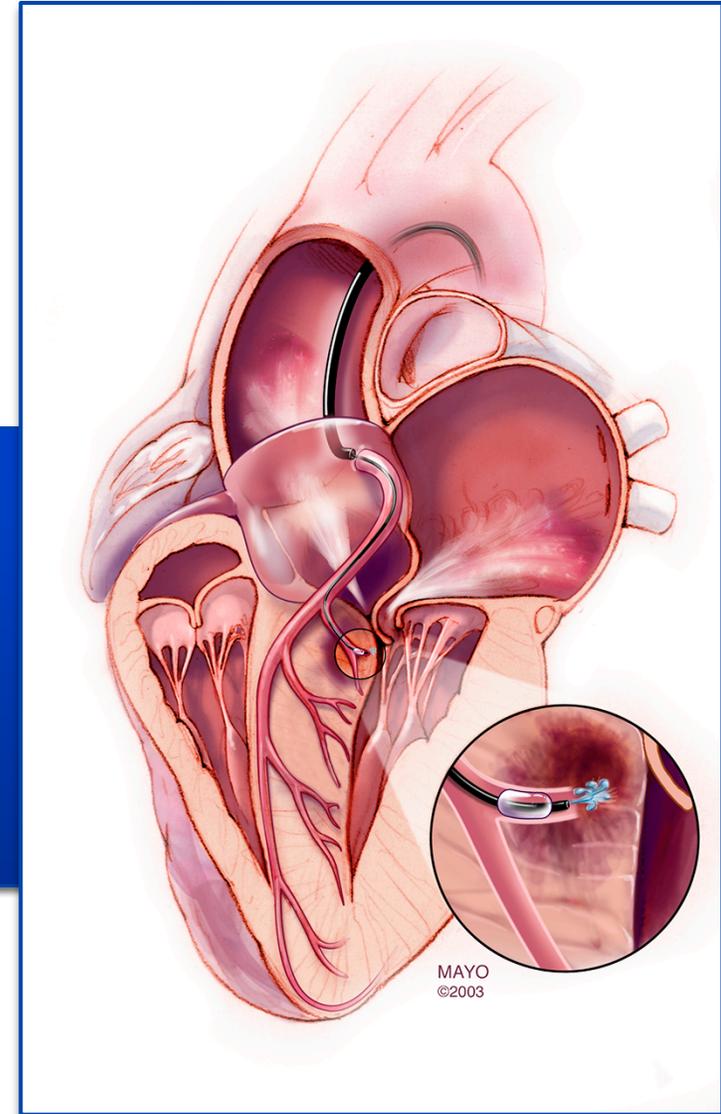




Patient with Complicated Obstructive Hypertrophic Cardiomyopathy

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Giornate Cardiologiche Torinesi
October 26, 2018



Disclosures

- No relevant financial relationships to disclose

Learning Objectives

- Understand physiology of obstruction in HCM
- Differentiate from dynamic LVOT vs. fixed aortic valve obstruction using invasive and noninvasive assessment
- Identify therapeutic strategies for patients with multiple levels of obstruction

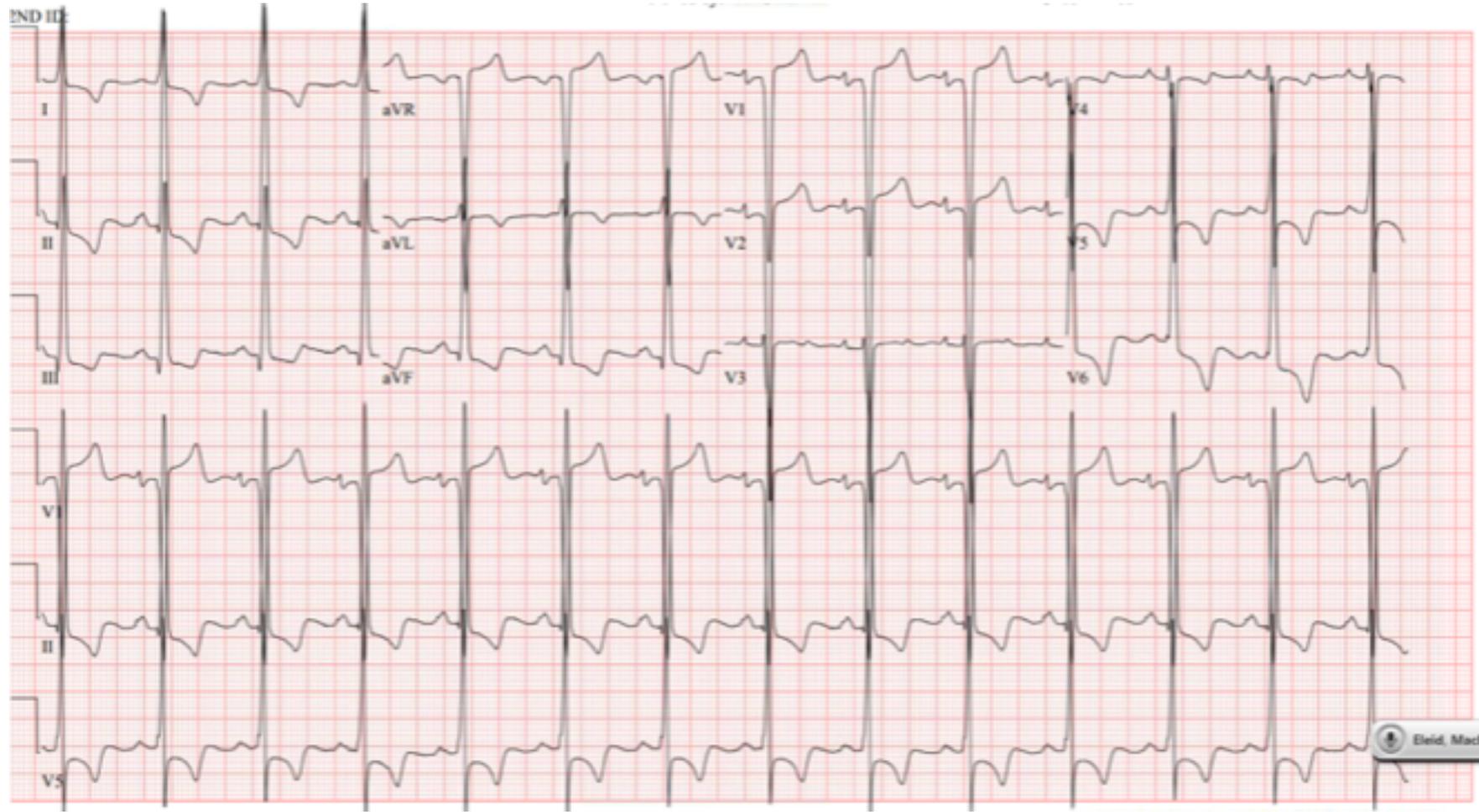
70 year old female with dyspnea

- Postprandial chest pain
- Recent diagnosis of HCM
- Maximal septal thickness 23 mm
- Also diagnosed with aortic stenosis and mitral regurgitation
- Surgery attempted at outside facility but aborted after sternotomy due to severe aortic calcification
- On metoprolol 50 mg BID (intolerant to higher doses)

Physical Examination

- Blood pressure 169/90 mm Hg, Heart rate 60 bpm
- Neck: reduced carotid pulses without parvus et tardus
- Lungs: prolonged expiratory phase
- Heart: grade 3/6 late-peaking systolic ejection murmur with accentuation with Valsalva. Preserved aortic closure sound.
- Extremities: no edema

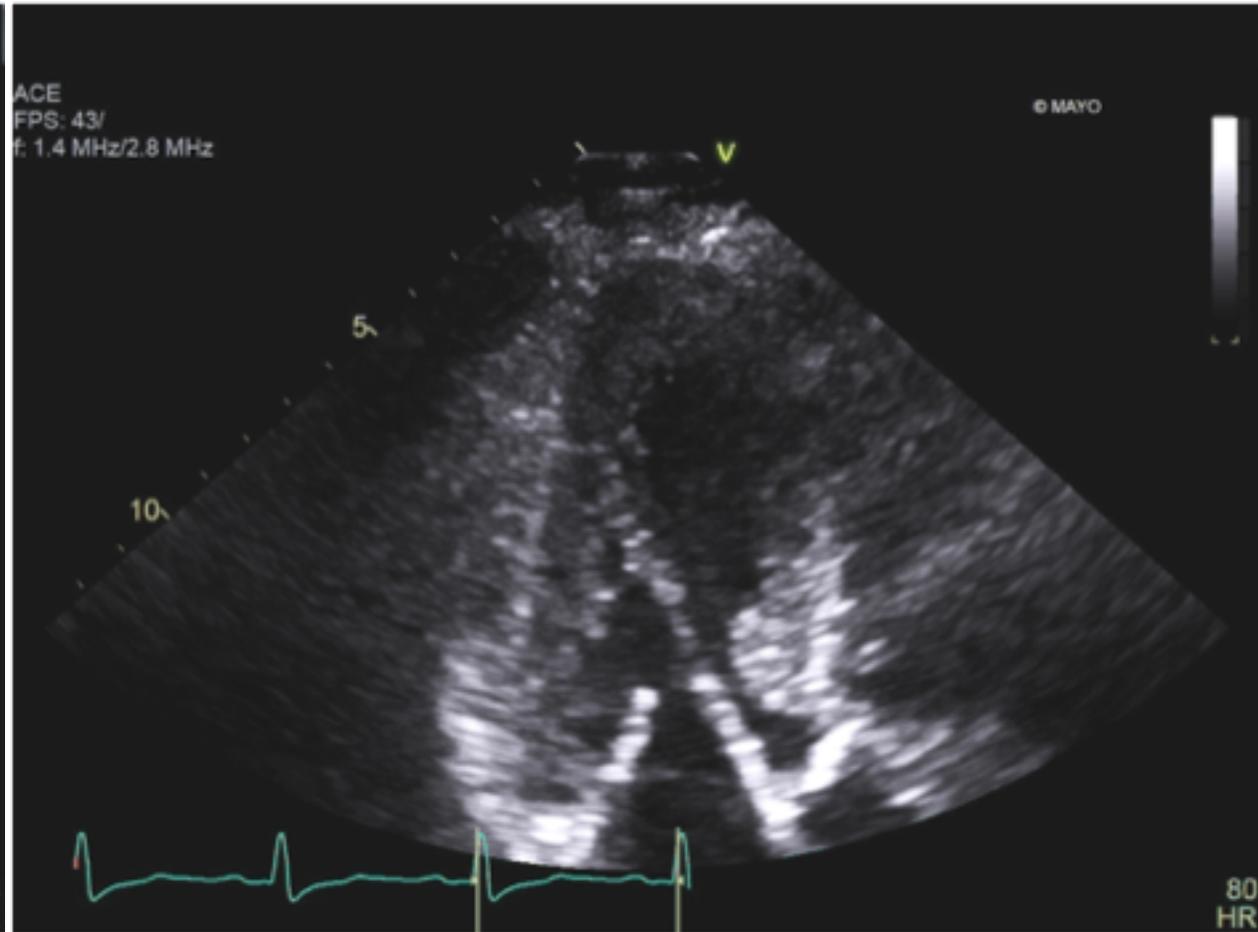
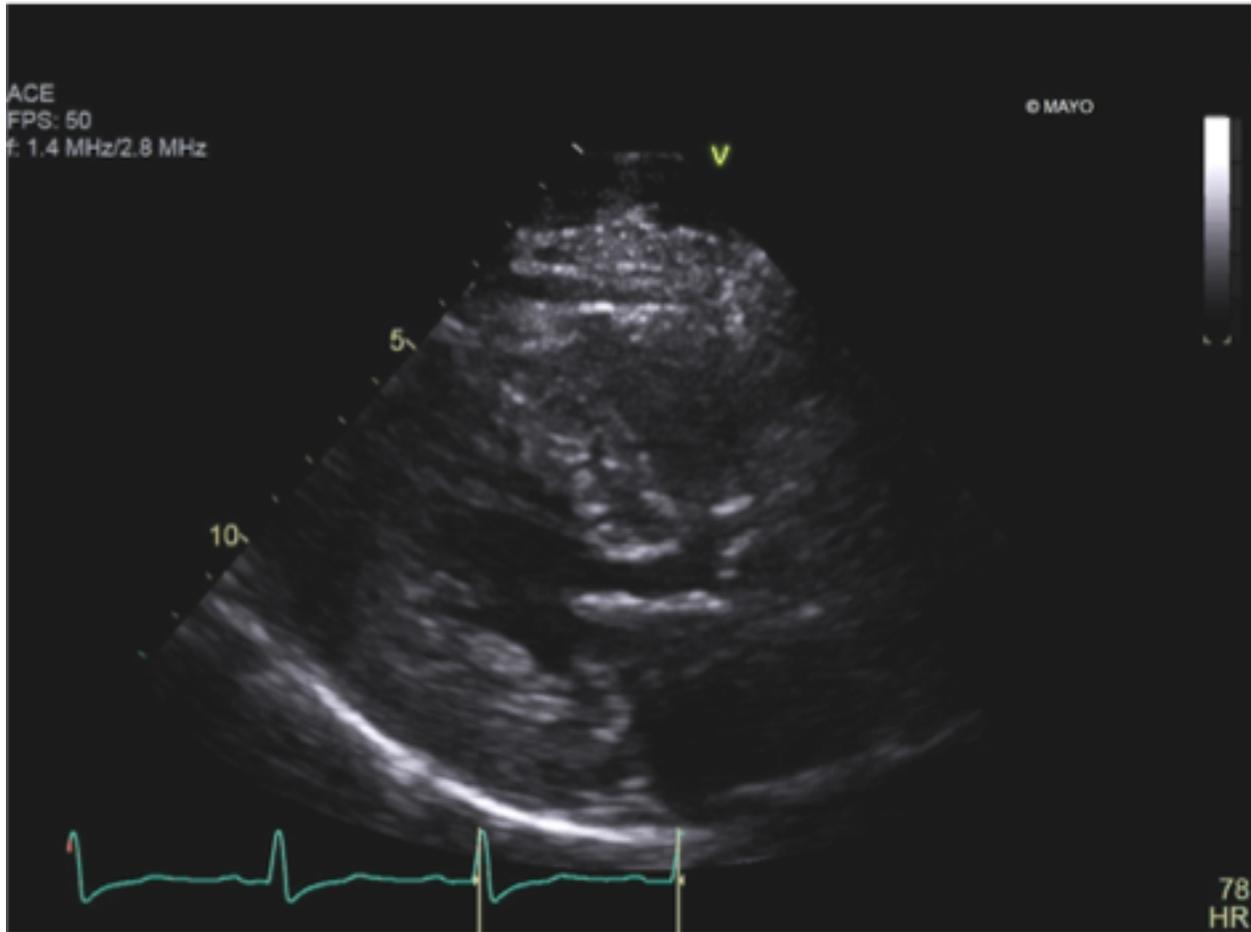
Electrocardiogram



