Transcatheter mitral valve repair (TEER)

Becky Sharp, CNP

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Objectives:

- Understand mitral regurgitation pathophysiology
- Review transcatheter mitral valve "edge to edge" repair using Mitraclip
- Case study

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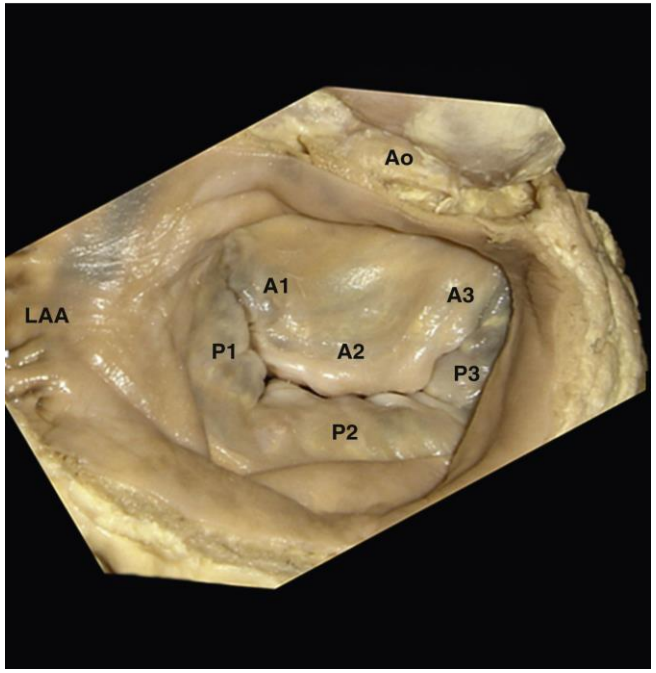
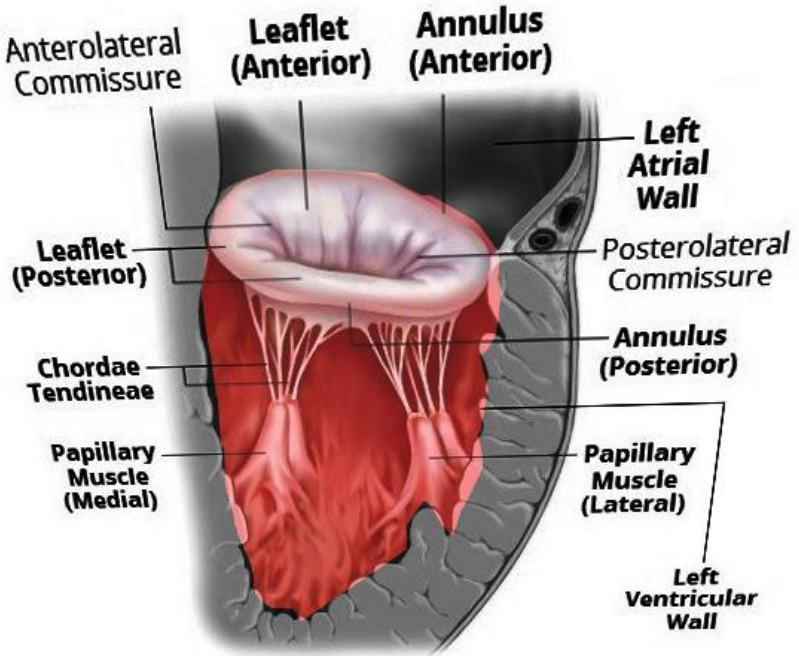
Mitral Valve Anatomy

-Anterior leaflet, posterior leaflet
-Chordae tendinae
-Papillary muscles
-Left ventricle
-Left atrium





Mitral Regurgitation

Primary or Degenerative MR

"Mechanical problem"

