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Pregnancy and Heart Disease

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No disclosures

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ESC GUIDELINES

ESC Guidelines on the management of cardiovascular diseases during pregnancy

The Task Force on the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC)

Endorsed by the European Society of Gynecology (ESG), the Association for European Paediatric Cardiology (AEPC), and the German Society for Gender Medicine (DGesGM)

Regitz-Zagrosek V, Lundqvist C, Borghi C, et al.

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Pregnancy and the Heart

- 2% of pregnancies involve maternal CV disease
- CV disease does not preclude pregnancy but poses ↑ risk to mother and fetus

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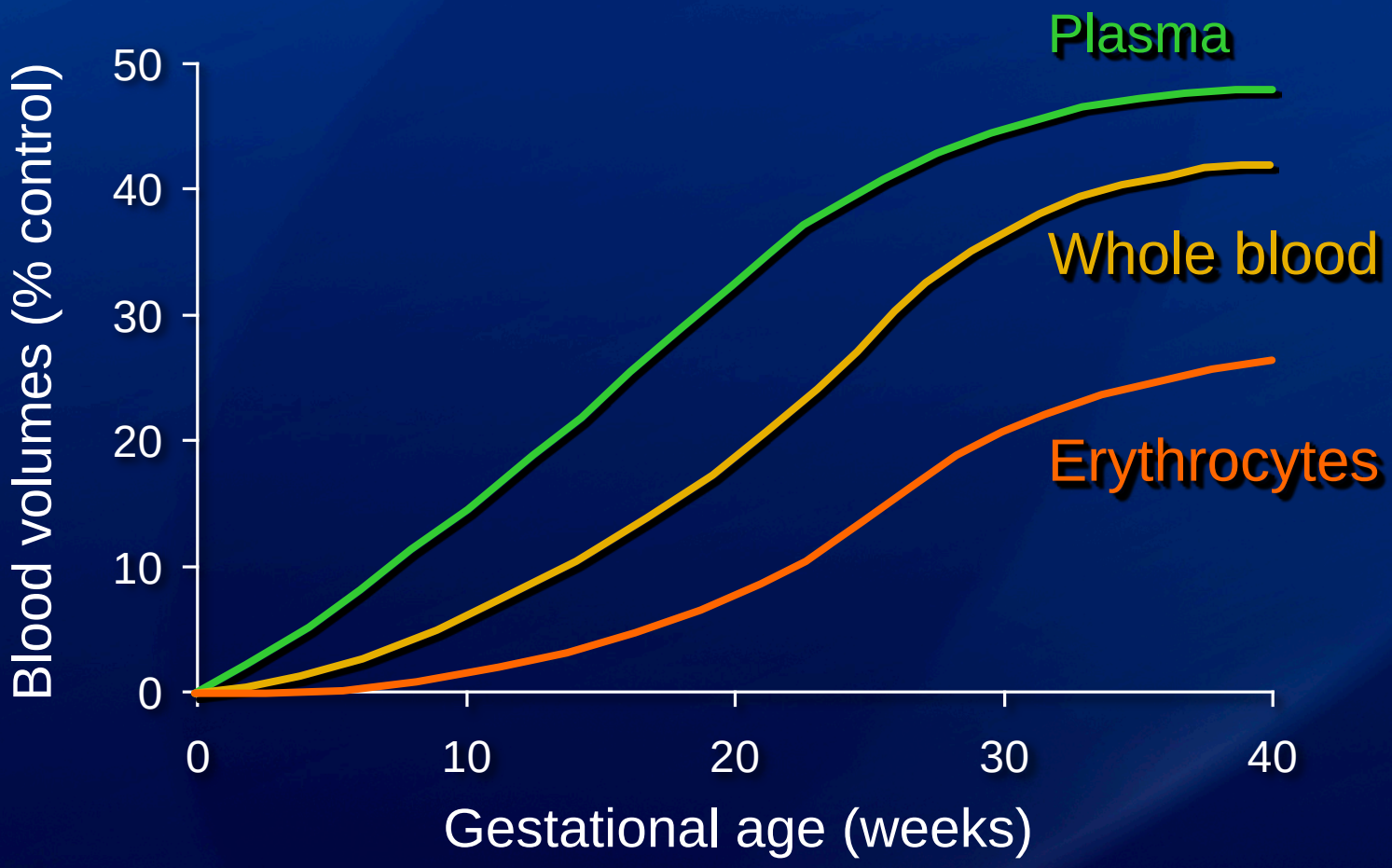
Pregnancy
Physiologic Changes



Am J Physiol 1983

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Hemodynamic Changes

- >40% ↑ in blood volume
- ↓ in SVR and PVR
- ↑ in HR

30% ↑ CO

- Little change in BP

Usually well tolerated

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Hemodynamic Changes
Labor and Delivery

- CO ↑ 60-80%

  HR and BP changes

- Volume changes

  ↑ blood volume with uterine contraction

  ↑ venous return

  Volume loss during delivery

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Advise Against Pregnancy

- Severe pulmonary arterial HT
- Severe obstructive lesions
  AS, MS, PS, HCM, Coarct

