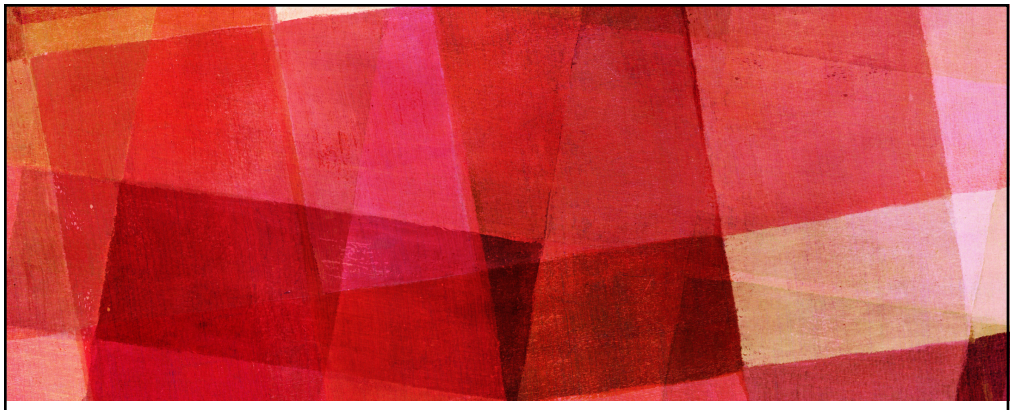
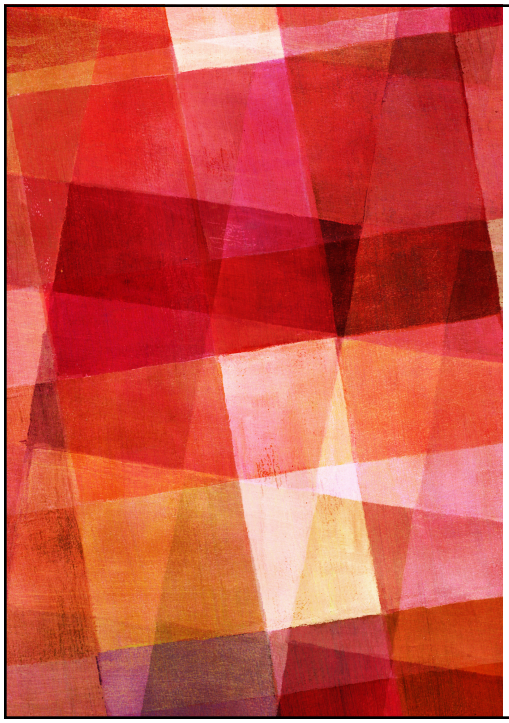


CARDIOVASCULAR COMPLICATIONS IN PREGNANCY: CHF VS. LOFT LESIONS

Carol J Harvey, MS, RNC-OB, C-EFM



DISCLOSURES

- I have no conflicts of interests to report with the content of this presentation.

Carol J Harvey

CARDIAC COMPLICATIONS IN PREGNANCY

- The MOST important factor in prognosis during pregnancy for women with structural cardiac disease is:
  1. Functional status
  2. Specific type of lesion
  3. Ejection fraction/echocardiogram findings
  4. Maternal age

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THE MOST COMMON CAUSES OF PULMONARY EDEMA IN PREGNANCY INCLUDE ALL OF THE FOLLOWING EXCEPT:

1. Iatrogenic fluid overload
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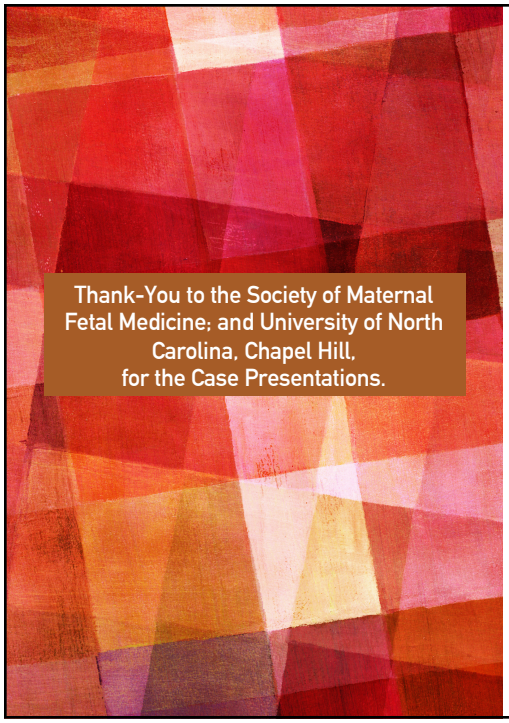


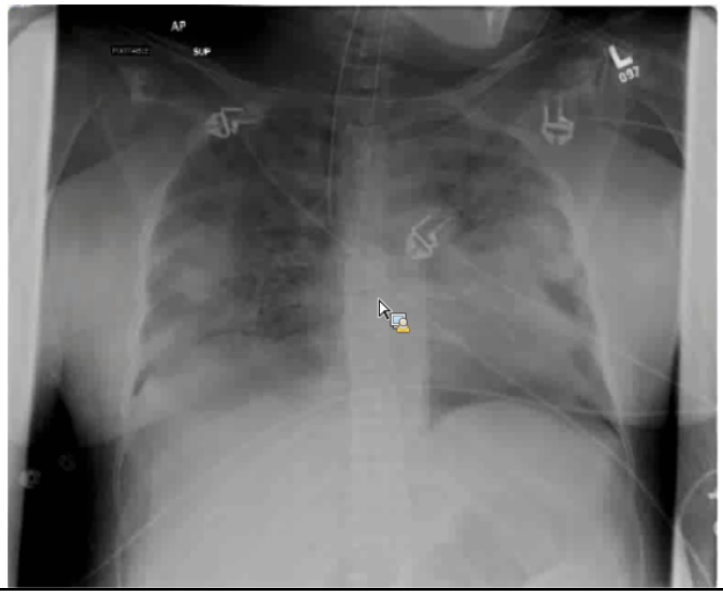
CASE STUDY #1

- 32 y.o. G2P0 @ 30 weeks
- CC: Productive cough, moderate shortness of breath, mild chest pain
- h/o lymphoma s/p radiation therapy
  - Resultant moderate mitral regurgitation
- ROS:
  - No fever, chills, +FM
  - Has baseline mild SOB with brisk walking / activity
- Family history - n/a

CASE STUDY #1 (CONT')

- Social negative hx
- Physical Exam:
  - BP 148/88, HR 106, RR 36, FHR 158
    - Chest: Decreased BS and rhonchi throughout
    - CV: slightly irregular HR, 2-3/6 systolic murmur
    - SpO2 87% on room air