Secondary or Functional MR

Cardiomyopathy or atrial myopathy

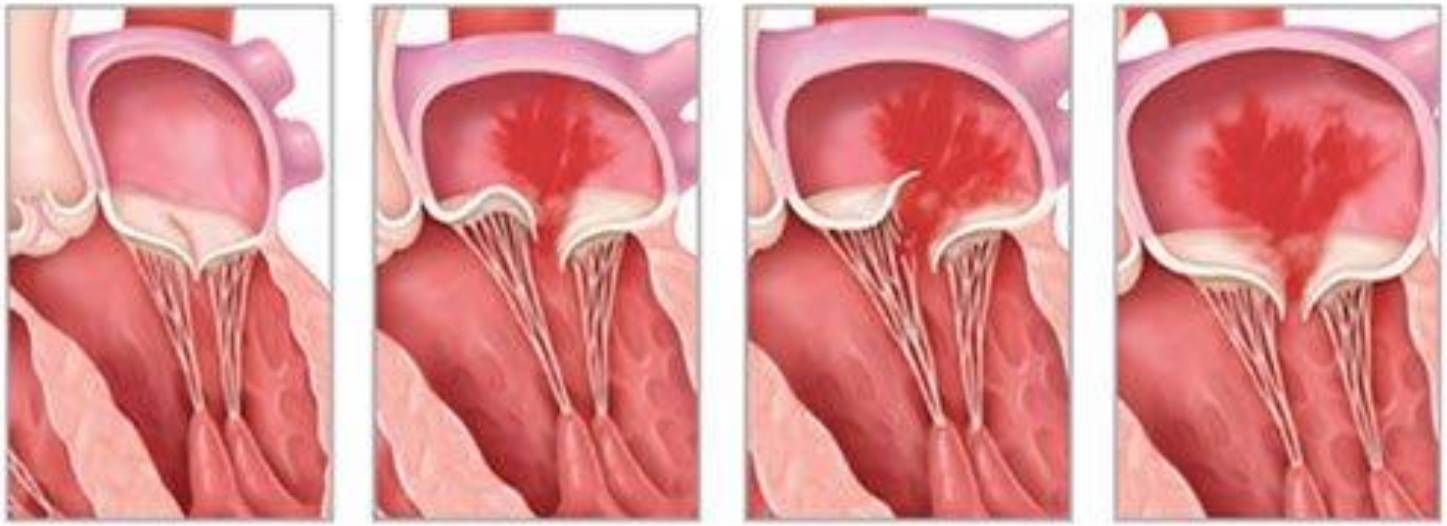


Photo source: Abbott Vascular

Clinical Presentation

- Murmur on examination
  - Holosystolic
  - apex, radiates to axillary area or back
- Asymptomatic
- Decreased activity tolerance, fatigue, exertional dyspnea
- Nocturnal dyspnea and orthopnea
- Long standing MR may result in myocardial damage, HF, pulmonary hypertension, RV failure, and atrial fibrillation

Diagnostic Testing:

- EKG: nonspecific
  - LA enlargement, atrial fibrillation, RV or LV hypertrophy
- Transthoracic echocardiogram (TTE)
  - Primary MR- every 6-12 months for surveillance or every 3-6 months for severe MR
  - Classify severity
  - LA and LV size and function
  - Pulmonary pressures (RVSP, right atrial pressures)
  - Regurgitation jet (Direction, EROA, Regurgitant volume, pulmonary vein flow, mitral inflow)

Quantitative parameters	Mild	Moderate		Severe
EROA, 2D PISA (cm2)	<0.2	0.2-0.29	0.3-0.39	>/=0.4
Rvol (ml)	<30	30-44	45-59	>/=60
RF	<30%	30-39%	40-49%	>/=50%