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Advise Against Pregnancy

- Severe pulmonary arterial HT
- Severe obstructive lesions
  AS, MS, PS, HCM, Coarct
- Ventricular dysfunction
  Class III or IV CHF, EF <40%
  Prior peripartum cardiomyopathy
- Dilated or unstable aorta
  Marfan with aorta ≥40-45 mm
- Severe cyanosis

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Heart Disease in Pregnancy

- Prepregnancy evaluation
- Pregnancy

  Multidisciplinary care
- Peripartum

  OB, anesthesia, IE prophylaxis
- Postpartum

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Peripartum Cardiomyopathy

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35-Year-Old Female

- Progressive dyspnea 3 weeks post partum
- 1st pregnancy
- Previously asymptomatic – no CV history
- Exam – JVP of 13 cm
  Diffuse apical impulse, gr 2 apical HSM
  S3 and S4 at apex
  Crackles both lung bases
- ECG – sinus tachycardia

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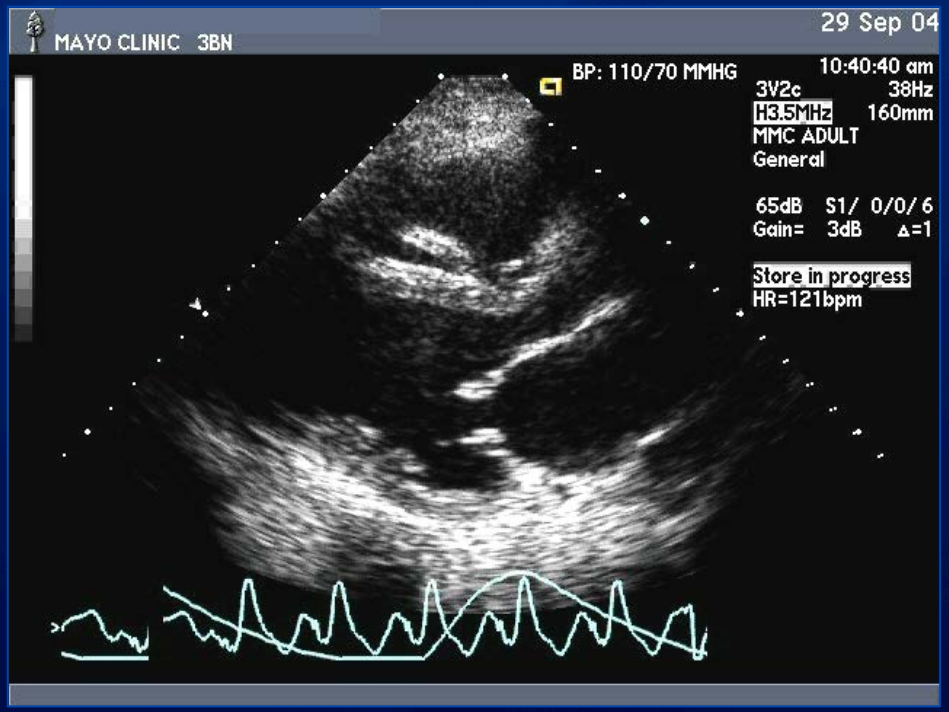
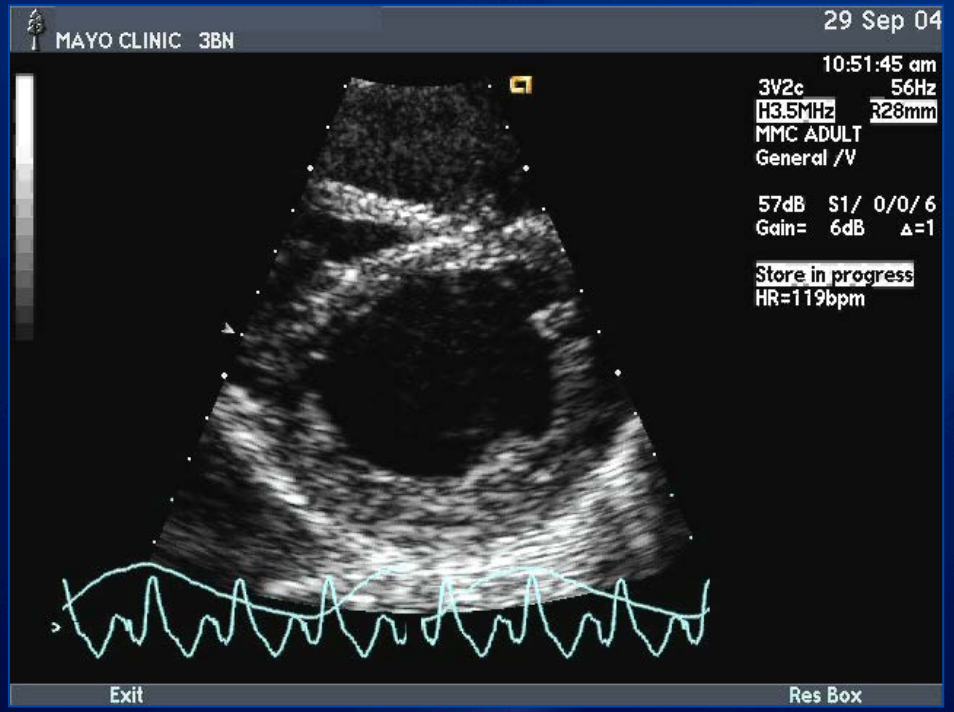
35-Year-Old Female