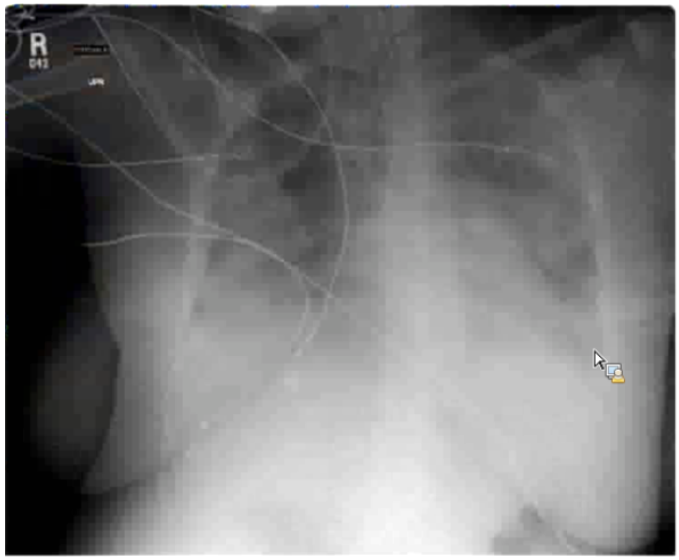
CHEST X-RAY



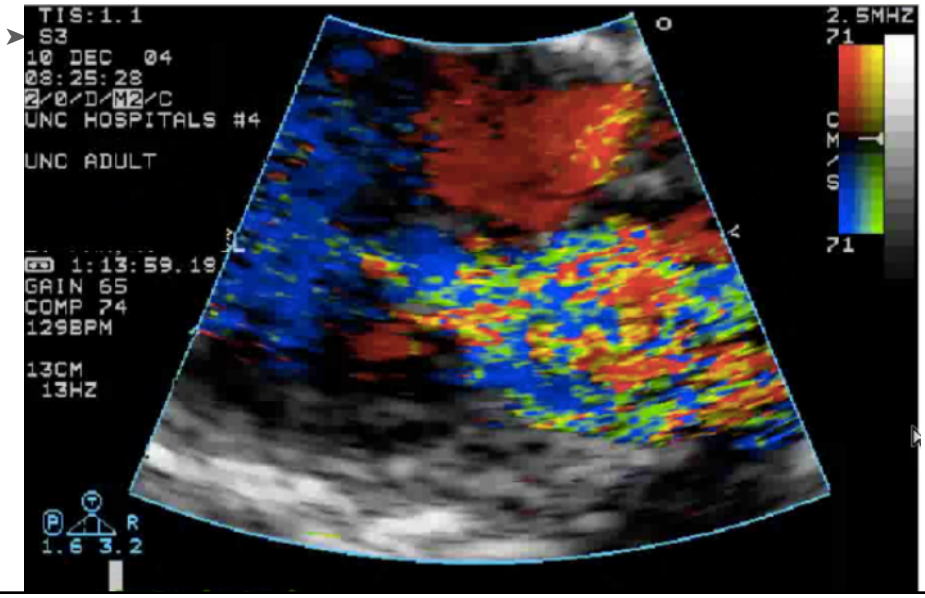
CASE STUDY #1 (CONT')

- Hospital Course
  - IV Lasix - multiple doses
  - Metoprolol - BP and rhythm control
  - Hydrazine - after load reduction
  - Transfer to CCU
  - HD 2 - return to MFM Unit
    - Remained stable with daily monitoring
    - Continued meds
  - At 2 weeks:

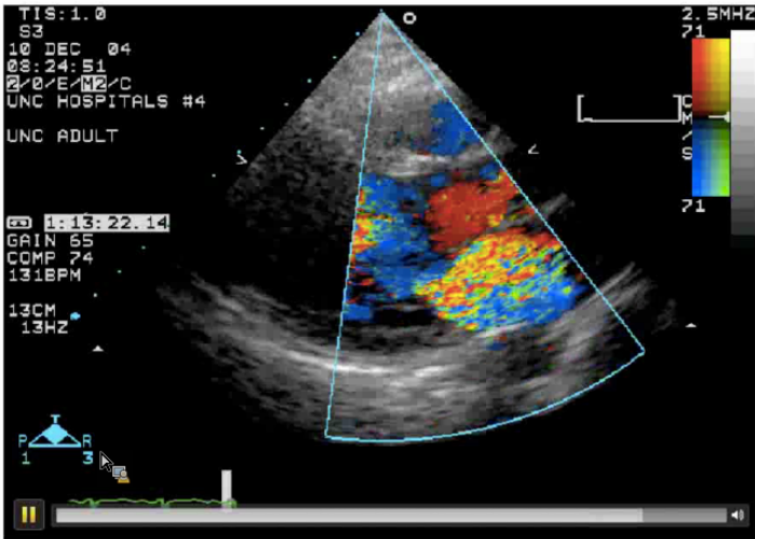
CHEST X-RAY



TT ECHO #1

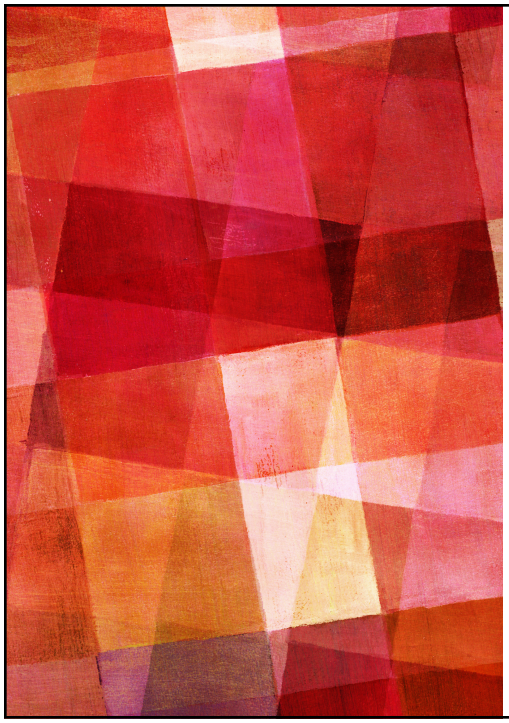


TT ECHO #2



HOSPITAL COURSE

- Pt returned to CCU
- Swan-Ganz catheter placed to guide fluid management
- Cesarean in main OR - to CCU post
- Accelerated recovery
  - Out of CCU on day 2
  - Home on day 5
  - Referred for value replacement



MFM PERSPECTIVES

- Pregnant women scare people
- Pregnancy women are almost an "entirely different species"
- Effective communication can save lives
- Effective care is TEAM based
- Obstetrician must remain at center of team
- Obstetrical issues don't disappear with delivery
  - Changes persist up to 12 weeks

THE BASICS . . .

- Major Physiologic Considerations
  - Blood volume increased 50 - 100%
    - Valvular and myocardial disease
  - SVR decreased 20%
    - R to L shunts; L heart obstruction
  - Blood is hypercoaguable
    - Low output states; A-Fib
  - Cardiac Output markedly fluctuates
  - Respiratory alkalosis
  - Delayed PP mobilization of fluids

CARDIAC OUTPUT – EFFECT OF AORTO-CAVAL SYNDROME

- Aorto-caval Compression
  - <23 weeks - No Change
  - 24 - 28 wks - Decrease by 8%
  - 29 - 32 wks - Decrease by 14%
  - 33 - term - Decrease by 25%

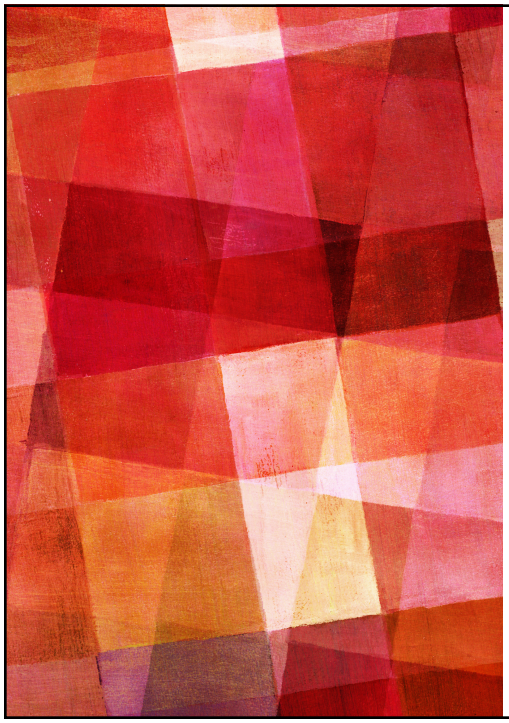
"SHOULD THIS WOMAN GET PREGNANT?"

➤NOPE

"SHOULD THIS WOMAN GET PREGNANT?"