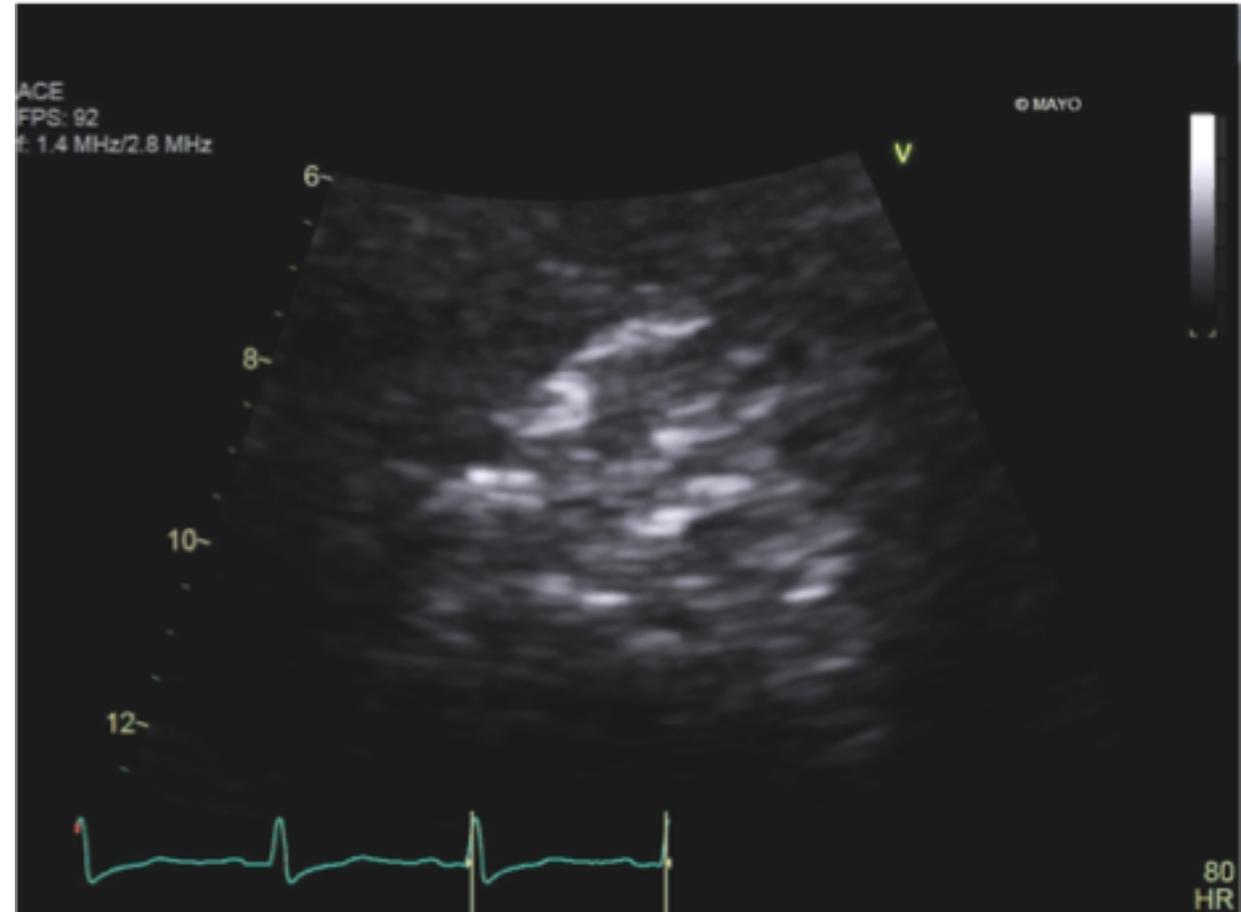
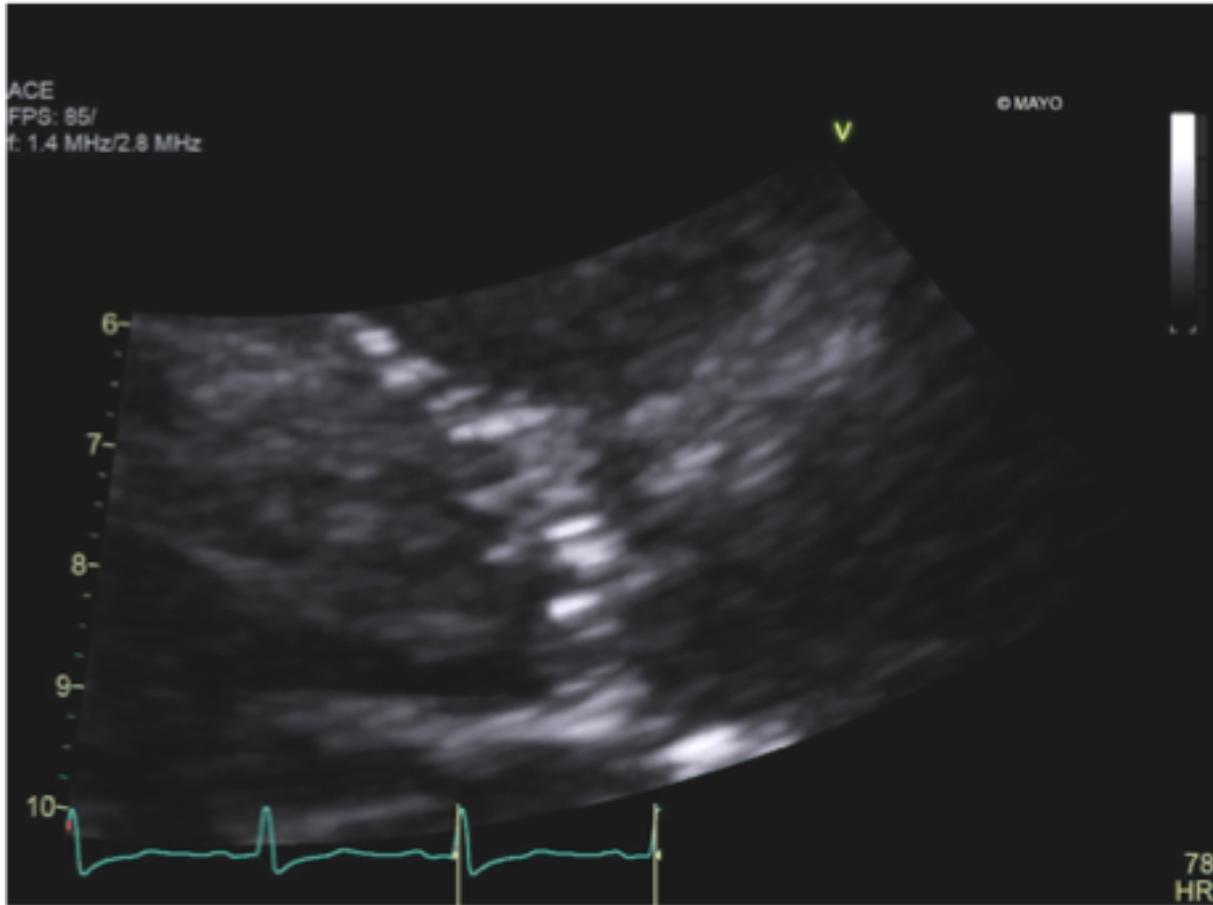
Chest Radiograph



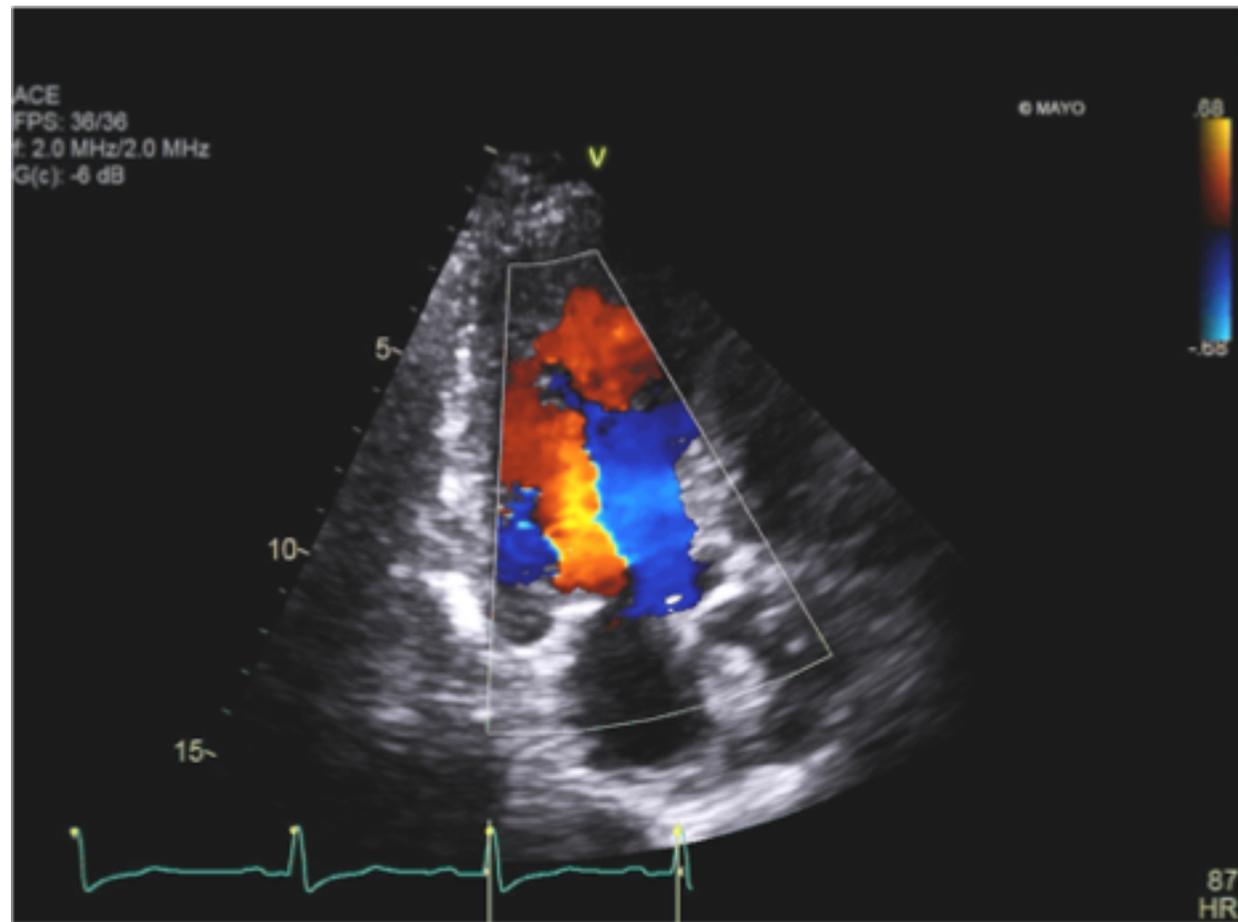
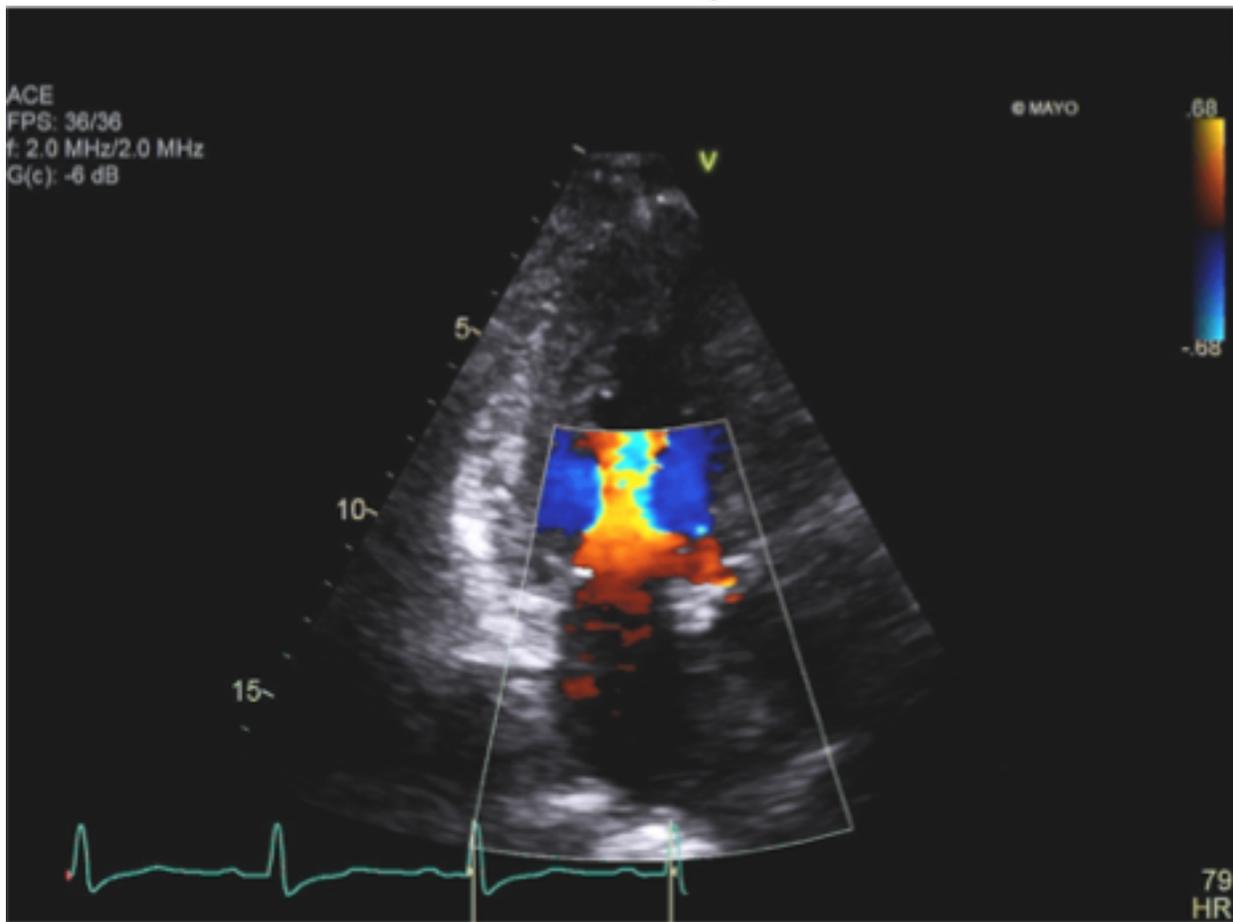
Echocardiogram