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35-Year-Old Female

- Progressive CHF symptoms despite diuretics, digoxin, ACE inhibitor, beta-blocker, warfarin
- Echo – global LV dysfunction, EF 25%
- Symptoms persist, SBP 100 mmHg

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What would you suggest next?

- Bromocriptine

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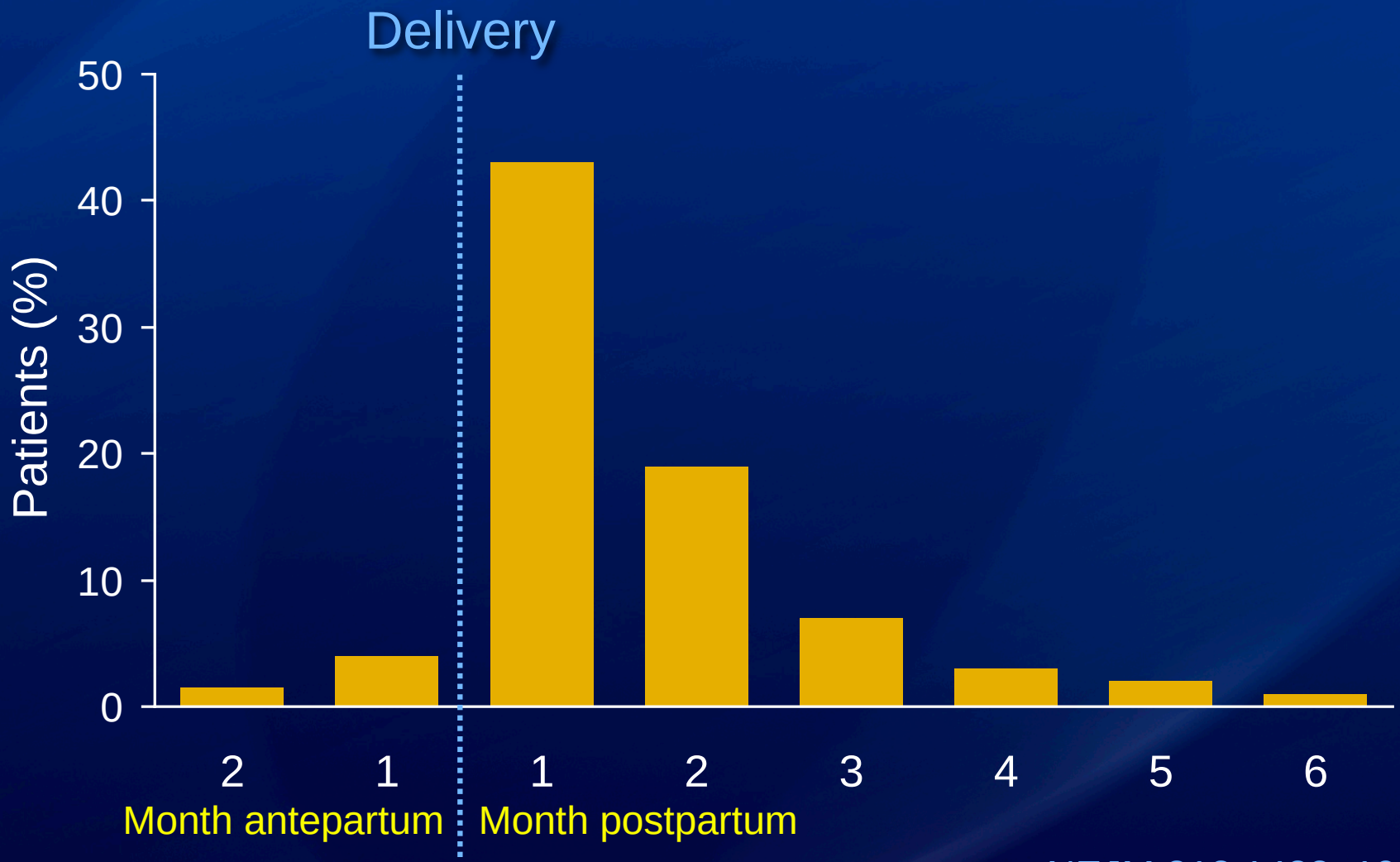
Peripartum Cardiomyopathy