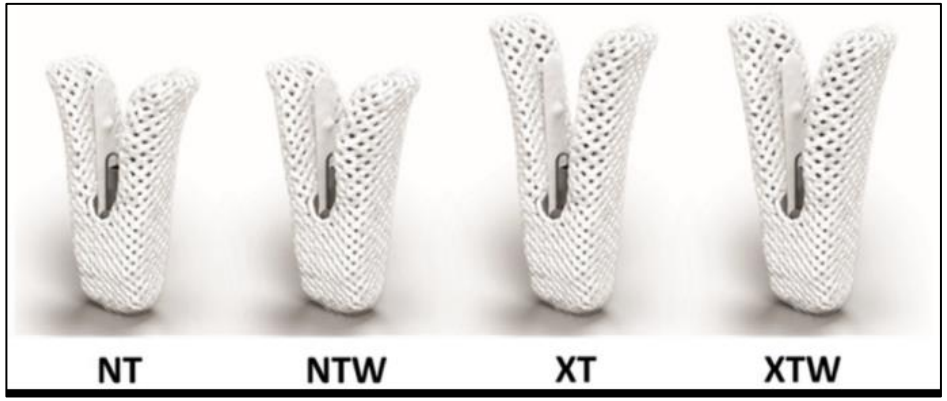
Additional Testing:

- Transesophageal echocardiogram (TEE)
  - More precise quantitation of regurgitant severity
  - Sedation may reduce afterload which can augment MR making it appear less severe than normal physiologic circumstances
  - Helps aid in determining treatment strategy
- Right and left coronary angiogram
  - Pulmonary pressure (distinguishing between MR vs lung disease)
  - Left ventriculography
  - Rule out coronary disease

Structural Heart Clinic

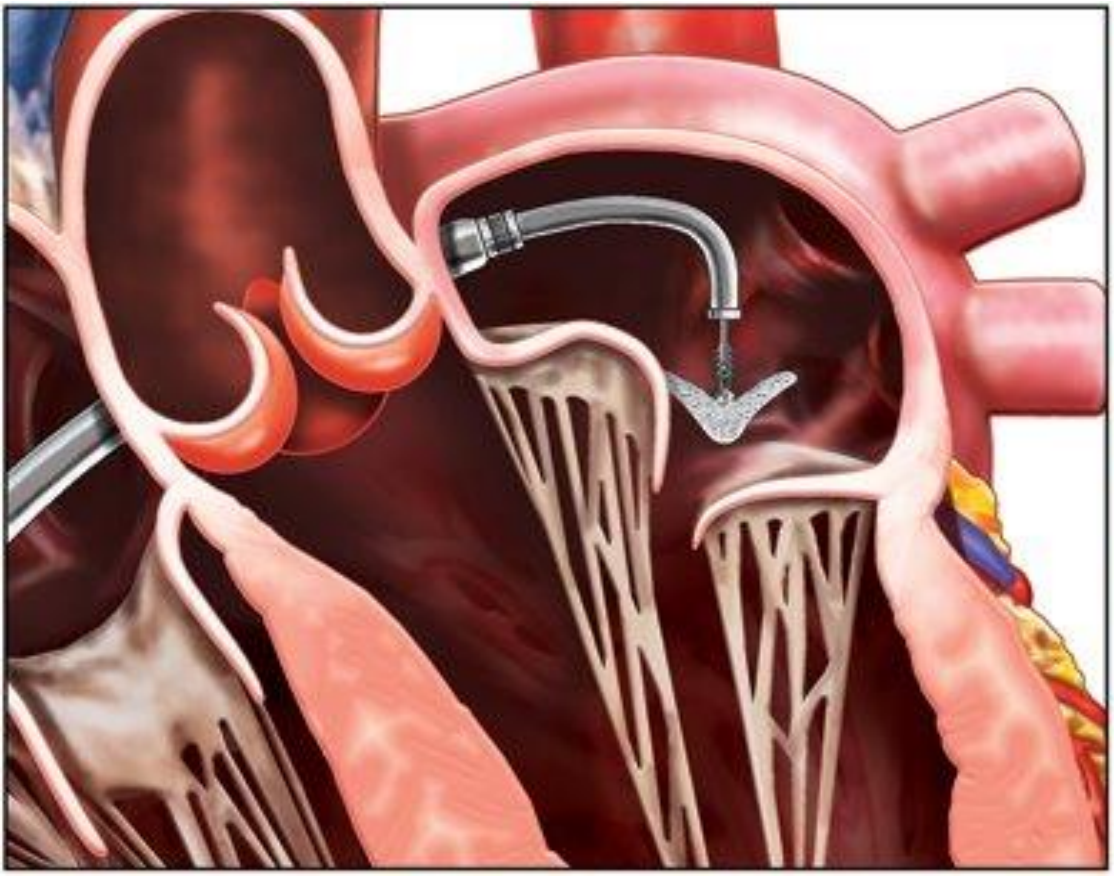
- Structural Heart team
  - Interventional Cardiologist
  - CV surgeon
  - Non-interventional cardiologist
  - Advanced Practice Provider
  - Nurse Coordinator
- Heart failure team
  - Optimize guideline directed medical therapy (GDMT)
- Assessing surgical risk
  - STS risk assessment for predicted risk of mortality (PROM),
  - Frailty testing (hand grip strength, visual assessment)
  - KCCQ
- Pre-Procedure Testing
  - TEE
  - Carotid duplex
  - Left and right Coronary angiogram

