Significant Mitral Regurgitation: Five Challenges, Two Etiologies, Three Approaches

David H. Adams, MD
Cardiac Surgeon-in-Chief
Mount Sinai Health System
Marie-Josée and Henry R. Kravis
Professor and Chairman
Department of Cardiovascular Surgery
Icahn School of Medicine at Mount Sinai
New York, NY
Disclosures: David H. Adams, MD

Icahn School of Medicine at Mount Sinai has royalty agreements with Edwards Lifesciences and Medtronic:

- Physio II Mitral Annuloplasty Ring
- IMR ETlogix Mitral Annuloplasty Ring
- TriAd Tricuspid Annuloplasty Ring

National Co-PI: Medtronic Apollo TMVR Pilot Trial

All patients have signed HIPAA release forms
Case 1

- 85 year old male; HTN, sleep apnea
- Diagnosed with MR, TR and Afib in 2012; medical Rx
- Recent onset of dyspnea
- Referred for one of many opinions
Transthoracic Echocardiogram June 2017

BP 120/65 mmHg  Height 5’4”  Weight 130Lb
Symptomatic 85 year old man with severe MR, develops Afib and exercise-induced PHTN (STS MV repair + CABG: 6.12%)

Imaging:
Severe MR, moderate TR (RVSP 51mmHg), moderate AI
LVEDD 5cm, LVESD 3.3cm, LA 4.7cm, EF 57%

Cath: D1 80%, LCx-LPL 80%, Ramus 90%; Right Dominant Baseline and exercise cath parameters:
PCW 18 (35), PASP 32 (65), RA 6 (12)
What would you recommend?

1. Optimize medical therapy, repeat TTE in 6 months

2. CABG, MV repair, MAZE, TV repair ± AVR

3. PCI + MitraClip
Case 2

- 78-year-old male; with myxomatous MV disease
- OSH MVr (’04): P2 neo chordae x6; 28mm MVA band
- Asymptomatic post MV repair, active echo surveillance
- Latest echo reports increasing MR
Transesophageal Echocardiogram

BP 153/81 mmHg   Height 69in   Weight 180 lb
Asymptomatic 78-year-old male, 13 years s/p MV repair and active echo surveillance, referred for suspicion of worsening MR
STS Score: MVrpr- Reop: 2.15%

Imaging:
Moderate-severe MR, mild TR (RVSP 34.6mmHg)  
LVEDD 5.5cm, LVESD 3.9cm, moderate LA 4.8cm, EF 40-45%
1. Active surveillance, repeat TTE in 6 months

2. Exercise stress echocardiogram

3. Reoperative MV repair / replacement
Exercise Stress Echocardiogram

6min 22sec
(7.5 METS)
85% pred peak HR
Normal LV + BP augmentation
Mod PHTN at peak
55 vs 41 mmHg
MR unchanged
EF 52%
What would you recommend?

1. Active surveillance, repeat TTE in 6 months

2. Reoperative mitral valve repair / replacement
Case 3

- 63-year-old female with remote history of bileaflet mitral valve prolapse
- Paroxysmal Afib, asymptomatic PVC’s; active surveillance
- s/p instability during induction for Obstetric procedure (age 34)
- Progressive exertional dyspnea accompanied by palpitations (↑frequency / duration)
- Latest imaging revealed severe MR
Coronary Angiogram
63-year-old woman with remote h/o bileaflet MV prolapse, PAF, worsening dyspnea and palpitations, seeks surgical opinion for severe MR
STS Score MVr 0.86%

Imaging:
Severe MR, trace TR
LVEDD 5.3cm, LVESD 3.4cm, moderate LA 5.7cm, EF 66%

CATH: normal coronaries, right dominant, MR++++
What would you recommend?

1. Mitral repair ± TV repair
2. Continue active surveillance
Intraoperative Events

- 12:37pm Anesthesia Induction
- 12:39pm 16mcg IV-Bolus Epinephrine
- 12:42pm Intubation: short runs VF, Hypertension (200/140mmHg) → VF Arrest
- 12:42pm Chest Compressions; Defibrillation, Swan-Ganz catheter insertion
- 12:58pm Multiple cycles Epi, norEpi, Vassopressin to maintain MAP
- Emergent TEE: severe MR, Anterior & Ant/septal wall akinesis, EF 10%, PVC’s +++
Emergent Transesophageal Echocardiogram
EP Specialist called to OR to evaluate EKG findings: multiple polymorphic PVC’s, QRS pattern consistent with pap. muscle origin

IABP placed
What would you recommend?