- **N** - NYHA >II
- **O** - Left heart obstruction
  - (MV <2cm; AV <1.5 cm)
- **P** - Prior cardiac event
  - (Failure, dysrhythmia, TIA, stroke)
- **E** - EF < 40%

- Predictors vs. Risk
  - 0 factors - Risk 5%
  - 1 factor - Risk 27%
  - > 1 factor - Risk 75%!



FETAL RISKS

- Recurrence overall: 3 - 4 %
- Some higher
  - Marfan 50%
  - Aortic Stenosis 15%
  - Coarctation 14%
  - VSD 10-15%
  - Pulmonary Stenosis 7%

SPECIFIC LESIONS IN LABOR

- Decreased SVR = BAD!
  - **"CAT PIE"**
    - C - Coarctation
    - A - Aortic stenosis
    - T - Tetralogy (uncorrected)
    - P - Pulmonary hypertension
    - I - IHSS
    - E - Eisenmenger

WHO SHOULD NOT BE PREGNANT?

- Eisenmenger / pulmonary hypertension
- Marfan - aortic root > 4cm
- Coarctation with aneurysm or other lesion
- Cardiomyopathy
- Recent MI
- Uncorrected Tetralogy

MAJOR PRINCIPLES IN MANAGEMENT

- Optimize Cardiac Funciton
  - Preload
  - After load
  - Inotropes
- Rhythm prophylaxis or control
  - Cardioselective Beta-blocker or Ca Channel Blocker
- VTE prevention
- Collaboration with cardiology and anesthesiology
- SVD generally preferred
  - Exceptions: aneurysm, dilated Aortic root

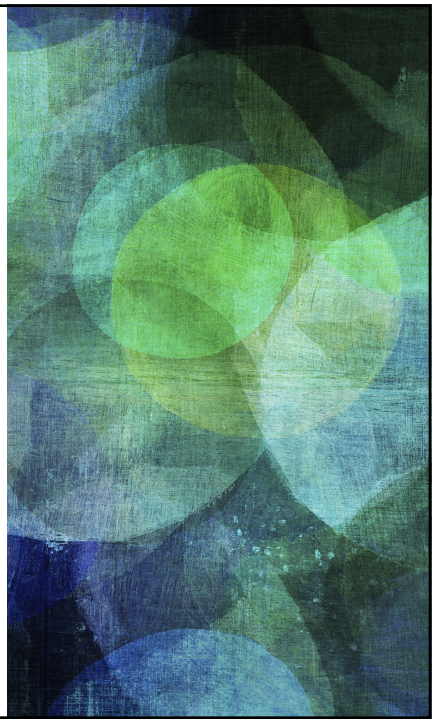
Case Study #2

BR 31 yo, Hispanic, G5P3 @ 30 wks

In FL - to urgent care - % Cough and SOB

Told she had URI - Rx. Azithromycin, Tussin, pseudophedrine

D/C'd to "I-95"



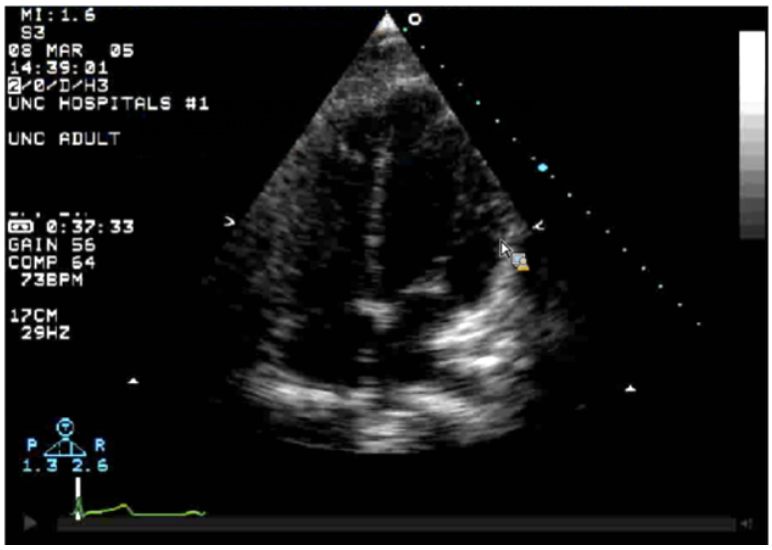
ONCE HOME…

- One week later, to ER with worse SOB
- O2 sat 84% on room air
- CXR - severe pulmonary edema
- EKG: low voltage tachycardia, frequent premature beats (? A-fib)