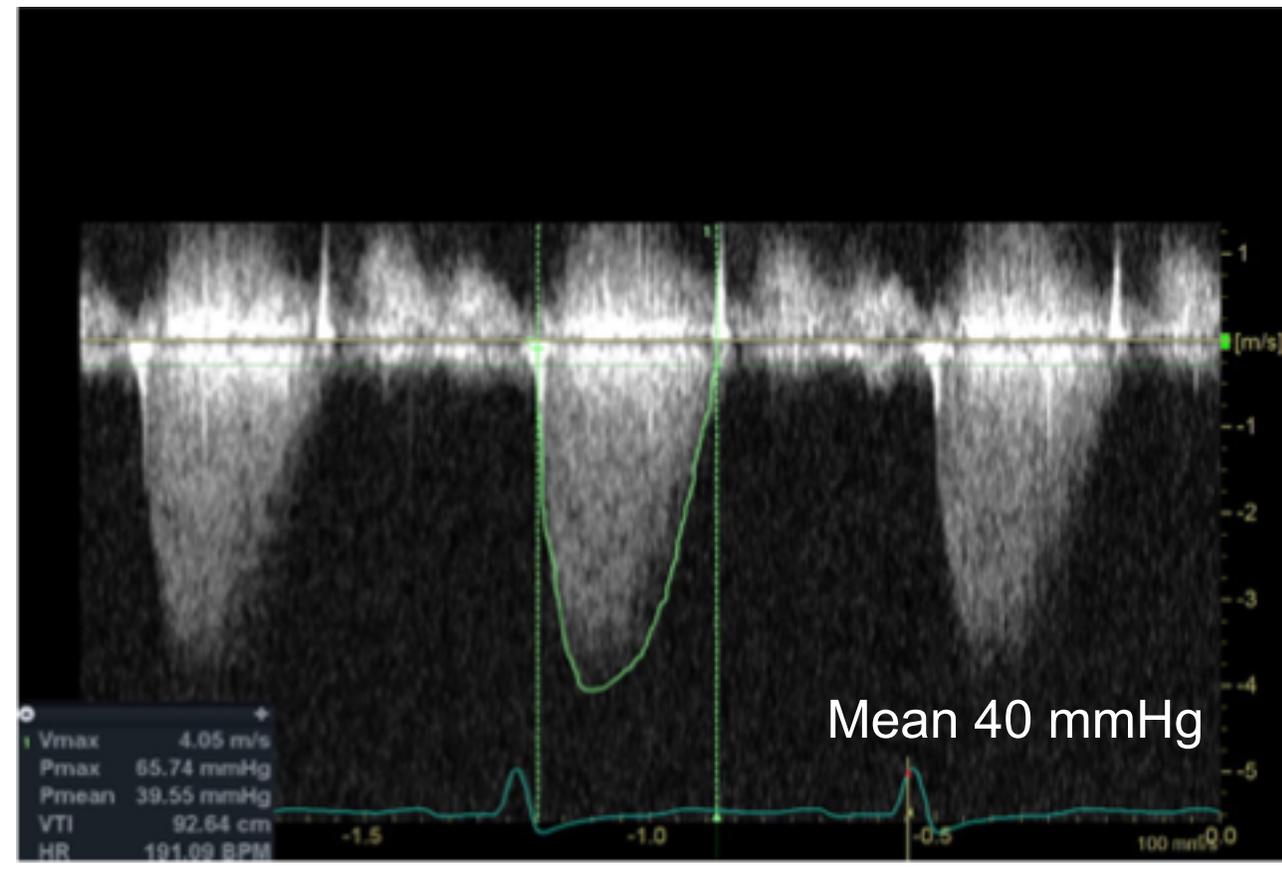
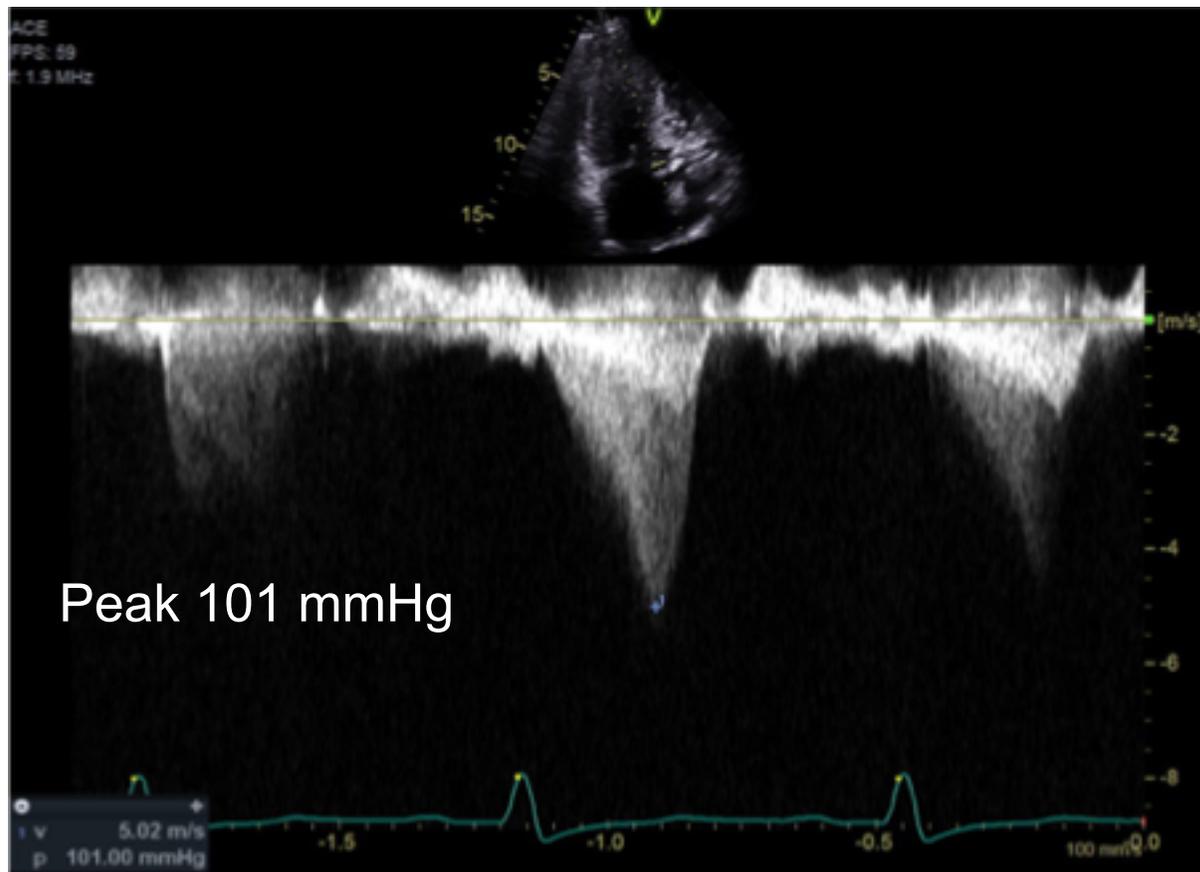
Echocardiogram



Echocardiogram



Echocardiogram



70 year old female with dynamic LVOT obstruction and aortic stenosis

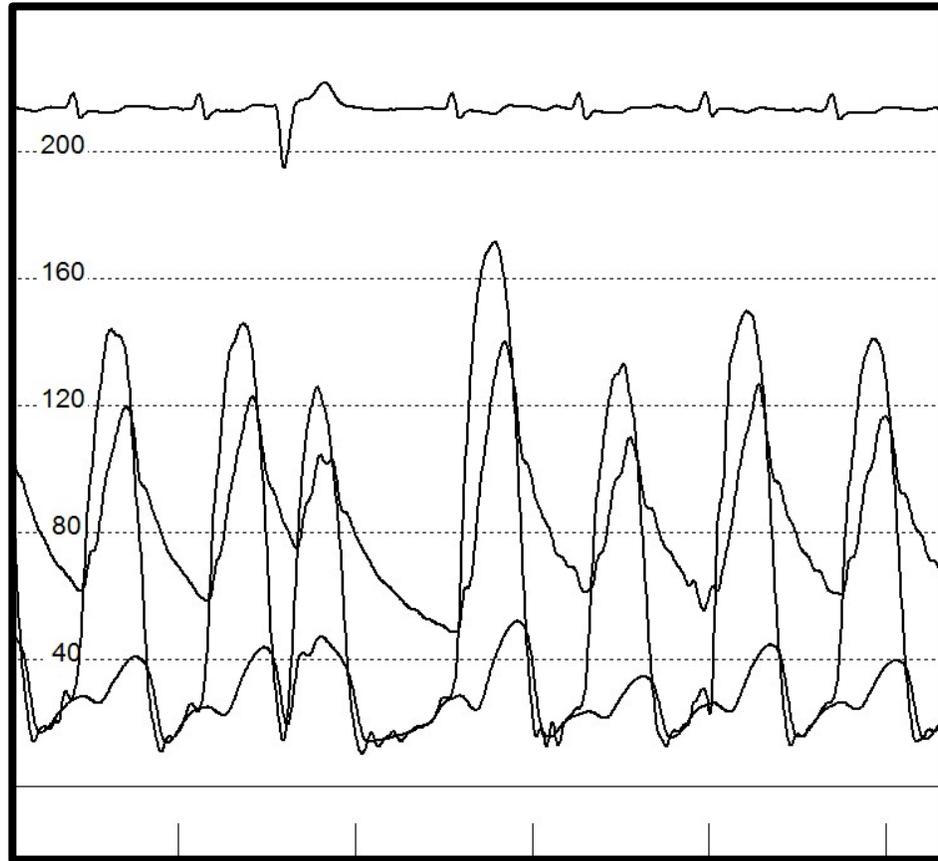
What would you recommend?

- A. Surgical aortic valve replacement, mitral valve repair and myectomy**
- B. Exercise stress echocardiogram**
- C. Cardiac CTA**
- D. Invasive hemodynamic catheterization**

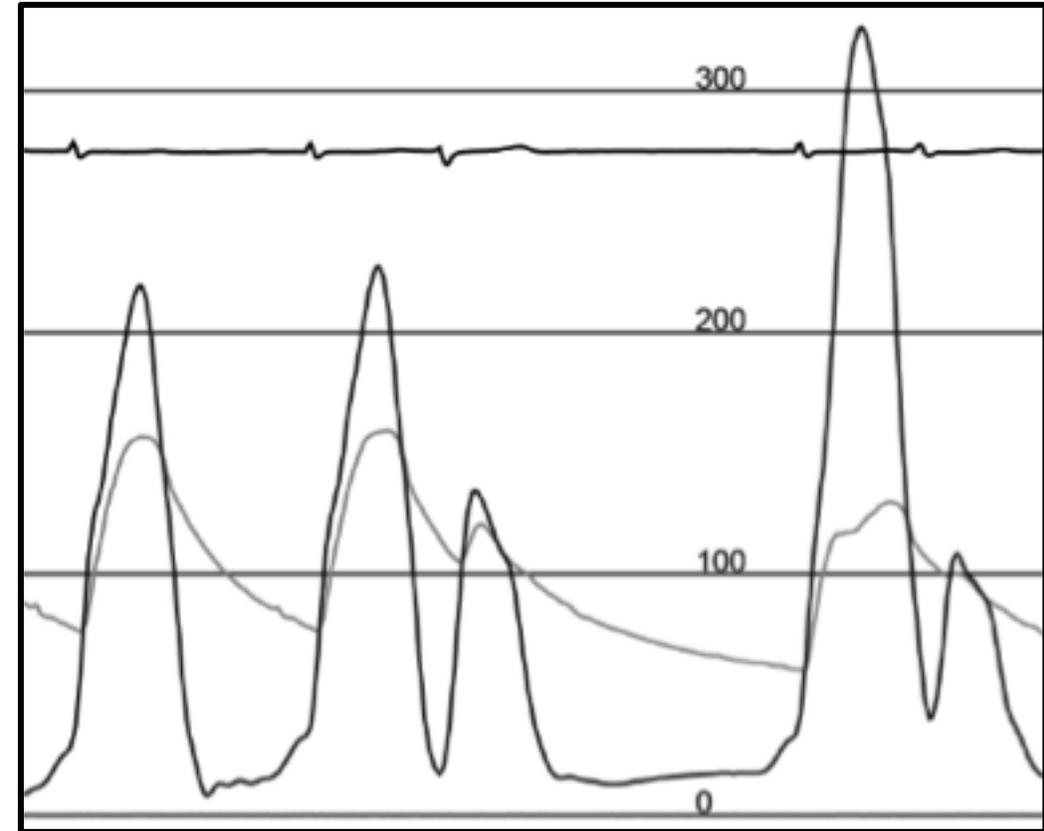
Indications for Invasive Hemodynamic Evaluation In HCM

- Discordance between physical examination findings and noninvasive testing
- Suspicion of dynamic obstruction not demonstrated on noninvasive testing
- Need to differentiate primary cause of symptoms in patients with multiple abnormalities

Post-PVC Beat: Look at the Aortic Pressure!