1. Proceed to surgery as planned

2. Emergent coronary angiogram
Emergent Coronary Angiogram

Normal Coronaries; No Coronary Vasospasm
Preoperative EKG
Strongly Positive PVC QRS in Inferior Leads
What would you recommend?

1. AICD placement now

2. AICD placement if ventricular arrhythmias reoccur
What would you recommend?

1. Long-term medical therapy without surgery

2. Medical optimization and surgery in 3 months
Plan of Care

- IACD placement
- Tapering dose Amiodarone; β-blocker
- Mitral repair scheduled for early 2018
Case 4

- 62-year-old retired speech & language pathologist
- History of MR and Parkinson’s disease
- s/p Burr hole; deep brain stimulation
- Active echo surveillance
- Developed palpitations followed by organized AFib
- Now symptomatic on minimal activity
Transthoracic Echocardiogram

BP 95/64 mmHg  Height 61”  Weight 108 lb
BP 139/73 mmHg    Height 61”    Weight 108lb
62-year-old female with long standing MR and Parkinson’s disease, Afib and now dyspnea on inclines. STS MVr: 0.82%

Imaging:
2015: Moderate MR, mild TR (RVSP 30-35mmHg)
LVEDD 4.9cm. LVESD 2.6cm, LA 5.1cm, EF 70%

2017: Severe MR, bileaflet MVP, MAC, mild TR (RVSP 41mmHg)
LVEDD 5.3cm, LVESD 3.6cm, LA 6cm, EF 57%
Deep Brain Stimulation Leads
1. Optimize medical therapy, repeat TTE in 6 months

2. MV repair + MAZE ± TV repair

3. MitraClip
Case 5

- 52-year-old male former Olympic gold medalist
- c/o dyspnea during intense physical training 4 years prior
- MRI/CATH 2012: non-ischemic dilated cardiomyopathy with severe MR
- s/p OOH AICD placement; CRT
- Now class III-IV symptoms on optimal medical therapy
Transesophageal Echocardiogram

BP 90/60 mmHg    Height 68.1”    Weight 134lb
52-year-old athletic male with non-ischemic dilated cardiomyopathy and Bi-Ventricular AICD in situ, reports progressive decline in exercise tolerance and dyspnea at one flight of stairs, despite optimal medical Rx and CRT. STS Score: MVr 0.496%

Imaging:
Severe MR, mild-moderate TR (RVSP 68mmHg)
LVEDD 6.9cm. LVESD 6.7cm, LA 6.9cm, EF 21%

RHC-rest: PCW 20mmHg, PA 60/29/39mmHg, RV 60/7mmHg
Exercise: PCW 30mmHg, PA 75/38/50mmHg
What would you recommend?

1. Continued optimal medical therapy

2. MV repair ± TV repair

3. MV replacement ± TV repair

4. MitraClip
Follow-Up TTE 3 Weeks Postoperatively
Follow-Up 6 Months Postoperatively

- Patient doing well
- Resumed moderate exercise training
Case 6

- 77-year-old female
- CHF admission, severe FMR, LVEF 27%, NYHA-IV
- CAD (STEMI 2003), HLD, HTN, T2DM, CKD, PVD, AFib
- s/p CABG (2005), AICD (2005), AVR(b) (2013), TIA (2016)
- Multiple OOH admissions: acute CHF episodes
- Referred for high-risk surgery consult
BP 139/69 mmHg  Height 163cm  Weight 73Kg
Summary

77-year-old female with ischemic cardiomyopathy, functional MR, multiple acute-on-chronic CHF, s/p CABG (2005), AICD (2005), AVR(b) (2013), TIA (2016), NYHA-IV, referred for high-risk surgery consult following ED admission for CHF exacerbation. STS Score: MV repair 11.21%

Imaging:
Severe MR, multiple jets, MAC, chordal fibrocalcification mild TR, moderate PHTN (RVSP 51mmHg)
LVEDD 5.2cm, LVESD 4.2cm, LA 4.6cm, EF 29%

Right Heart Cath: PCW 35, PA 64/25/38, RV 60/14
Coronary CT Angio: patent SVG’s to LAD, RCA
What would you recommend?

1. Continue optimal therapy; no intervention

2. MV surgery

3. MitraClip

4. TMVR
Preoperative Screening
Intraoperative Echocardiogram
Device Deployment Final Result
4-month Follow-Up

- Patient doing well
- Currently asymptomatic
- Resumed normal life style
Thank You