



Constrictive Pericarditis

Never Confused with Anything Else

Jae K. Oh, MD

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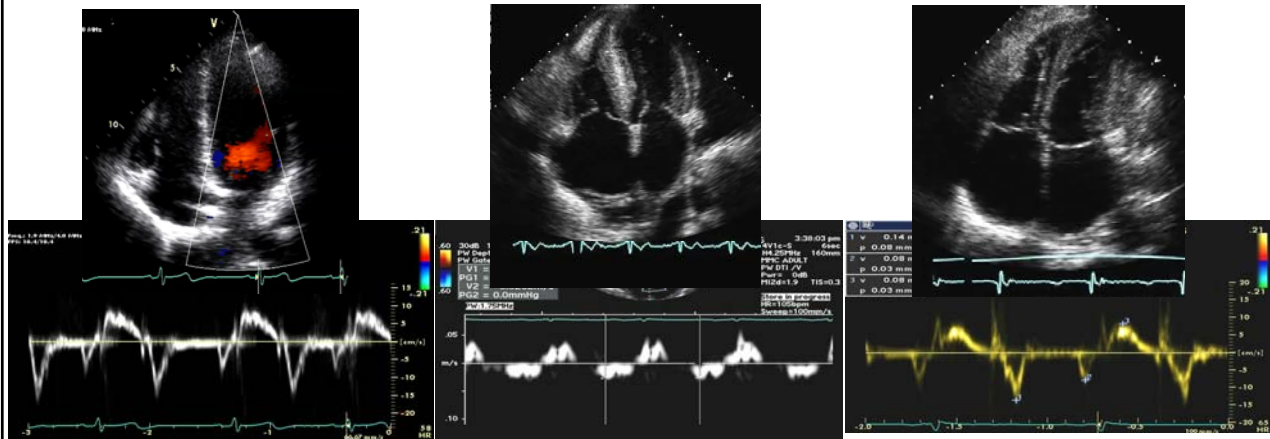
ARS #1 CP

Which of following patients has constrictive pericarditis?

1

2

3



Medial e' 13 cm/s

Medial e' 3 cm/s

Medial e' 14 cm/s



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Learning Objectives

Based on 9 Cases

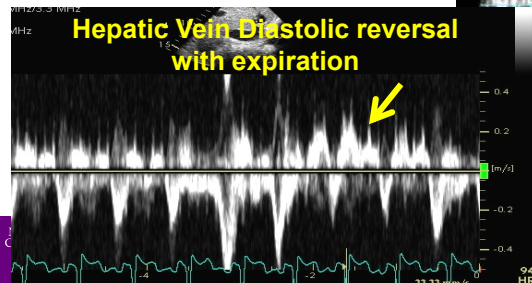
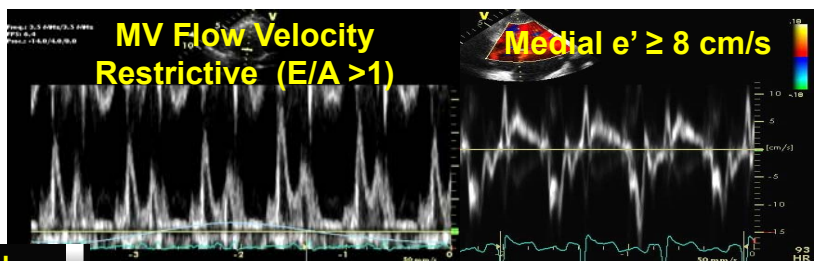
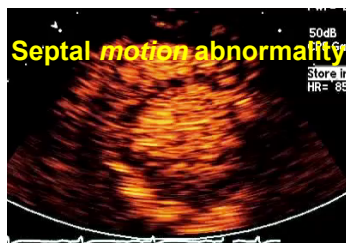
- Identify constriction easily by 4 parameters
 - Ventricular septal motion abnormality
 - Mitral inflow velocity \geq Grade 2
 - Mitral annulus medial $e' \geq 8$ cm/sec
 - Hepatic vein diastolic expiratory flow reversal
- Identify mimickers of constriction
 - Restrictive CM
 - Severe TR
 - Interventricular dependence of other causes



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Echocardiographic Diagnosis of Constrictive Pericarditis: Mayo Clinic Criteria
 Terrence D. Welch, Lieng H. Ling, Raul E. Espinosa, Nandan S. Anavekar, Heather J. Wiste, Brian D. Lahr, Hartzell V. Schaff and Jae K. Oh