Aortic Stenosis

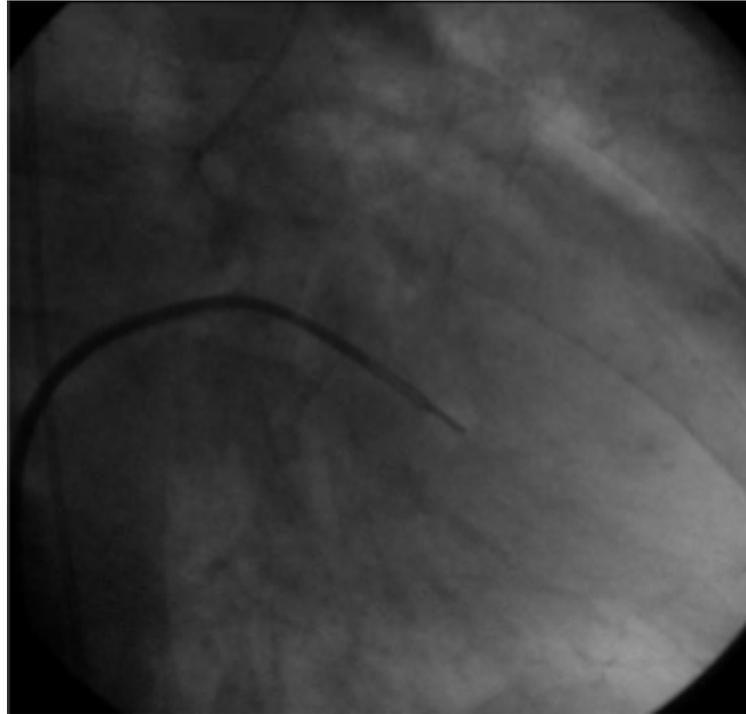


**Hypertrophic Obstructive
Cardiomyopathy**

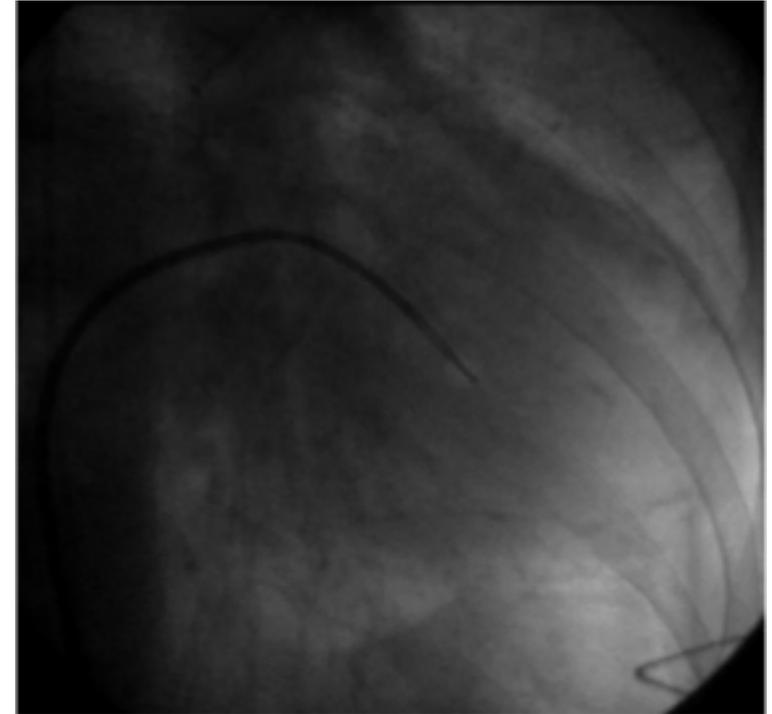
Hypertrophic Cardiomyopathy and MR – What Medication was Given?