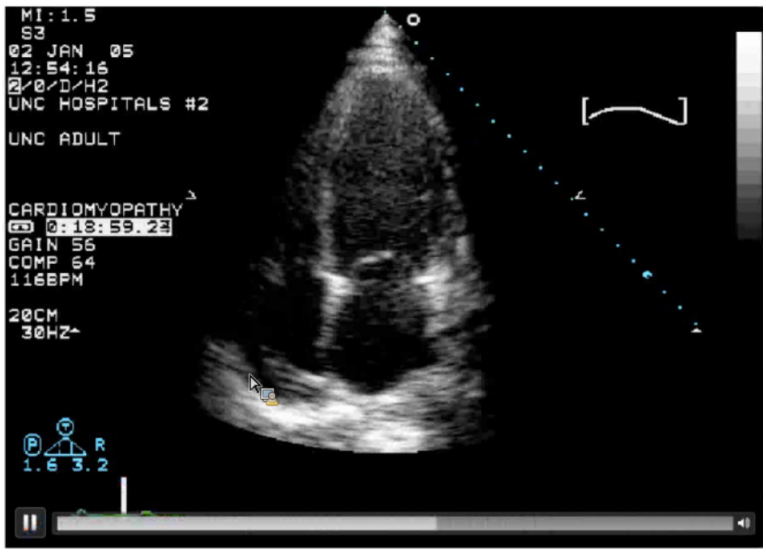
ADMISSION PROFILE

- Labored respirations @ 40+ / minute
- FHR 160+, minimal to moderate variability
- IV furosemide given, multiple 20 mg doses
- 100% O2 by face mask
- Echocardiogram ordered

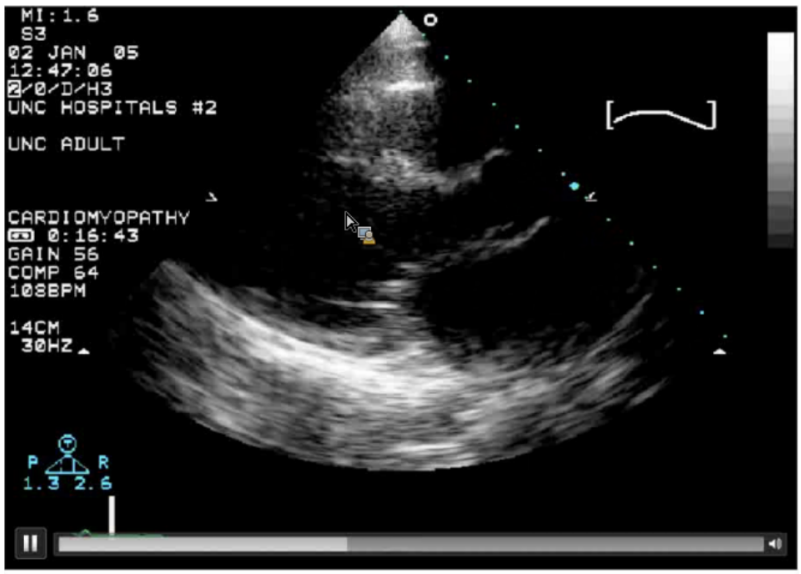
NORMAL 4 CHAMBER HEART



CASE STUDY #2 PPCM



CASE 2 (CONT')



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- Coarctation with aneurysm or other lesion
- Cardiomyopathy
- Recent MI
- Uncorrected Tetralogy