NEJM 312:1432, 1985

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Peripartum Cardiomyopathy

- New diagnosis of HF due to LV dysfunction
  - Last trimester → 6 mos postpartum
  - Diagnosis of exclusion
- Incidence varies

U.S.	1 in 3200 deliveries (1350/year)
South Africa	1 in 1000
Haiti	1 in 300

- ↑ frequency

Age >30 yr	Tocolytic
Multifetal pregnancy	Black women
Multiparity	HT, DM, smoking

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Elkayam: JACC, 2011

Peripartum Cardiomyopathy
Pathophysiology

- Defective antioxidant defense mechanism

  Prolactin/bromocriptine

- Viral infection
- Autoimmune response
- Genetic susceptibility

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Sliwa et al: Eur J Heart Fail, 2010

Peripartum Cardiomyopathy
Defective Antioxidant Defense Mechanism

- Due to oxidative stress
  - ↑ levels of activated cathepsin D
  - ↑ total prolactin and angiostatic 16 kDa prolactin
- Inhibits endothelial cell proliferation and migration, induces apoptosis, disrupts capillary structures, promotes vasoconstriction and impairs cardiomyocyte function
- Suppression of prolactin production by bromocriptine, prevents onset of PPCM in mouse

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Sliwa et al: Circulation, 2010

Peripartum Cardiomyopathy
Management

- Standard CHF Rx – O_2, ACE, diuretic, iv NTG
  inotrope for ↓ CO
- Bromocriptine - blocks prolactin release
  ↑ EF in PPCM vs standard Rx
  2.5 mg BID for 2 wk, then 2.5 mg QD for 6 wks with standard HF therapy
- Anticoagulation for EF <35%, or bromocriptine
- VAD or transplantation

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Peripartum Cardiomyopathy
Prognosis

- Variable
- Major cause of preg related death in US
- Mortality 6 mos and 2 yr $\rightarrow$ 10 and 28%

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Sliwa et al: Eur J Heart Fail, 2010

Peripartum Cardiomyopathy
Prognosis

- Variable
- Major cause of preg related death in US
- Mortality 6 mos and 2 yr → 10 and 28%
- ↑ mortality with ↓ EF >6 mos postpartum
- ~50% improve in 6 months
- 20-40% normalize EF
- Recurrence with recurrent pregnancy

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Sliwa et al: Eur J Heart Fail, 2010

CHF in Pregnancy

- Conservative – ↓ salt, bedrest
- Limited medical therapy

  Digoxin, hydralazine

  Diuretic if necessary
- Aldosterone antagonists

  Antiandrogenic effect in first trimester

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Cardiac Drugs in Pregnancy

ACE Inhibitors – contraindicated in pregnancy

- 30% fetal morbidity with administration after week 14
  Fetal renal tubular dysplasia, neonatal renal failure
  Oligohydramnios, ↓ cranial ossification, IUGR

Cooper et al: N Engl J Med 2006

- 1st trimester ACE ↑ risk of congenital malformations
  ↑ CV and CNS malformations
- AT II blocker – contraindicated
- Safe during lactation

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Genetic/Aortic Disorders in Pregnancy

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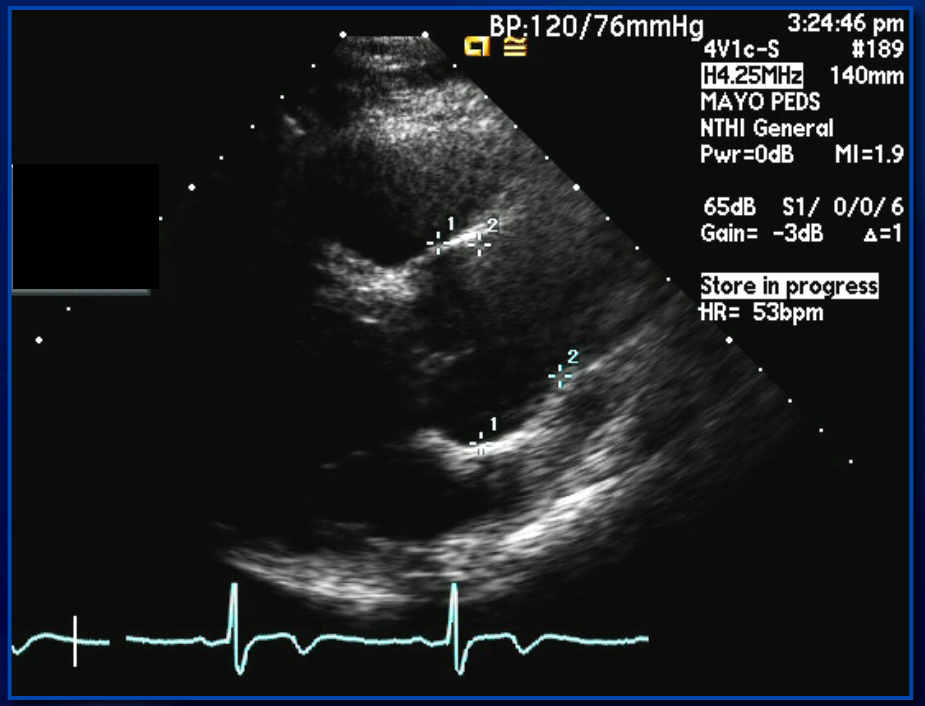
20-Year-Old Female

- Pre-pregnancy counseling
- FH of Marfan, dissection, ectopia lentis
- Asymptomatic

  Ao root 41 mm



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What would you recommend?