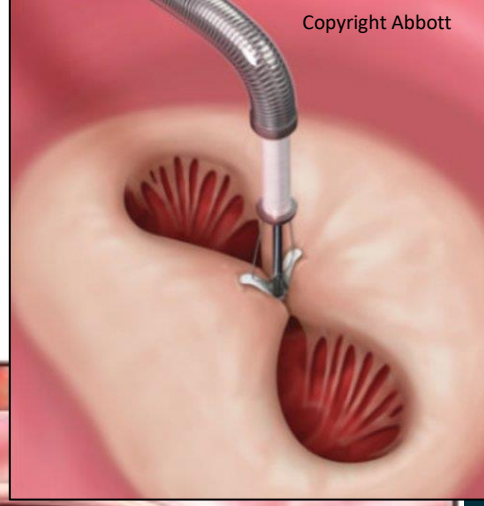
Transcatheter "Edge-to-Edge" Repair (TEER)



- MitraClip:
  - FDA approval
    - 2013: Primary MR
    - 2019: Secondary MR
  - ACC 2020 guidelines for intervention:
    - **Primary MR:**
      - **Class IIa:** Transcatheter edge-to-edge repair (TEER) symptomatic patients with primary MR who are at high or prohibitive surgical risk
    - **Secondary MR:**
      - **Class IIa (reiterated in 2022 HF guidelines):** Transcatheter edge-to-edge repair (TEER) with LVEF between 20-50% with persistent symptoms (NYHA class II-IV) while on optimal GDMT for HF (Stage D) and who have favorable anatomy (LVEF 20-50%, LVESD < or= 70 mm, PASP < or = 70 mmHg)

MitraClip Procedure





Case Study

77 y/o male

- PMH: mitral regurgitation, permanent atrial fibrillation on Eliquis, right heart failure with cor pulmonale secondary to pulmonary HTN and OSA, type 2 DM, HTN, obesity, history of DVT, CKD (GFr 45), Barrett's esophagus with previous dilation

- TEE: EF 60 to 65%, flailed posterior P2 scallop with severe MR with Coanda effect with EROA 0.72 cm^2, mean gradient 1.7 mmHg, regurgitant volume 110 mL with RV dilatation and reduced systolic function.

- Bilateral heart cath: mild nonobstructive 3 vessel disease, PCWP 26 mmHg, mean right arterial pressure 24 mmHg, right mean pulmonary artery pressure 45.

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Case study cont...