IN HOUSE

- Admitted to OB Special Care Unit
- Low dose metoprolol
- Scheduled hydrazine
- Lasix 60mg BID
- Lovenox 40mg BID
- NST 3x/day
- Continuous maternal heart monitor
- Echo:
  - Global hypokinesis, EF 15-20%
  - Pt. more comfortable

ANTEPARTUM COURSE

- Comfortable / asymptomatic
  - Asking to go home
- At 33+ weeks, worsening SOB and BP, more frequent dysrhythmias
  - CXR: worse pulmonary edema
- Induction of labor undertaken
- Vigorous male infant delivered

POSTPARTUM

- Transfer to CCU due to increasing dysrhythmias
- Oscillating course of pulmonary edema and dysrhythmias
- Rx: ACE inhibitor, hydrazine, Toprol*, Lovenox**, Lasix

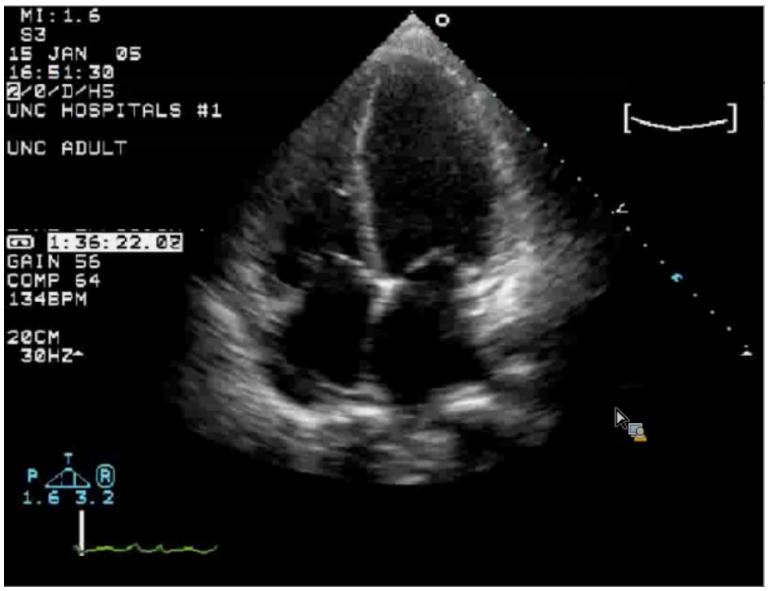
* **Toprol**-XL (metoprolol) is a beta-blocker that affects the heart and circulation (blood flow through arteries and veins). **Toprol**-XL is used to treat angina (chest pain) and hypertension (high blood pressure). It is also used to treat or prevent heart attack. (drugs.com)