- A. Isoproterenol
- B. Nitroprusside
- C. Phenylephrine

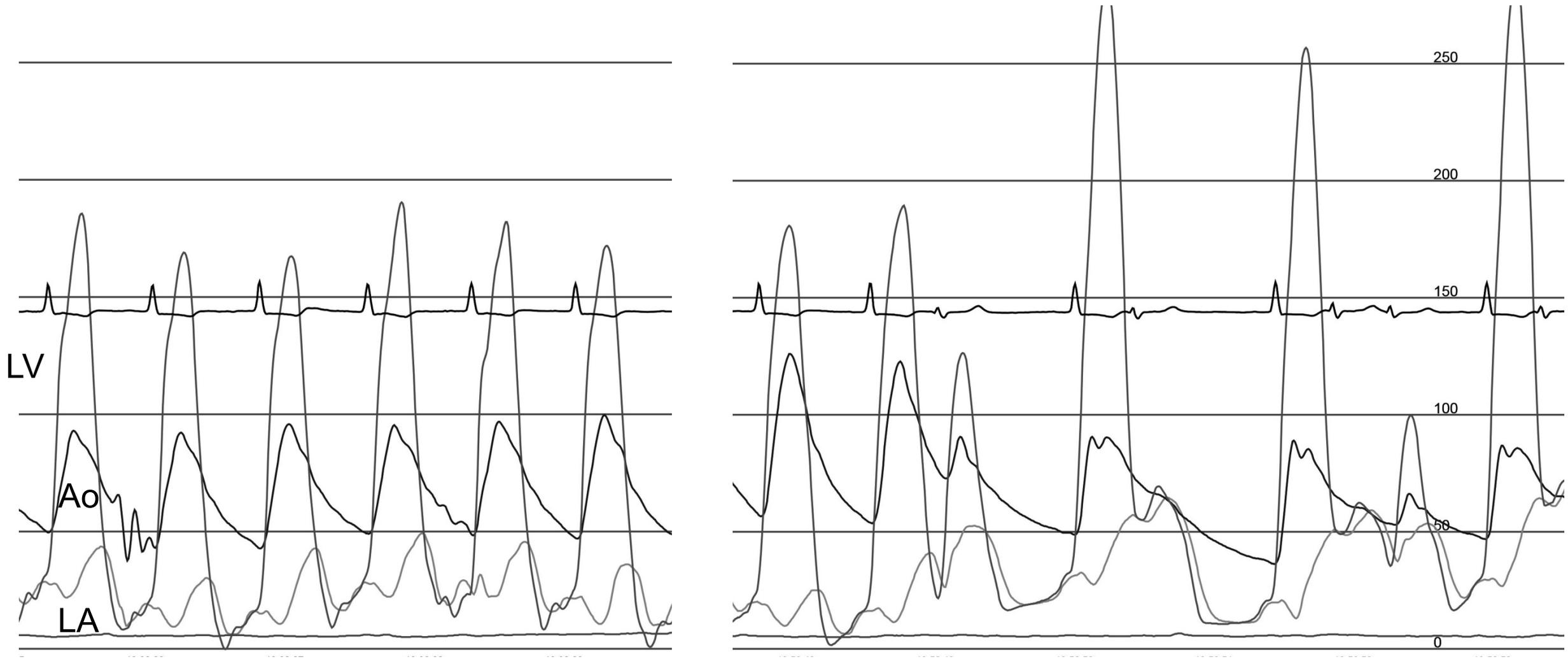
Before Medication



After Medication



Our Patient - Invasive Hemodynamics



Adult Echo

TIS0.6 MI 0.1

X5-1
24Hz
18cm



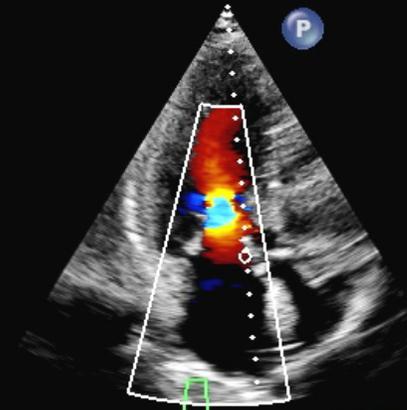
PRE ABLATION

2D

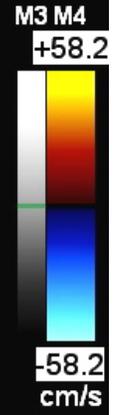
67%
C 50
P Low
HPen

CF

50%
3777Hz
WF 377Hz
2.5MHz

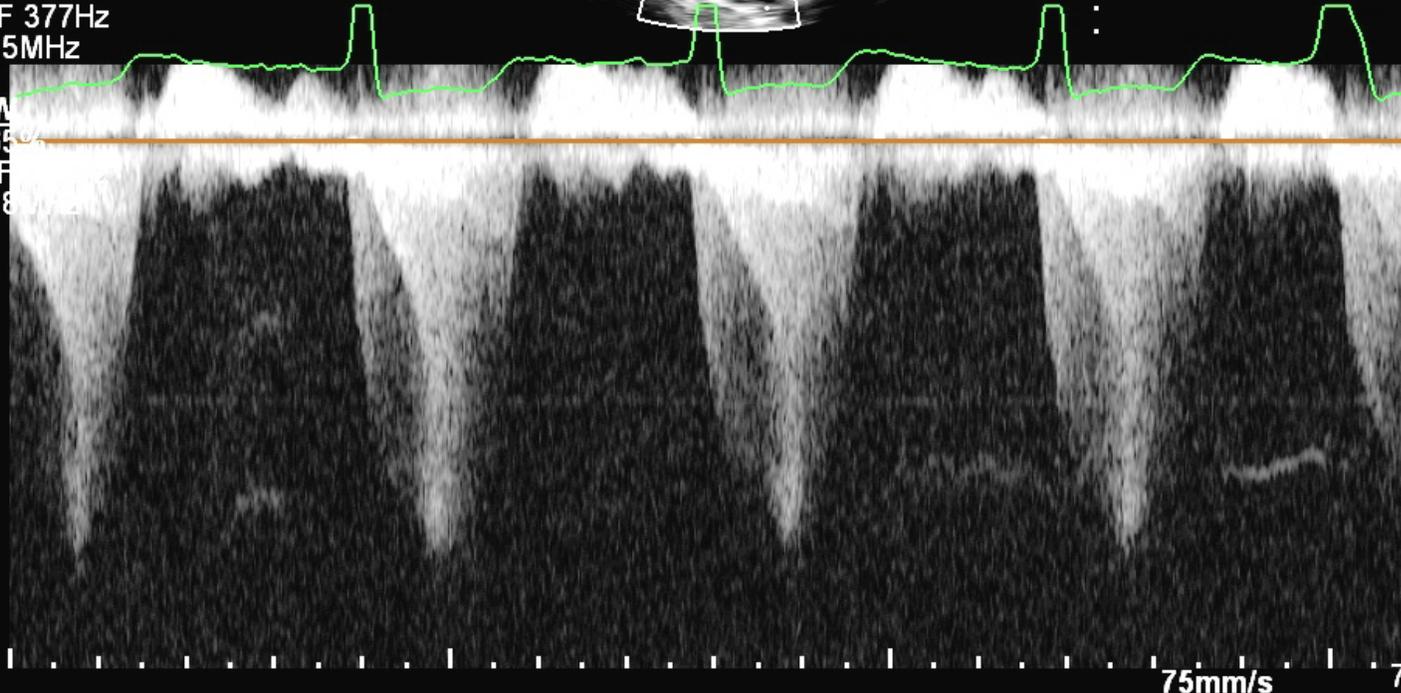


0
5
10
15

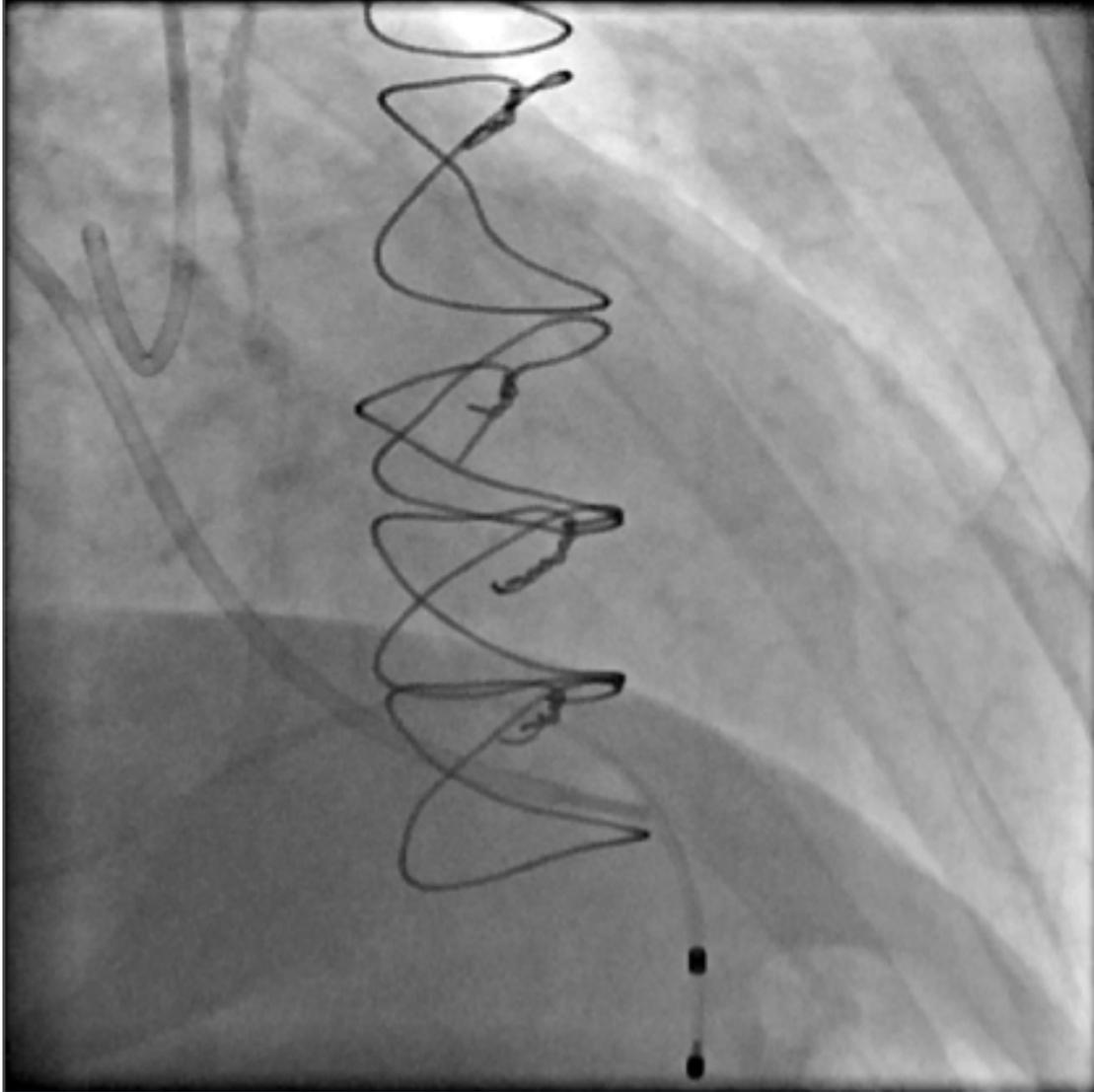


CW

65%
WF 1.8



Coronary Angiography

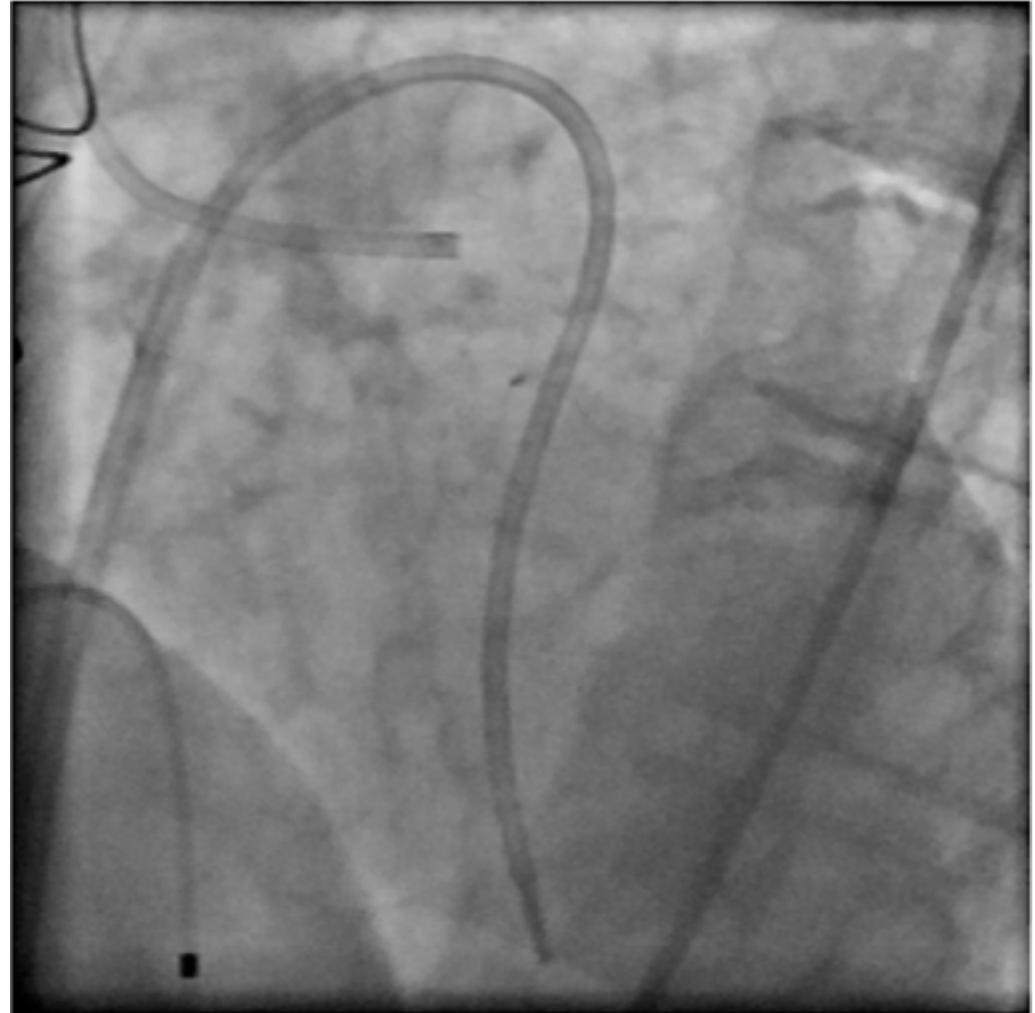
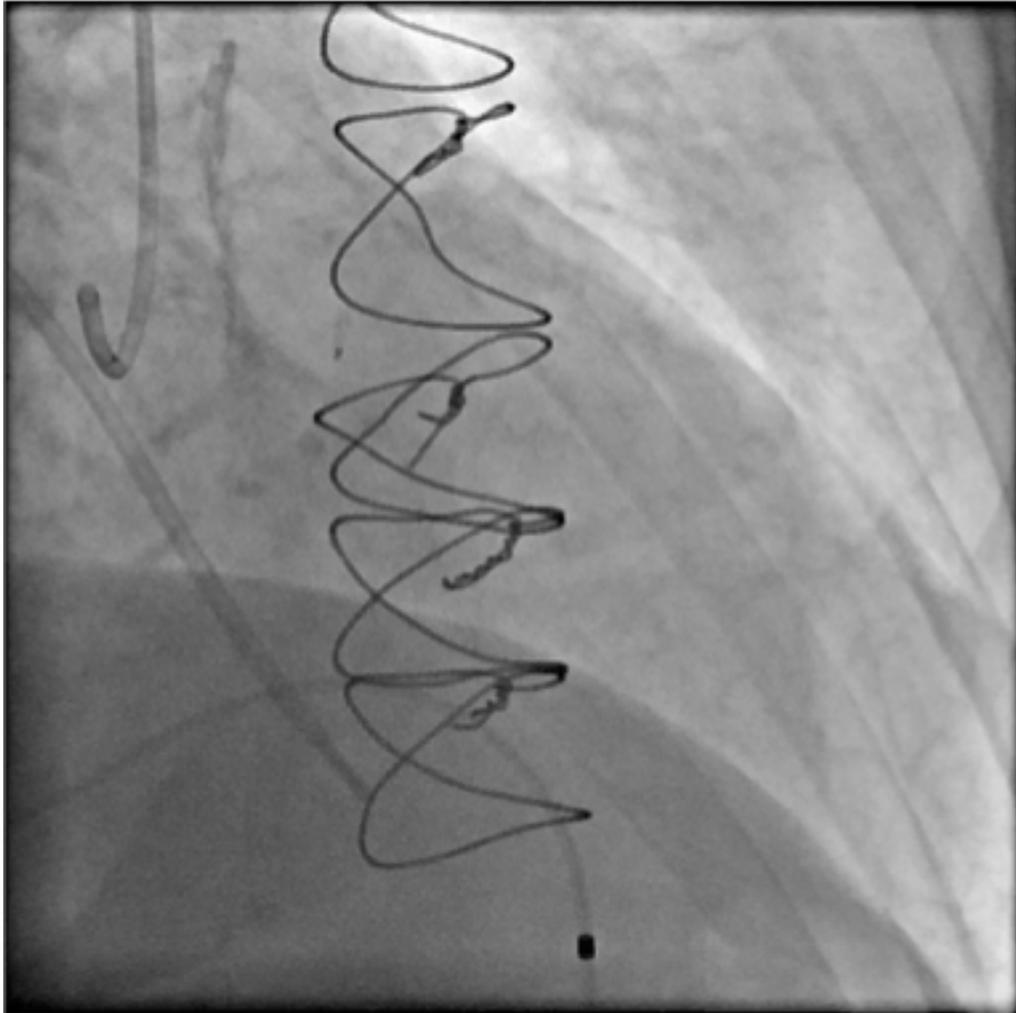


RAO



LAO

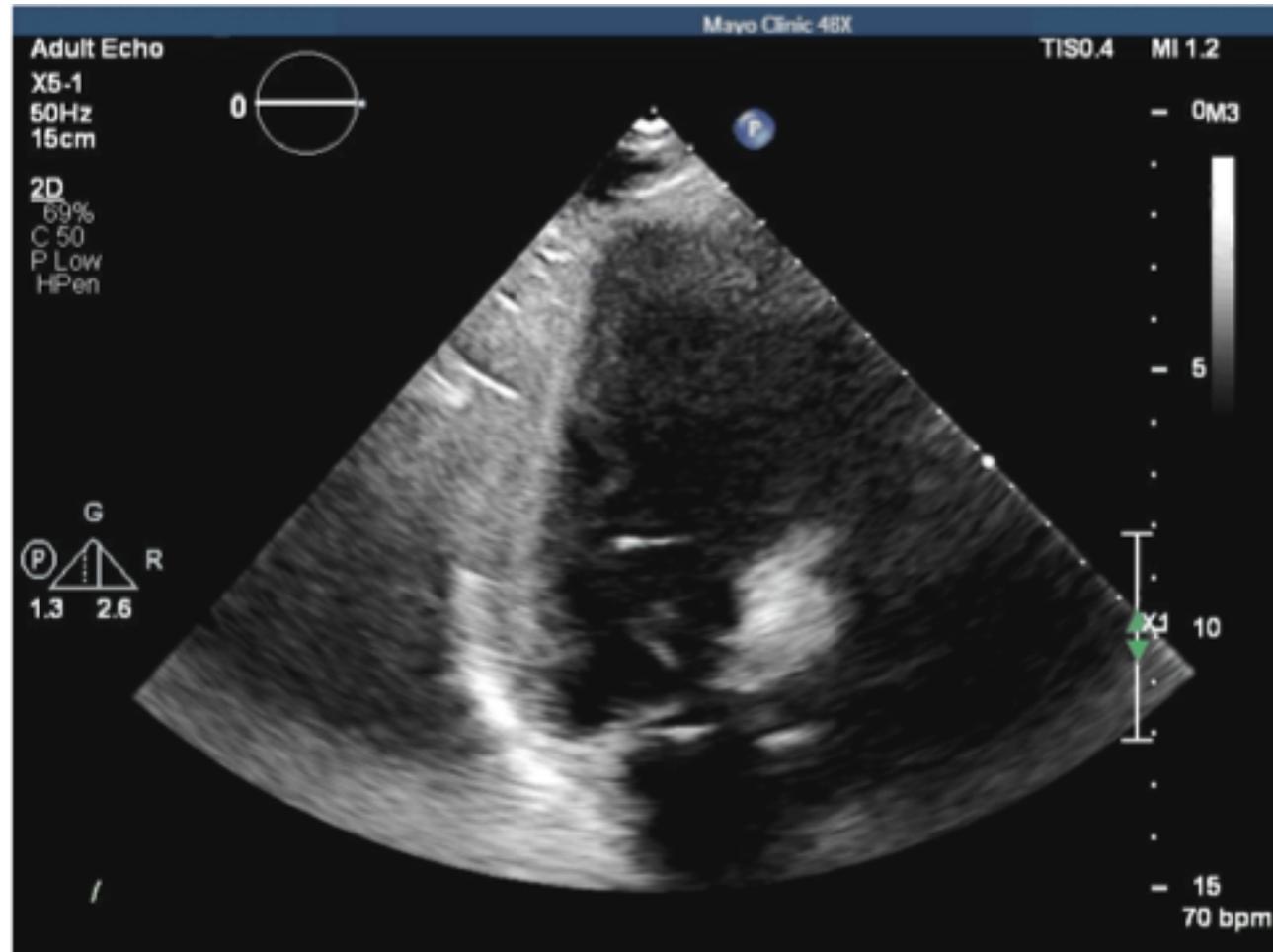
Selective 1st Septal Angiography



RAO

LAO

Intraprocedural Echocardiography



A Second Branch...

