dysfunction occurs. (Circulation. 1996;94:830-837.)

**Key Words** • ejection fraction • regurgitation • mitral valve
DURABILITY OF MITRAL VALVE REPAIR FOR DEGENERATIVE DISEASE

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Eugene H. Blackstone, MD
Ramon Diaz, MD
John H. Arnold, MD
Bruce W. Lytle, MD
Nicholas G. Smedira, MD
Joseph F. Sabik, MD
Patrick M. McCarthy, MD
Floyd D. Loop, MD

Background: Degenerative mitral valve disease is the most common cause of mitral regurgitation in the United States. Mitral valve repair is applicable in the majority of these patients and has become the procedure of choice. Objective: This study was undertaken to identify factors influencing the durability of mitral valve repair. Patients and methods: Between 1985 and 1997, 1072 patients underwent primary isolated mitral valve repair for valvular regurgitation caused by degenerative disease. Repair durability was assessed by multivariable risk factor analysis of reoperation. It was supplemented by a search for valve-related risk factors for death before reoperation. Three hospital deaths occurred (0.3%); complete follow-up (4152 patient-years) was available in 1062 of 1069 hospital survivors (99.3%). Results: At 10 years, freedom from reoperation was 93%. Among 30 patients who required reoperation for late mitral valve dysfunction, the repair failed in 16 (53%) as a result of progressive degenerative disease. Durability of repair was adversely affected by pathologic conditions other than posterior leaflet prolapse, use of chordal shortening, annuloplasty alone, and posterior leaflet resection without annuloplasty. Durability was greatest after quadrangular resection and annuloplasty for posterior leaflet prolapse and was enhanced by the use of intraoperative echocardiography. Death before reoperation was increased in patients having isolated anterior leaflet prolapse or valvular calcification and by use of chordal shortening or annuloplasty alone. Conclusions: Repair durability is greatest in patients with isolated posterior leaflet prolapse who have posterior leaflet resection and annuloplasty. Chordal shortening, annuloplasty alone, and leaflet resection without annuloplasty jeopardize late results. (J Thorac Cardiovasc Surg 1998;116:734-43)
Isolated Mitral Valve Surgery: The Society of Thoracic Surgeons Adult Cardiac Surgery Database Analysis

James S. Gammie, MD, Joanna Chikwe, MD, Vinay Badhwar, MD, Dylan P. Thibault, MS, Sreekanth Vemulpalli, MD, Vinod H. Thourani, MD, Marc Gillinov, MD, David H. Adams, MD, J. Scott Rankin, MD, Mehrdad Ghoreishi, MD, Alice Wang, MD, Gorav Ailawadi, MD, Jeffrey P. Jacobs, MD, Rakesh M. Suri, MD, Steven F. Bolling, MD, Nathaniel W. Foster, BS, and Rachael W. Quinn, PhD

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THE SOCIETY OF THORACIC SURGEONS ADULT CARDIAC SURGERY DATABASE: UPDATE ON OUTCOMES AND RESEARCH

STS Adult Cardiac Surgery Database: 2021
Update on Outcomes, Quality, and Research

Michael E. Bowdish, MD, MS, Richard S. D’Agostino, MD, Vinod H. Thourani, MD, Thomas A. Schwann, MD, Carole Krohn, MPH, BSN, Nimesh Desai, MD, David M. Shahian, MD, Felix G. Fernandez, MD, MSc, and Vinay Badhwar, MD

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1125 U.S Centers

869 (77%) 0-6 cases.

25 + cases/yr. = Top 4%
## Mitral Valve Repair Outcomes

### BENEFITS OF ROBOTIC MITRAL VALVE SURGERY FOR YOUR PATIENTS

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<th>STS1,2</th>
<th>Dr. Daniel O’Hair</th>
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<tr>
<td><strong>Comparative Metrics</strong> (n=53, 2019-2021)</td>
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<tr>
<td>Mean Length of Stay</td>
<td>7 Days</td>
<td>3 Days</td>
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<tr>
<td>Transfusion Rate</td>
<td>33%</td>
<td>22%</td>
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<tr>
<td>New Onset Atrial Fibrillation</td>
<td>29%</td>
<td>17%</td>
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<tr>
<td>Readmission within 30 Days</td>
<td>11%</td>
<td>8%</td>
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<tr>
<td>Stroke</td>
<td>1%</td>
<td>0%</td>
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<tr>
<td>Renal Failure</td>
<td>2%</td>
<td>0%</td>
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<tr>
<td>Prolonged Intubation</td>
<td>5%</td>
<td>0%</td>
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<tr>
<td>Postoperative Pacemaker</td>
<td>6%</td>
<td>6%</td>
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<tr>
<td>Operative Times - Open vs. Robot</td>
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<tr>
<td>Cardiopulmonary Bypass, Median</td>
<td>117</td>
<td>132</td>
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<tr>
<td>Cross Clamp, Median</td>
<td>85</td>
<td>100</td>
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### Hospital Specific Metrics

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<tr>
<td>Conversion to Sternotomy</td>
<td>0%</td>
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<tr>
<td>Mitral Valve Repair Success Rate</td>
<td>96%</td>
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<tr>
<td>Home by Day 2</td>
<td>42%</td>
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• Excellence in mitral valve repair is available in Boulder.
• We have the largest, most experienced robotics team in Colorado for heart care.
• We offer expedited second opinions.
• Our results far exceed the published national data from the STS database.

• 303-500-1694: Ask for Sally Brennan.