Avoid pregnancy

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Pregnancy in Marfan

- Preexisting medial changes
- Changes with pregnancy
  Physiologic, hormonal
- Unpredictable maternal risk
  Dissection, rupture, IE, CHF
- Fetal - 50% inheritance (AD)
- Oxytocin – implicated in dissection

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Preconceptual Counseling

In addition to routine obstetric screening

- Detailed CV history, FH, medications and exam
- Echo – aorta and valves
- Aortic imaging

  Aorta >45 mm → no pregnancy

  Aorta ≤40 mm → reasonable if low risk

  Aorta 40-45 mm → individualize
- Genetics, prenatal diagnosis

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ESC GUCH Guidelines 2010

Pregnancy in Aortic Disorders
Recommendations

- During pregnancy
  - Beta-blocker, regular ao imaging (individualize)
  - Fetal echo
- Peripartum
  - Facilitated vaginal delivery
  - C-section for ao >40 mm or ↑ size
  - IE prophylaxis
- Postpartum FU - dissection risk persists
  - Future eval of lactation risk

Management similar with other aortic disorders

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Arrhythmias in Pregnancy

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29-Year-Old Female

29 weeks pregnant

- Presents to ED with palpitations and lightheadedness
- No past CV history
- BP 100/50, HR 160

  Alert

  No murmurs

  Lungs clear

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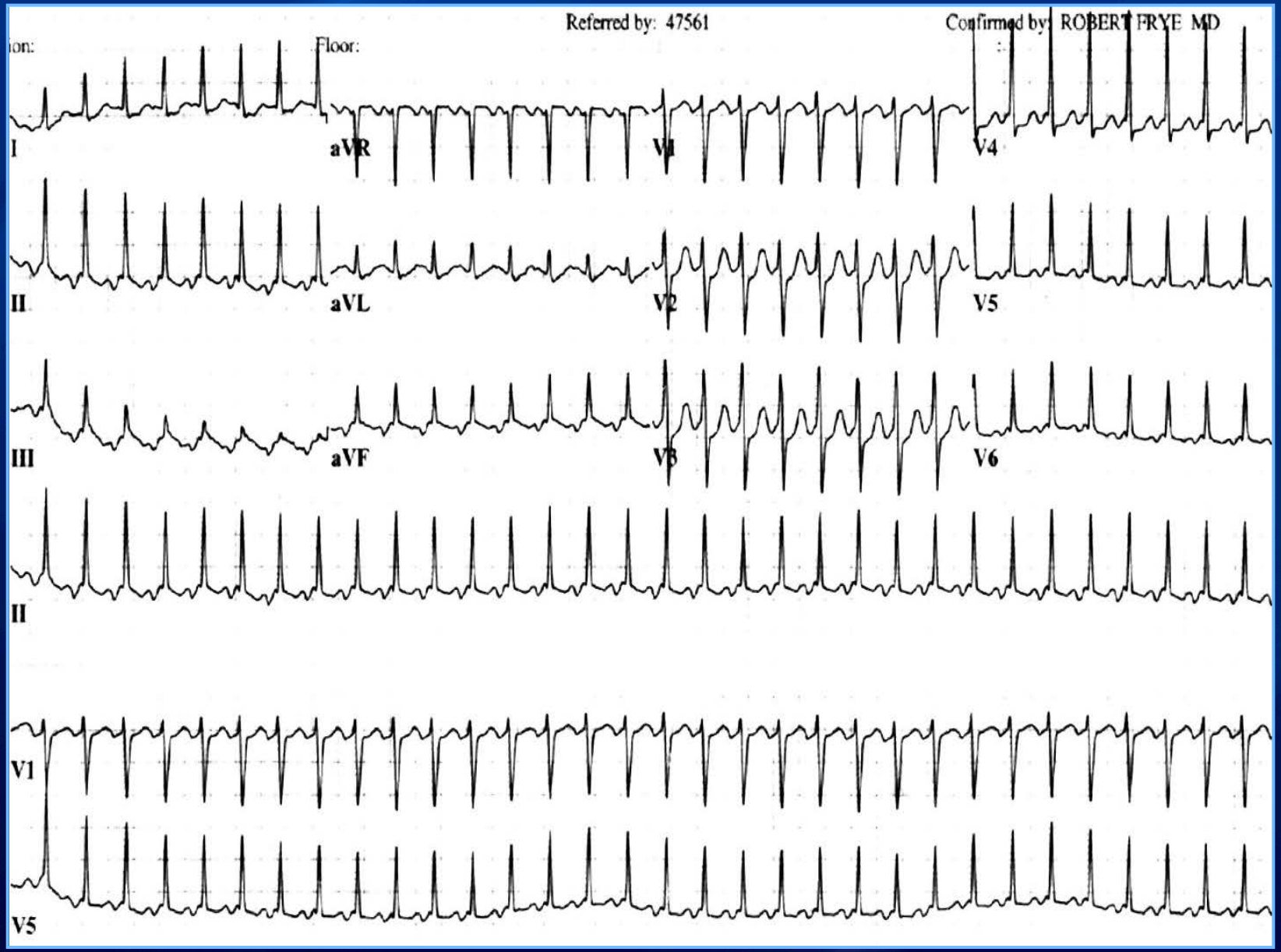