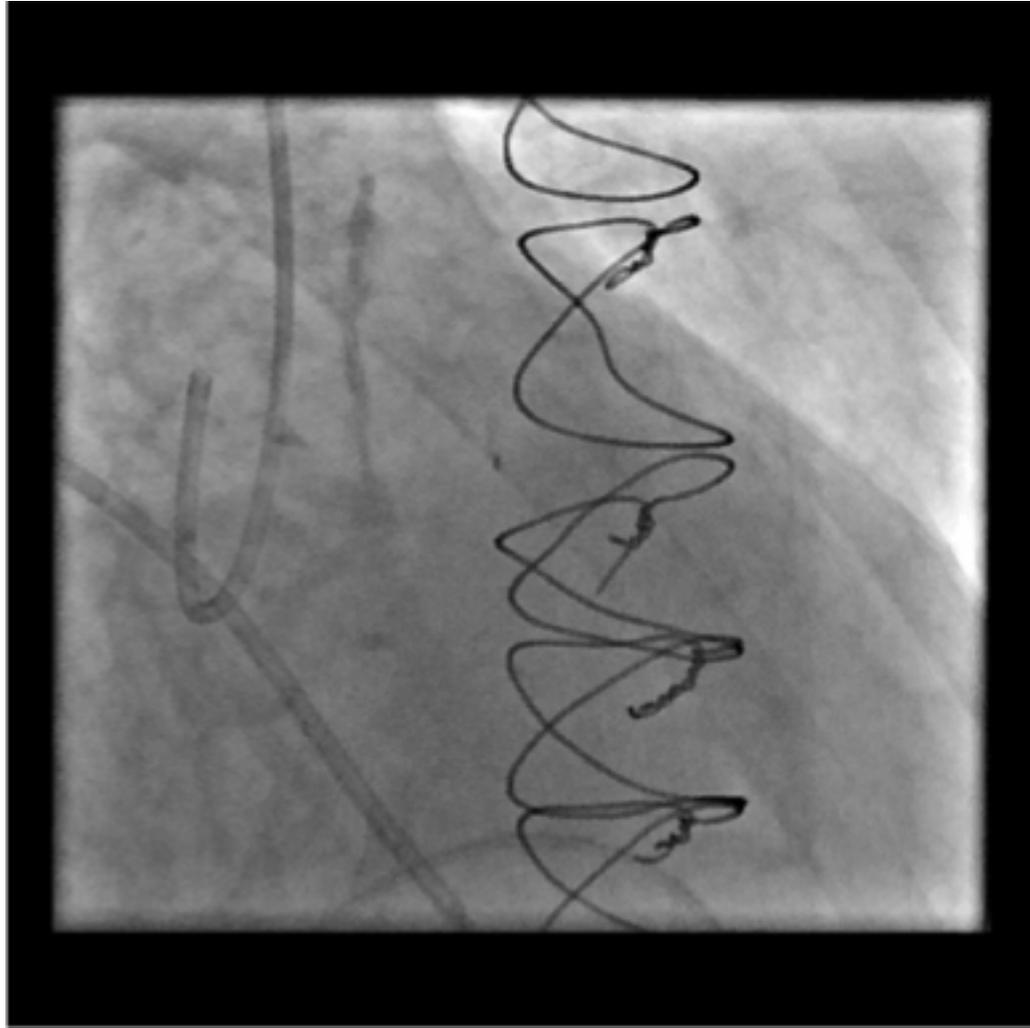


RAO

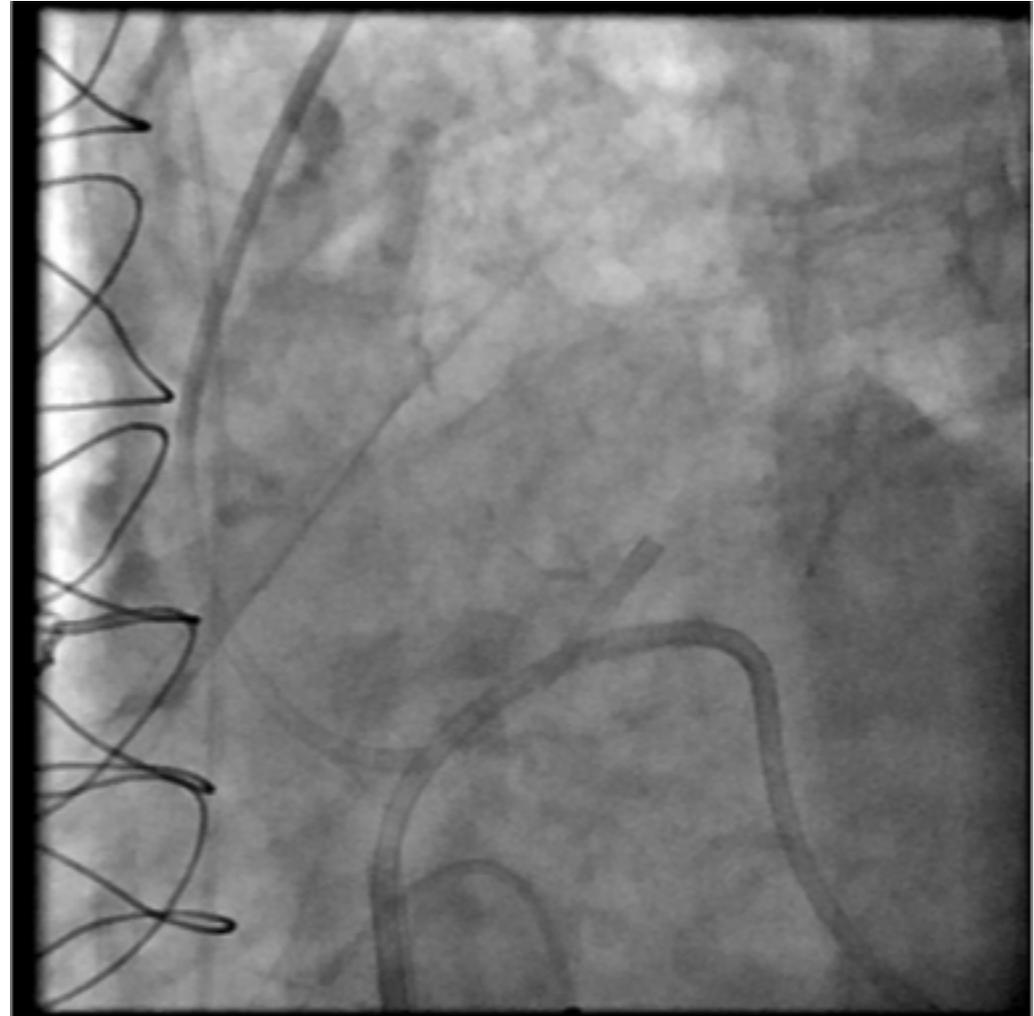


LAO

The Second Perforator is Found

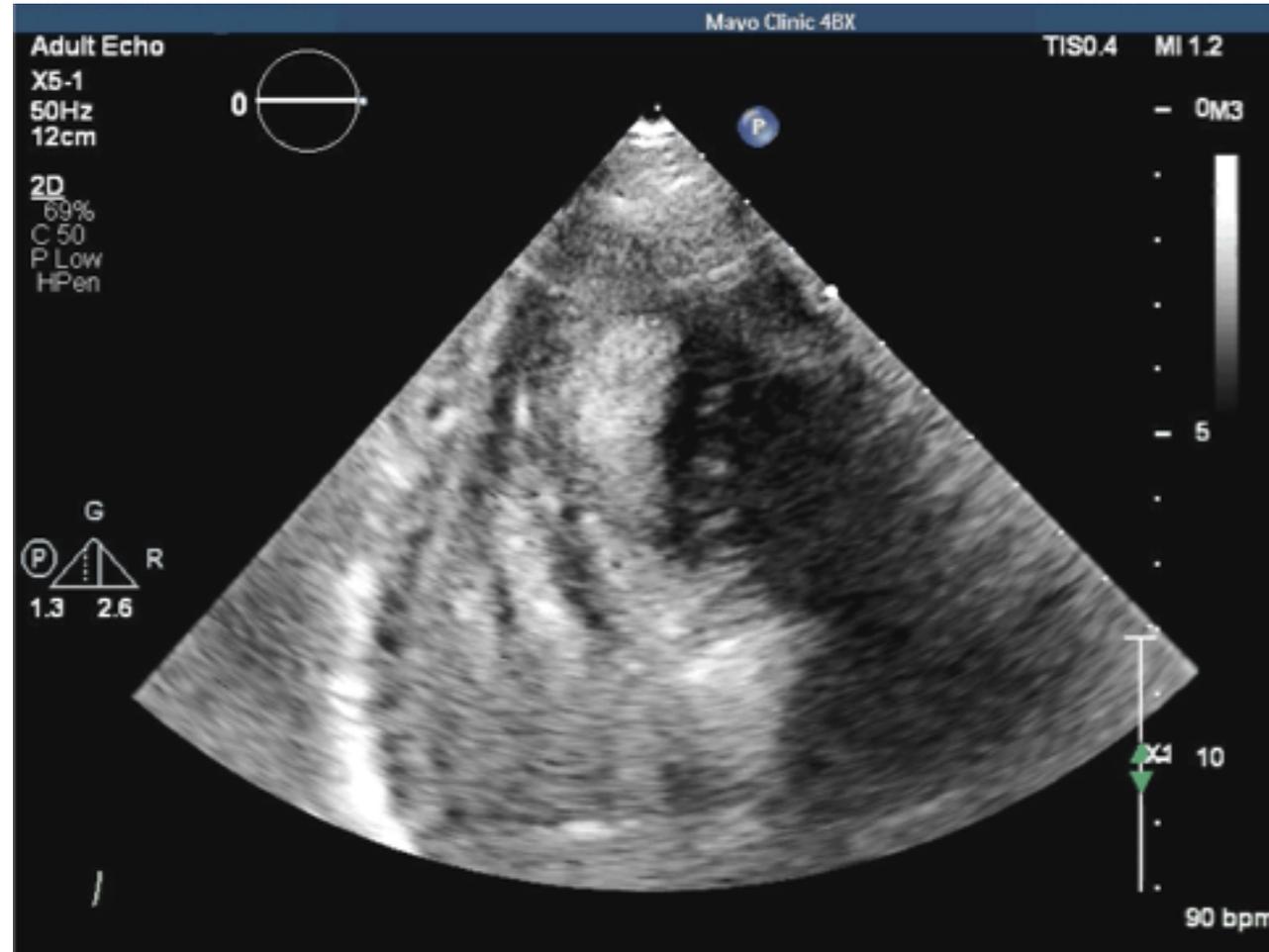


RAO

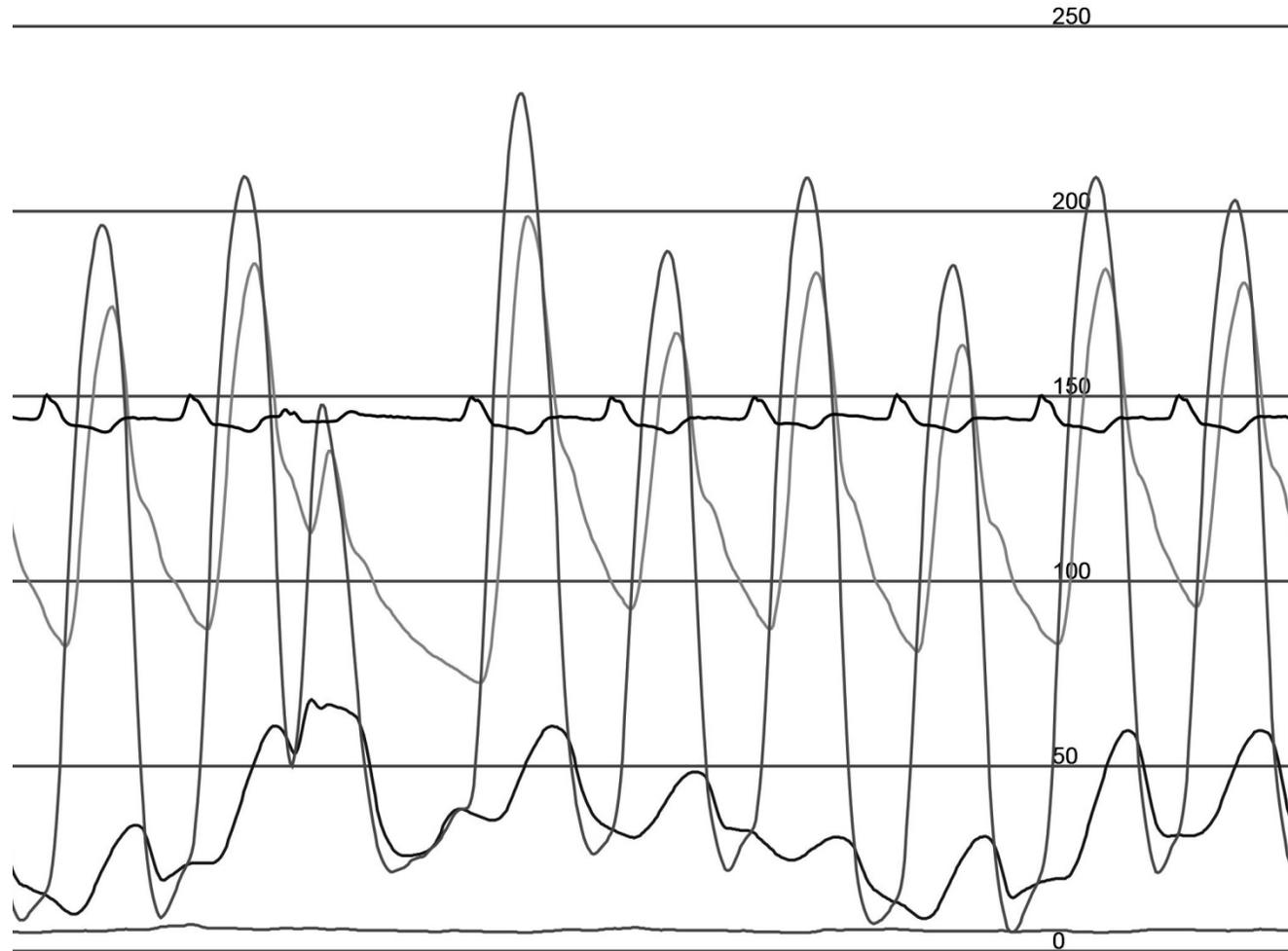


LAO

Intraprocedural Echocardiography

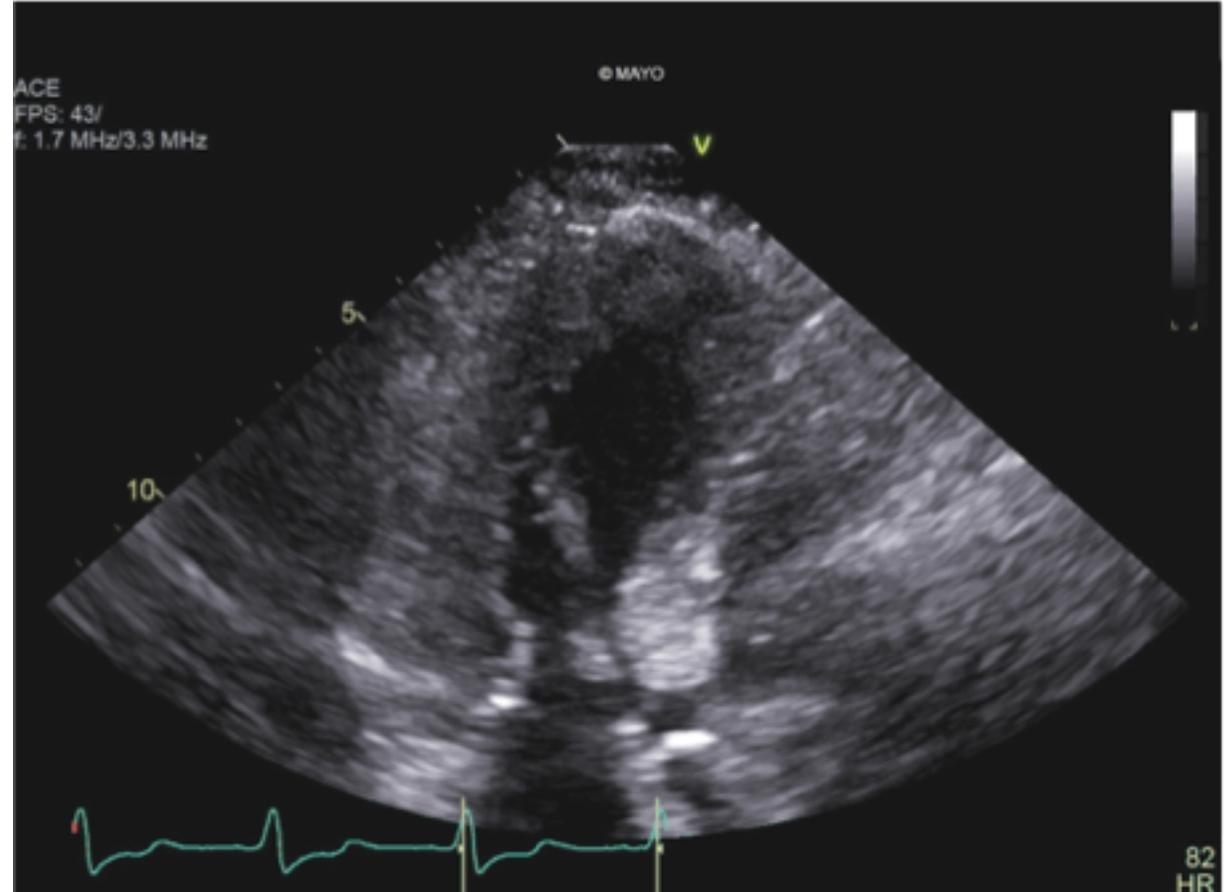
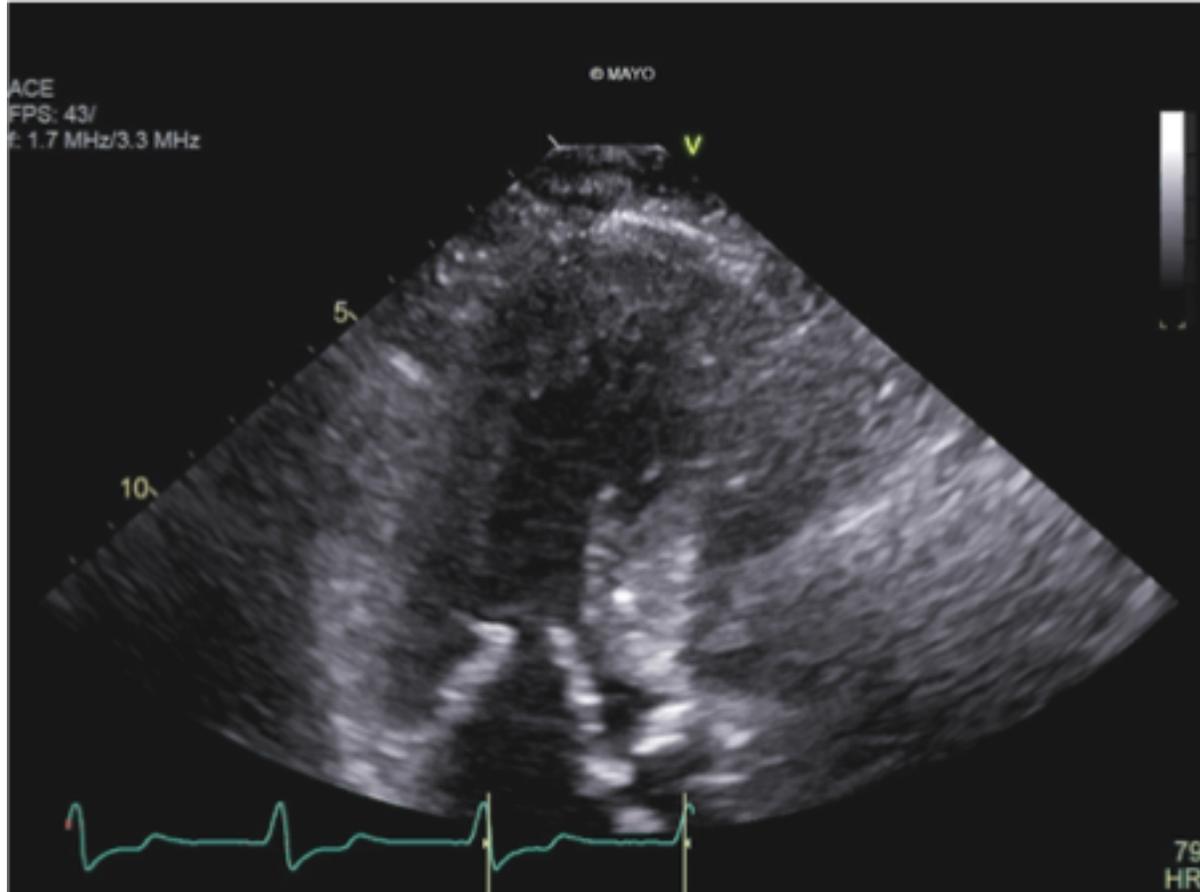