Echo Diagnostic Criteria

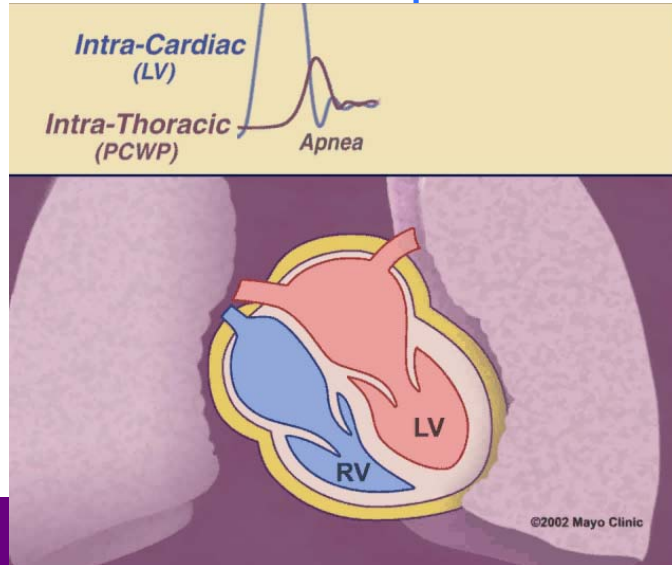


Sensitivity	87 %
Specificity	91 %

Welch et al Circ Imaging 2014

Hemodynamics in Constriction

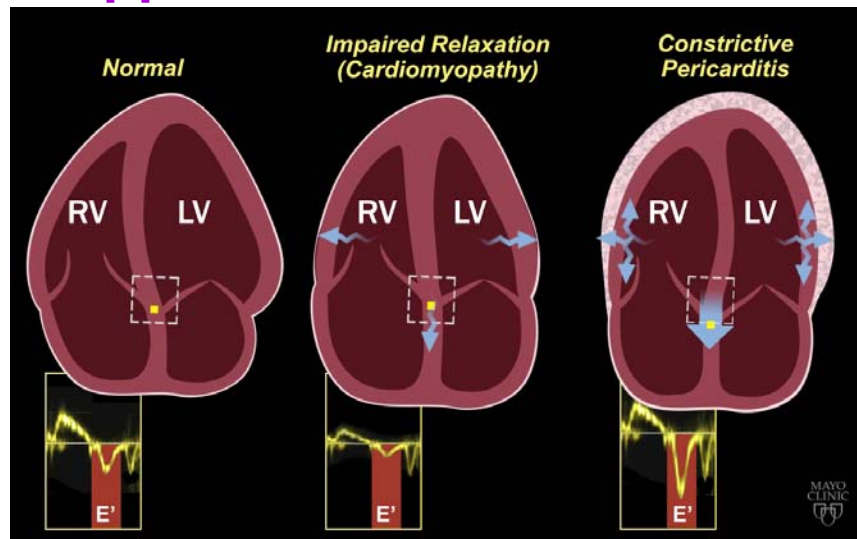
Intracardiac pressure Δ < intrathoracic pressure Δ
 Interventricular dependence