What would you recommend?

iv adenosine

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SVT in Pregnancy

- Hemodynamic compromise

  DC cardioversion – fetal ↓ HR/mortality

- Acute symptoms

  Adenosine - bradycardia

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Recurrent SVT in Pregnancy

- Beta blocker
- Calcium channel blocker
- Sotalol
- Flecainide
- Amiodarone - CI by manufacturer
  Monitor neonatal ECG and thyroid
  Excreted in breast milk
- Ablation

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Valvular Heart Disease in Pregnancy

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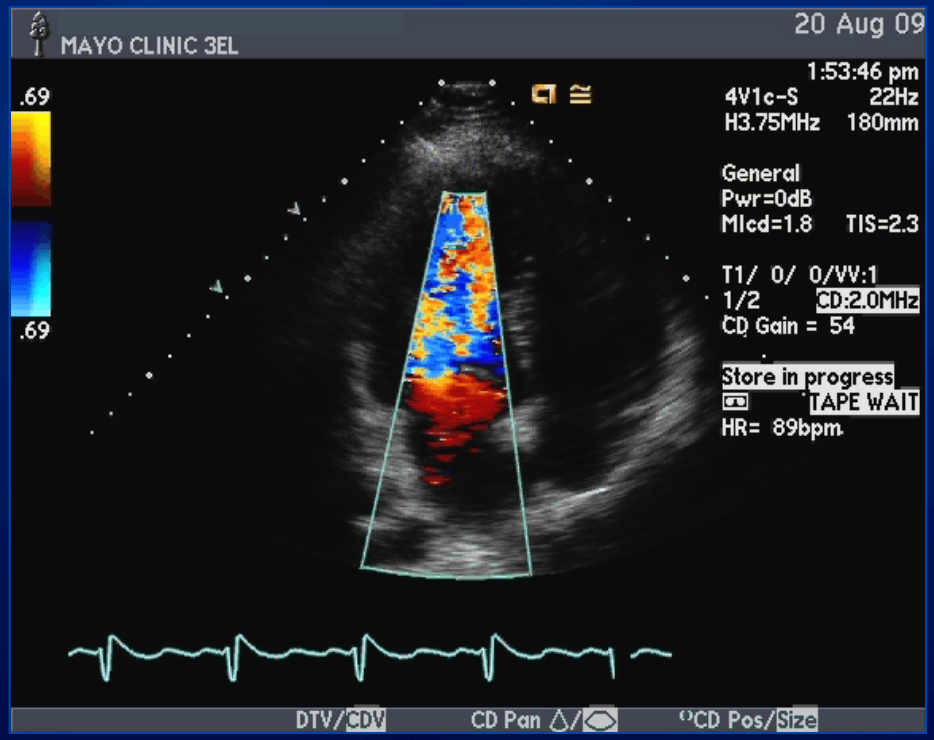
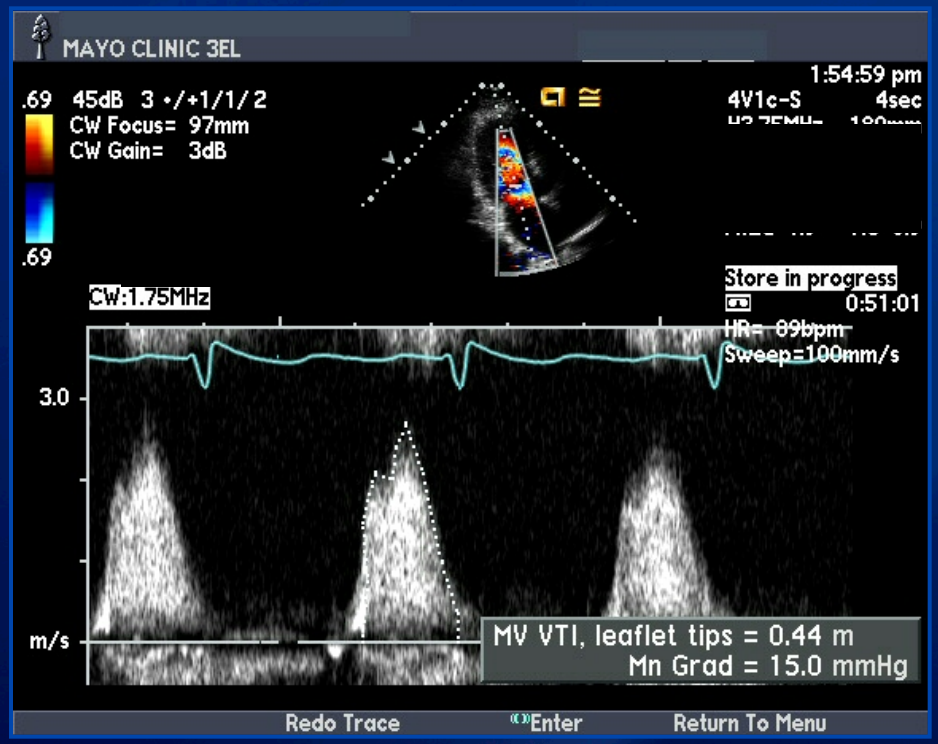
30-Year-Old Female