Post-Ablation Hemodynamics

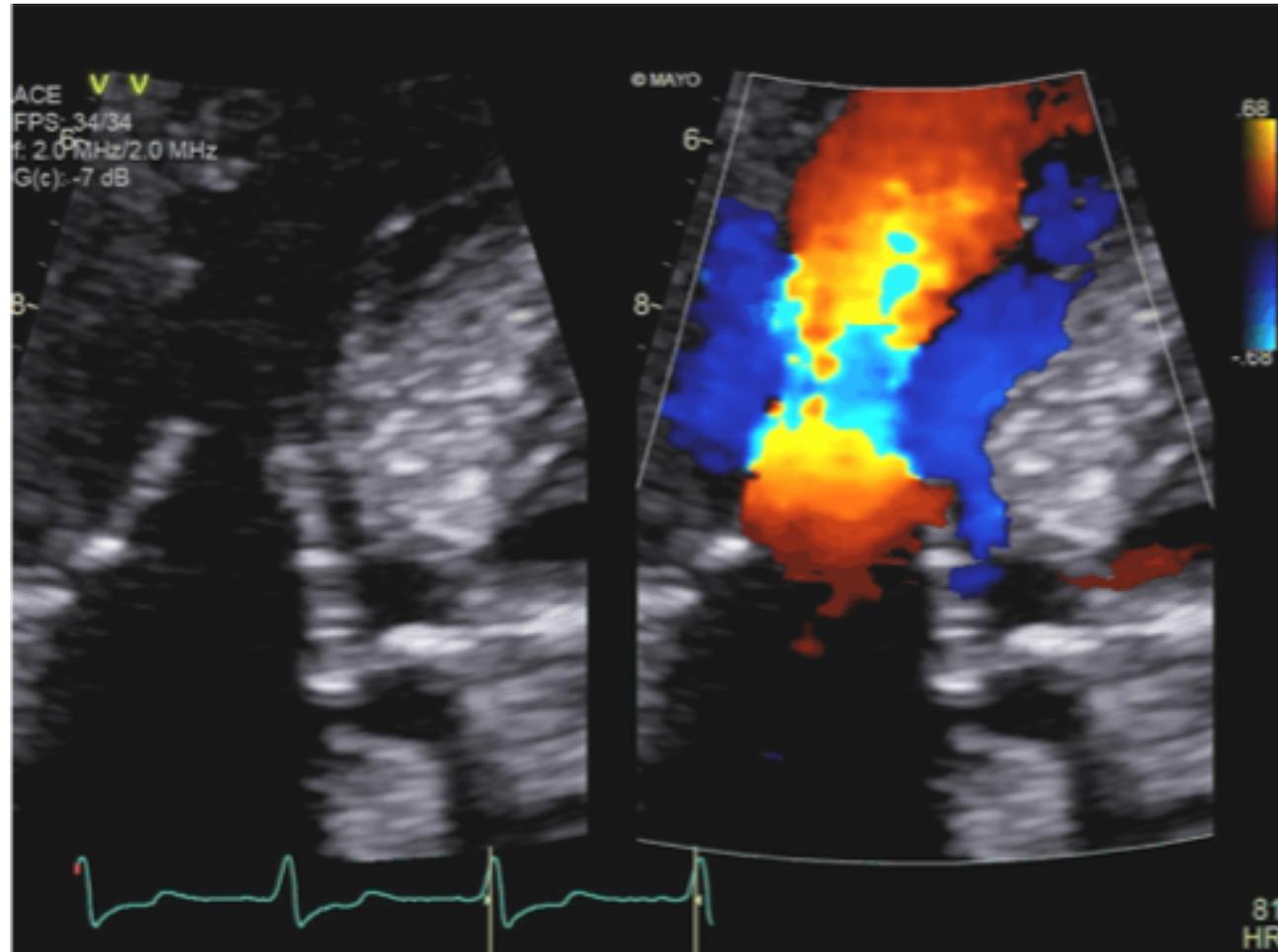


**Mean Aortic Valve
Gradient: 22 mmHg**

Post Procedural Echocardiogram



Post Procedural Echocardiogram



Post-procedure care

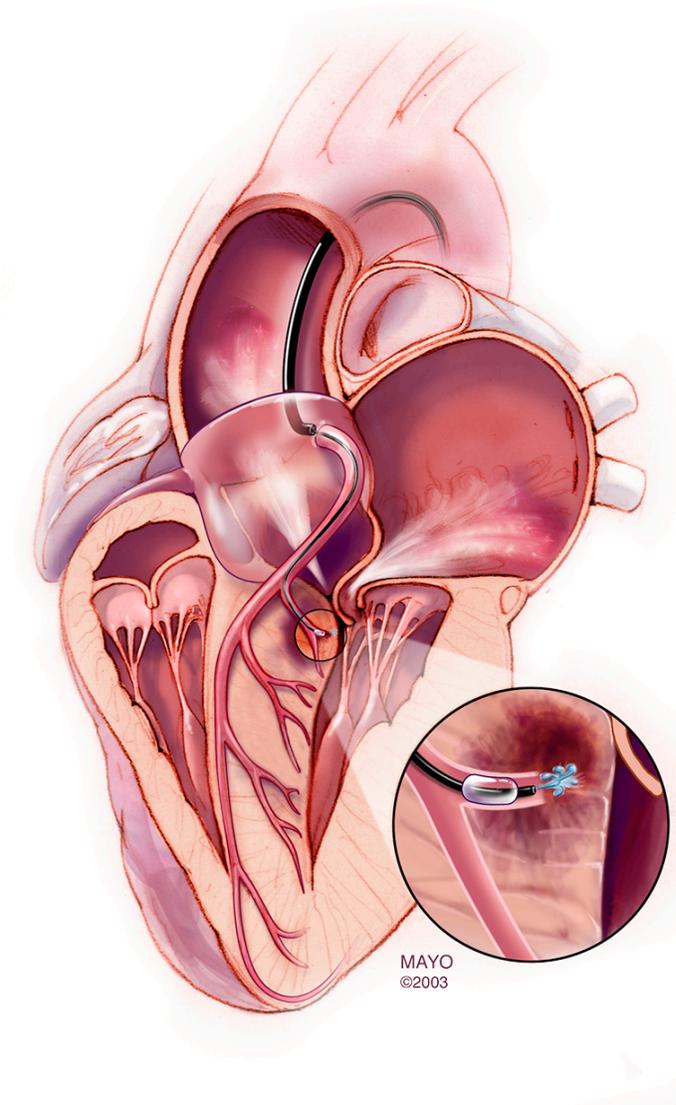
- Permanent pacemaker implanted for heart block
- Dismissed from hospital 2 days post procedure