- Medications: Toprol xl 100 mg, Eliquis 5 mg BID, Digoxin 125 mcg, Losartan 50 mg, Spironolactone 25 mg, Bumex 1 mg daily, aspirin 81 mg, Jardiance 10 mg
- S/S: DOE, limited activity, fatigue, LE swelling, BNP 662
- STS score: MVR 6.98%

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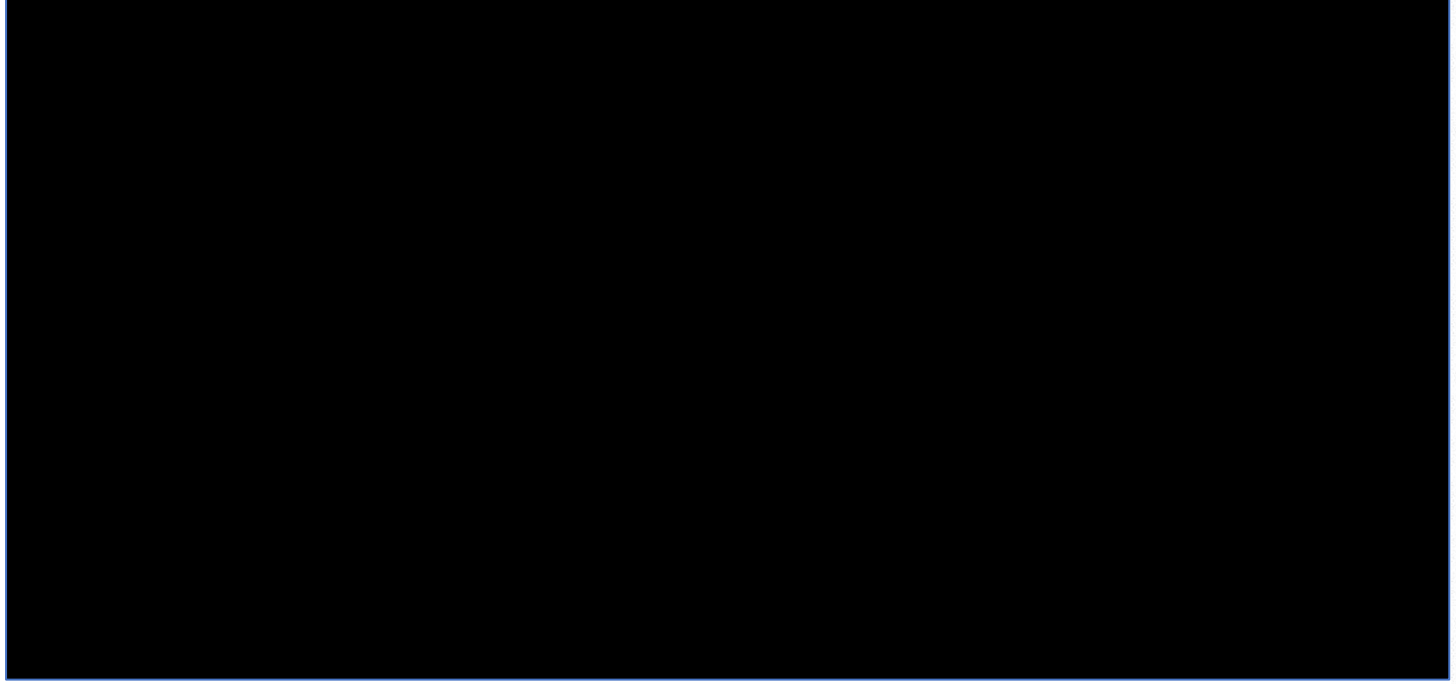

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Case study cont...

1 month follow up:

•Echocardiogram: stable position of mitraclip A2P2, trace residual MR, no significant mitral stenosis, MG 2 mmHg with heart rate 52 bpm.

•Plavix completed after 30 days with Eliquis. Bumex 1 mg continued.

•Improved breathing/energy level. Continued Cardiac rehab as outpatient. Continued to follow his general cardiologist and HF team.

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