33 weeks pregnant, dyspnea





Mean gradient = 15 mmHg

What would you do next?

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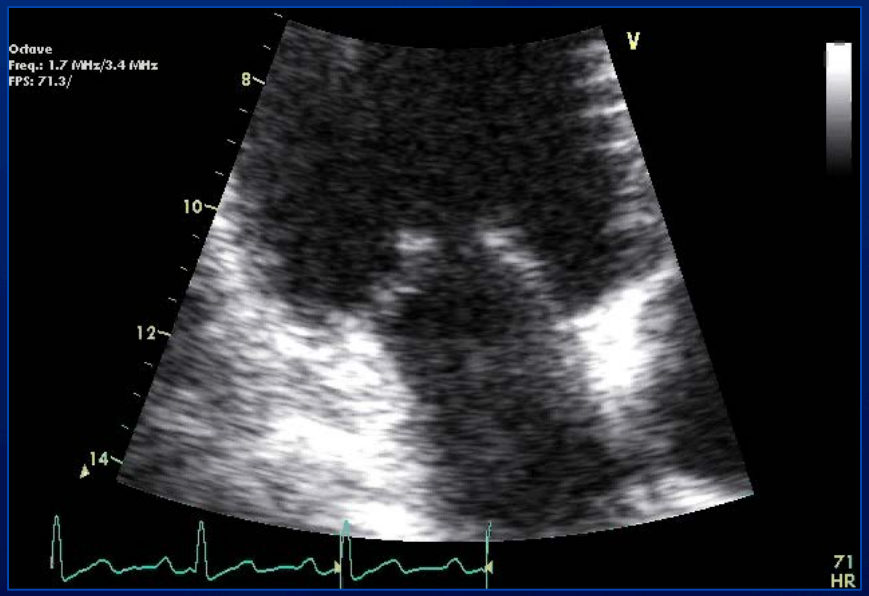
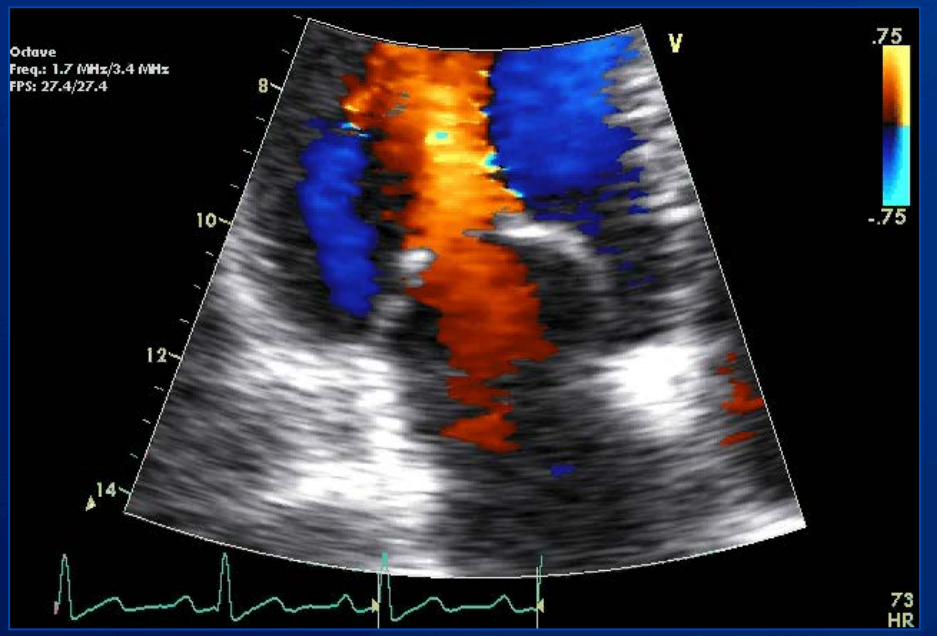
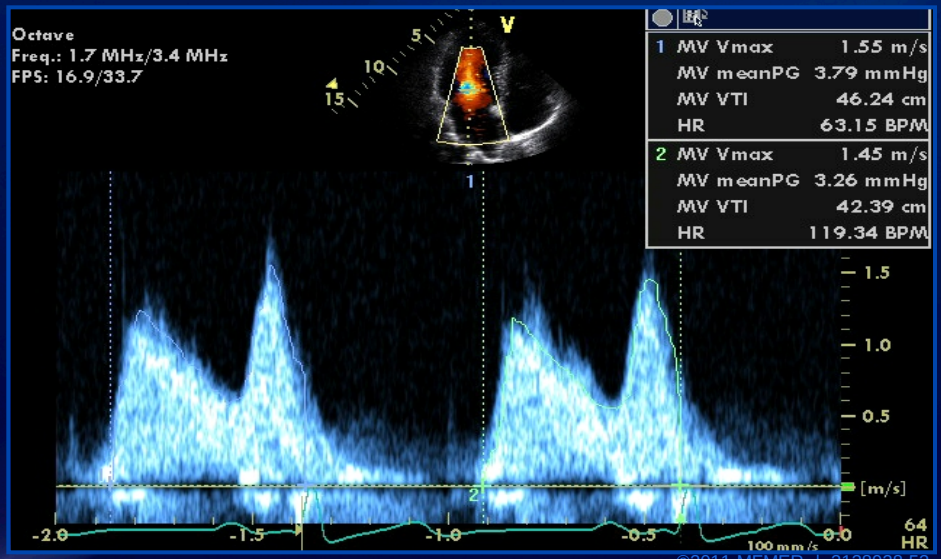
30-Year-Old Female
Beta-blocker