One week follow-up

- Complete resolution of postprandial angina
- Improvement in dyspnea

Septal Ablation

- Dr. Ulrich Sigwart
- 1995



2011 ACC/AHA HCM Guidelines

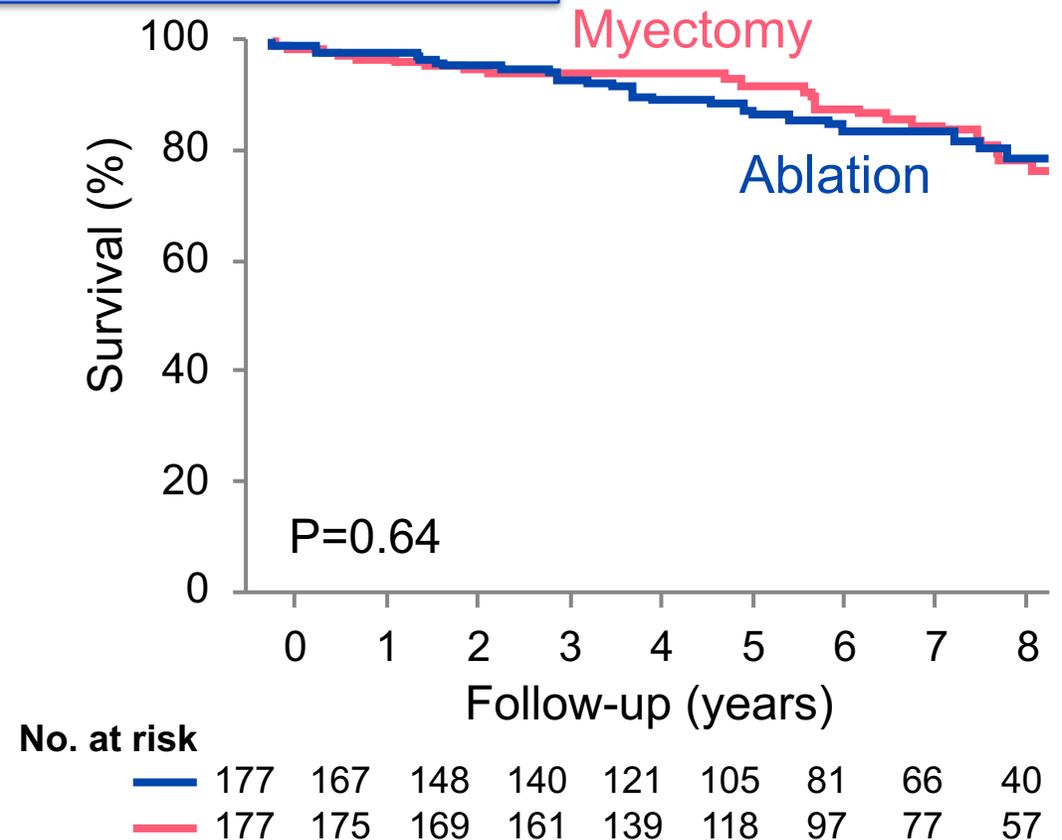
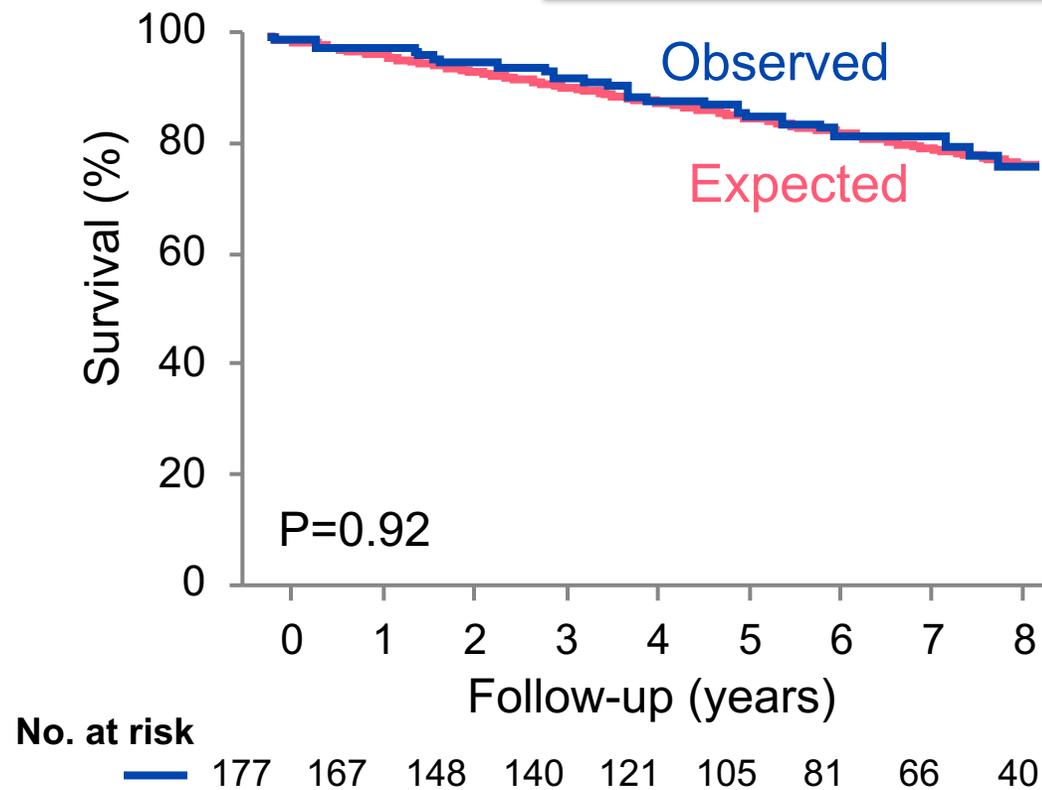
- **Class IIa:** When surgery is contraindicated or the risk is considered unacceptable because of serious comorbidities or advanced age, alcohol septal ablation, when performed in experienced centers, can be beneficial in eligible adult patients with HCM with LVOT obstruction and severe drug refractory symptoms (usually NYHA functional classes III or IV)
- **Class IIb:** Alcohol septal ablation, when performed in experienced centers, may be considered as an alternative to surgical myectomy for eligible adult patients with HCM with severe drug-refractory symptoms and LVOT obstruction when, after a balanced and thorough discussion, the patient expresses a preference for septal ablation

2014 ESC HCM Guidelines

- **Class IIa:** Septal reduction therapy to improve symptoms is recommended in patients with a resting or maximum provoked LVOT gradient of 50 mm Hg, who are in NYHA functional Class III–IV, despite maximum tolerated medical therapy.

Long Term Survival Post ASA at Mayo Clinic

Mean Follow-up = 5.7 yrs
Residual Gradient Predicted Mortality



STRUCTURAL

Long-Term Outcome of Alcohol Septal Ablation for Obstructive Hypertrophic Cardiomyopathy in the Young and the Elderly



Max Liebrechts, MD,^a Robbert C. Steggerda, MD,^b Pieter A. Vriesendorp, MD,^c Hannah van Velzen, MD,^c Arend F.L. Schinkel, MD, PhD,^c Rik Willemis, MD, PhD,^d Johan van Cleemput, MD, PhD,^d Maarten P. van den Berg, MD, PhD,^e Michelle Michels, MD, PhD,^c Juriën M. ten Berg, MD, PhD^a

ABSTRACT

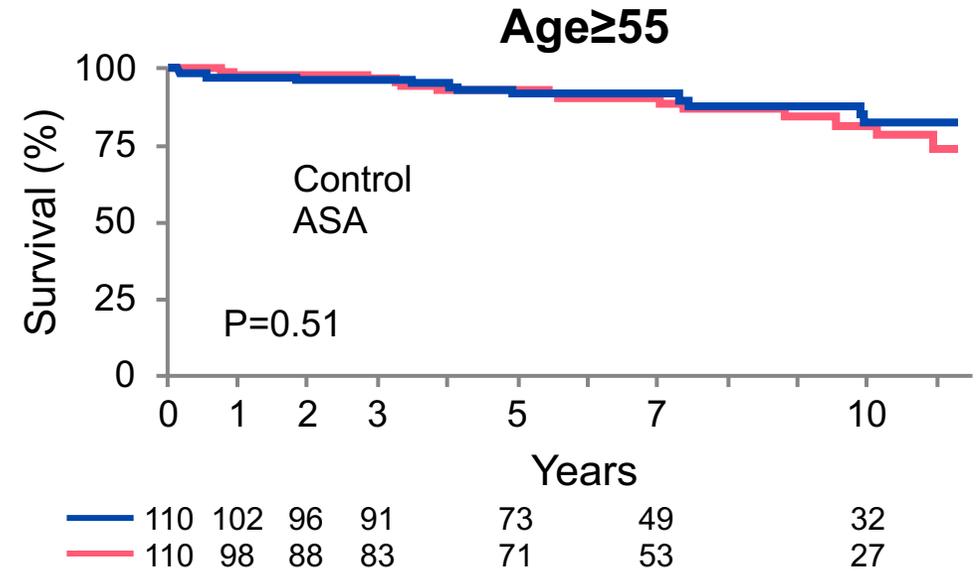
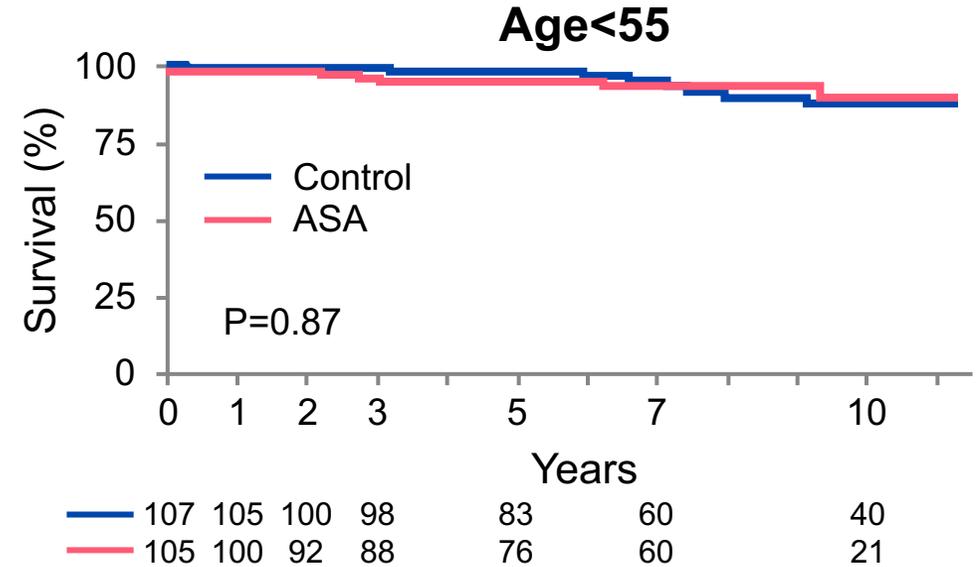
OBJECTIVES The aim of this study was to compare outcomes of alcohol septal ablation (ASA) in young and elderly patients with obstructive hypertrophic cardiomyopathy (HCM).

BACKGROUND The American College of Cardiology Foundation/American Heart Association guidelines reserve ASA for elderly patients and patients with serious comorbidities. Information on long-term age-specific outcomes after ASA is scarce.

METHODS This cohort study included 217 HCM patients (age 54 ± 12 years) who underwent ASA because of symptomatic left ventricular outflow tract obstruction. Patients were divided into young (age ≤55 years) and elderly (age >55 years) groups and matched by age in a 1:1 fashion to nonobstructive HCM patients.

RESULTS Atrioventricular block following ASA was more common in elderly patients (43% vs. 21%; $p = 0.001$), resulting in pacemaker implantation in 13% and 5%, respectively ($p = 0.06$). Residual left ventricular outflow tract gradient, post-procedural New York Heart Association functional class, and necessity for additional septal reduction therapy was comparable between age groups. During a follow-up of 7.6 ± 4.6 years, 54 patients died. The 5- and 10-year survival following ASA was 95% and 90% in patients age ≤55 years and 93% and 82% in patients age >55 years, which was comparable to their control groups. The annual adverse arrhythmic event rate following ASA was 0.7%/year in young patients and 1.4%/year in elderly patients, which was comparable to their control groups.

CONCLUSIONS ASA is similarly effective for reduction of symptoms in young and elderly patients; however, younger patients have a lower risk of procedure-related atrioventricular conduction disturbances. The long-term mortality rate and risk of adverse arrhythmic events following ASA are low, both in young and elderly patients, and are comparable to age-matched nonobstructive HCM patients. (J Am Coll Cardiol Intv 2016;9:463-9) © 2016 by the American College of Cardiology Foundation.



Septal Ablation or Not?

Things to remember ...

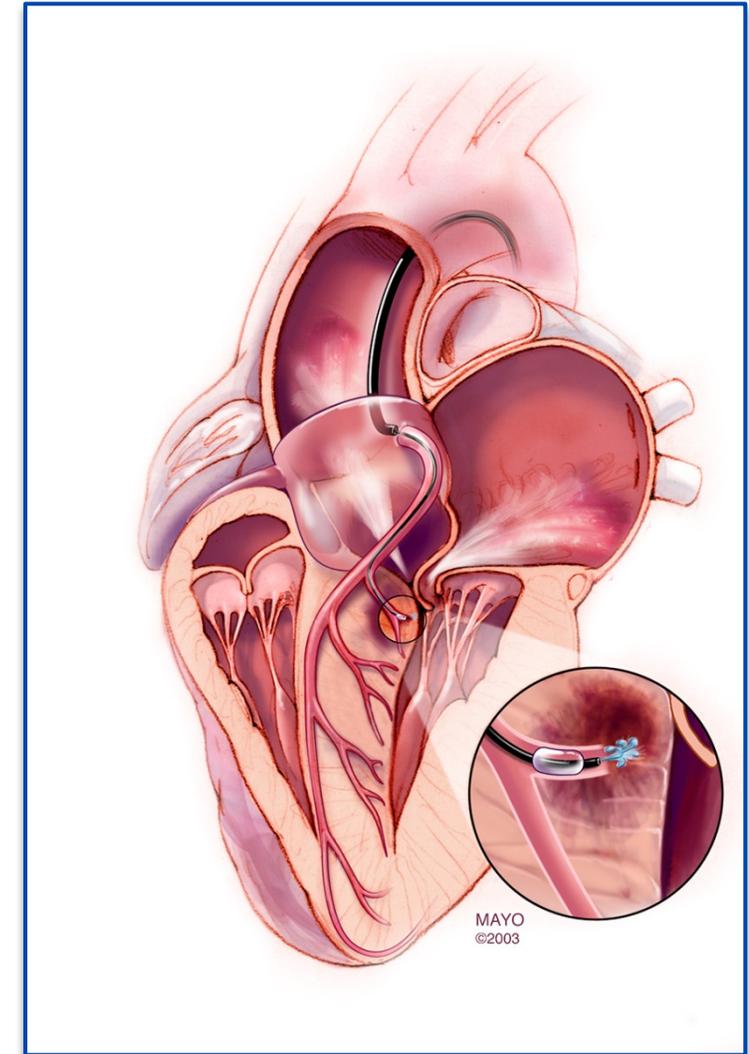
- Dynamic obstruction, no mitral disease
- Degree of septal hypertrophy
- Risk of pacemaker
- Efficacy good but less than myectomy in experienced centers

Alcohol Ablation Tips for Vessel Selection

- Use LAO cranial to confirm septal distribution
- Keep in mind 1st septal perforator may arise from ramus, diagonal or even PDA
- Always perform selective contrast injection in vessel prior to ablation
- Check for papillary muscle involvement by TTE
- Multiple vessels may require ablation to achieve extended septal reduction

Hypertrophic Cardiomyopathy Hemodynamic Pearls

- Invasive hemodynamic assessment is important for multiple levels of obstruction
- Aortic pressure contour and change post PVC is key to diagnosis
- Pharmacologic maneuvers combined with left ventriculography are highly useful to confirm etiology and severity of mitral regurgitation





Questions & Discussion

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