** **Lovenox** (enoxaparin) is an anticoagulant that helps prevent the formation of blood clots.

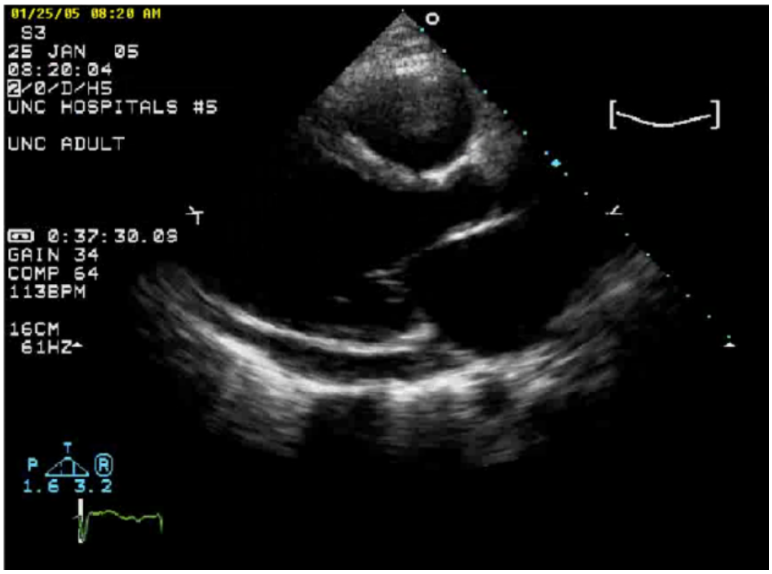
LATE POSTPARTUM

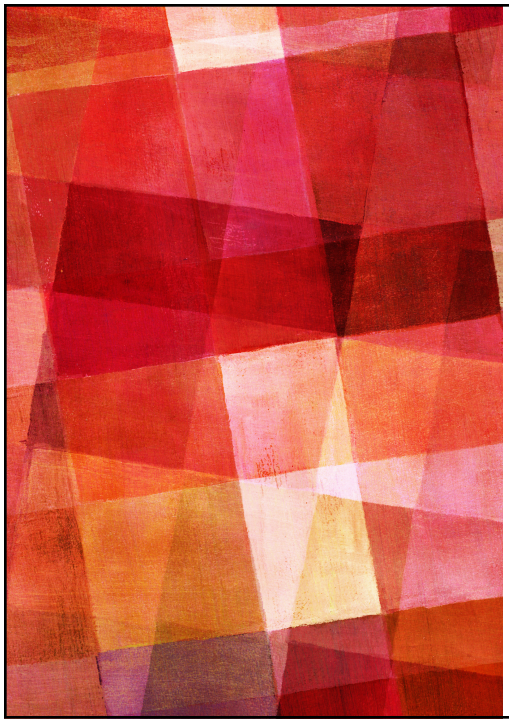
- Increasing dysrhythmias,refractory to beta blockade and amiodarone
- ICD placement and transplant discussed
- Worsening signs of heart failure

LATE PPCM – ECHO



END STAGE



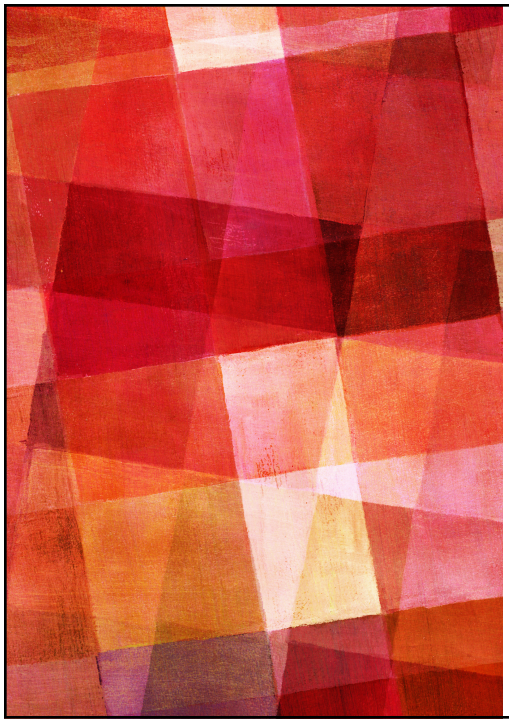


END STAGE DISEASE

- EF now <10%
- Atrial fibrillation >50% of the time
- PP Day 8, cardiopulmonary arrest, resuscitation unsuccessful
- Postmortem: Massive pulmonary embolus, myocardium consistent with myopathy

GENERAL

- Permpartum Cardiomyopathy (PPCM) is infrequent, but potentially fatal
  - Leading cause of pregnancy-related mortality in states adjacent to Georgia (ex: NC - 18 - 56%)
  - Mortality ratio 0.4 per 100,000 live births
  - Risk factors:
    - Multiparity
    - Advanced maternal age
    - African American race
    - Preeclampsia
  - Subsequent pregnancy: Decreased LVEF and increased risk of death



PPCM DEFINED

- NIH Consensus Workshop, 2000
- Cardiac failure in the last month of pregnancy to 5 months postpartum
- No identifiable cause
- No heart disease before last month of gestation
- LV systolic dysfunction

SUMMARY