MG = 4 mmHg at HR 60

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Mitral Stenosis in Pregnancy

Further ↑ in LA pressure

AF → Pulmonary Edema

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Mitral Stenosis
Management in Pregnancy

β blockade, maintain NSR
Anticoagulation, diuretics

Balloon valvotomy
Surgical valvotomy or MVR

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Valve Surgery may be Required During Pregnancy

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VHD in Pregnancy
Tissue Prosthesis

- ↑ degeneration in young
- Reoperation risk
- Possible accelerated degeneration in pregnancy

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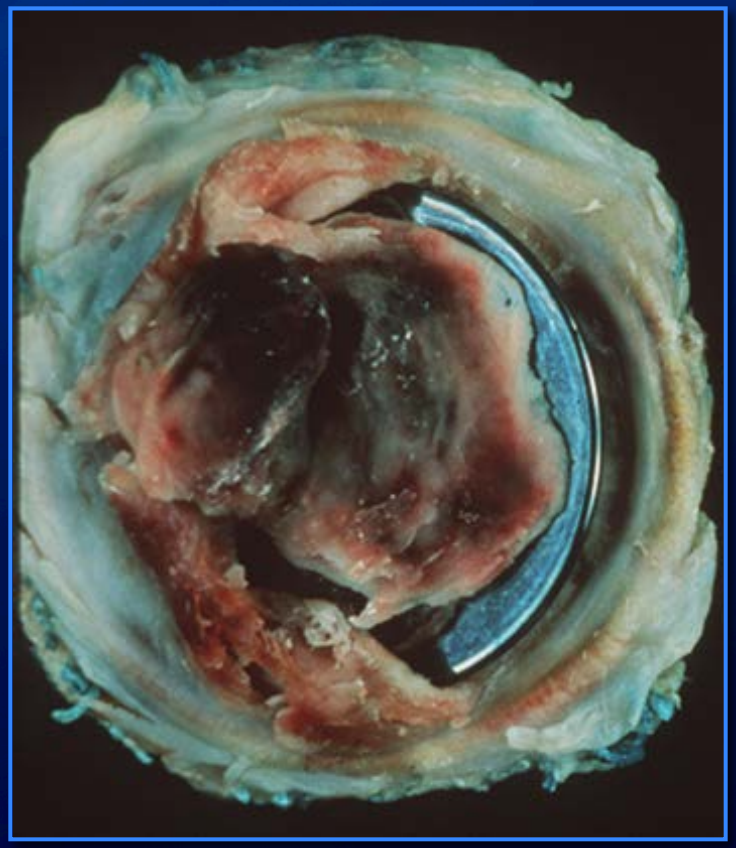
Anticoagulation in Pregnancy
Mechanical Prosthesis



- AC options suboptimal
- ↑ thrombosis risk
  - ↑ clotting factor, plt adhesion
  - ↓ fibrinolysis, prot S activity
- High mortality
- Limited options

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ESC VHD Guidelines
European Heart Journal 2012

- Warfarin favored AC therapy during 2nd and 3rd trimesters until the 36th wk
- Warfarin is favored during the first trimester if dose is <5 mg/24 hr, after patient approval
- Close AC monitoring advised when UFH used

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Pregnancy and the Heart

- CVD 1-2% of pregnancies
- CHD most common SHD
- Doesn't preclude pregnancy
- ↑ risk to mother and fetus
- Individual assessment

Preferably prior to conception

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Questions or Comments?

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