©2002 Mayo Clinic

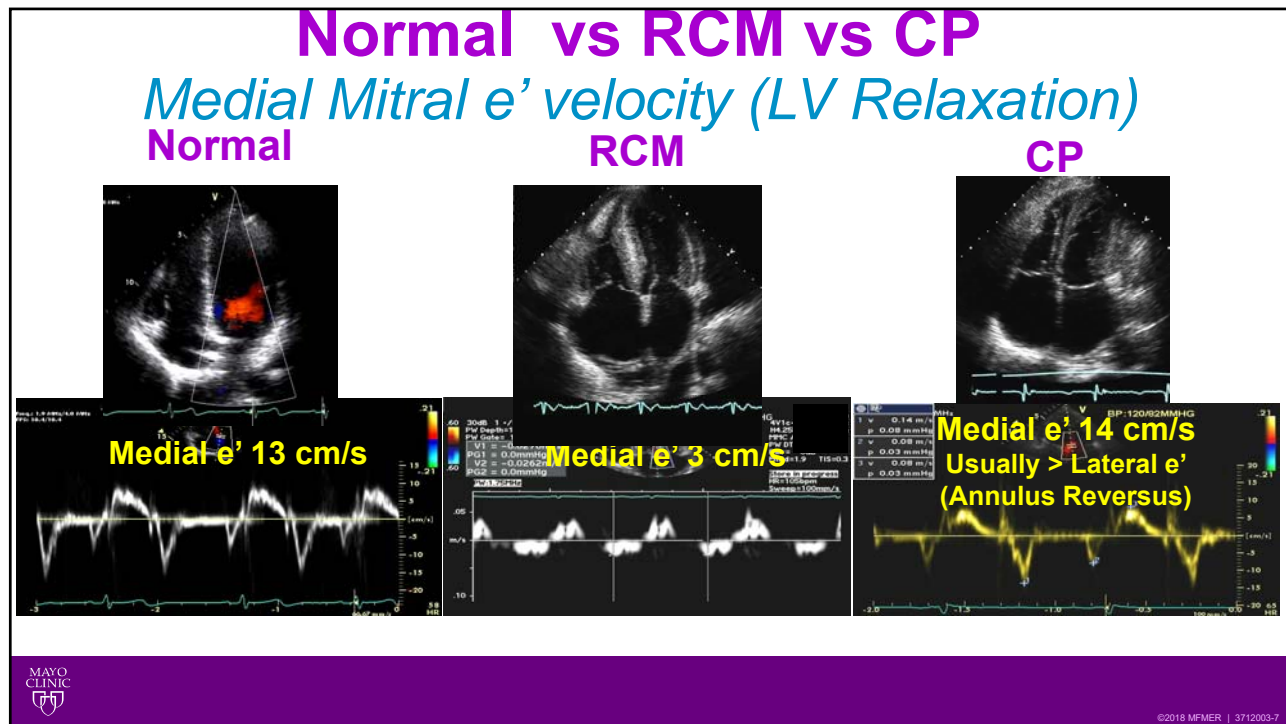
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Tissue Doppler in Constriction vs Restriction



E' normal to high in constriction, low in myocardial disease

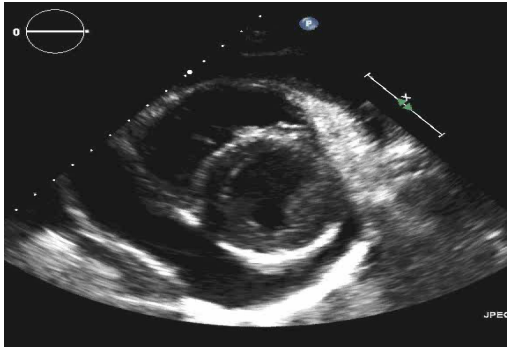
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Case # 1

27 yo man with fatigue and dyspnea

- Sep. 2015...Flu-like symptoms, treated with inhaler
- Oct. 2015...Pre-syncope and palpitation
 - Pericardial rub
 - Pericardial effusion on Echo
 - Treated with Ibuprofen 2400 mg/d
Colchicine 0.6 mg BID
- Not feeling better and CRP 60
- Underwent pericardial window

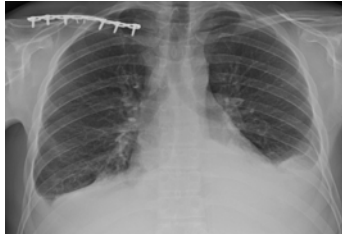


MAYO CLINIC

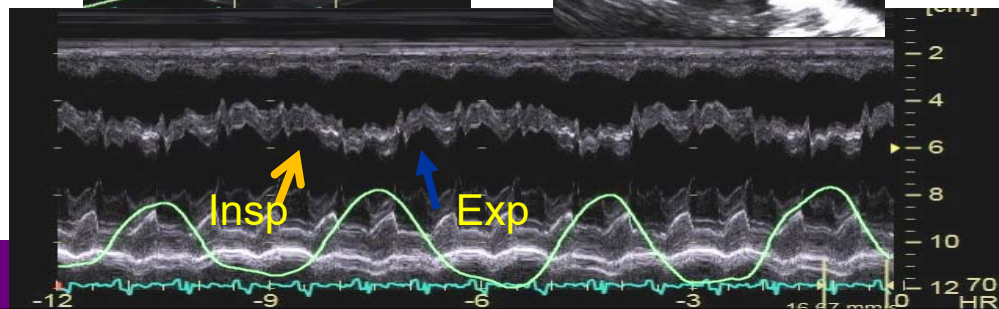
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27 year old man underwent a window *Referred to Mayo*

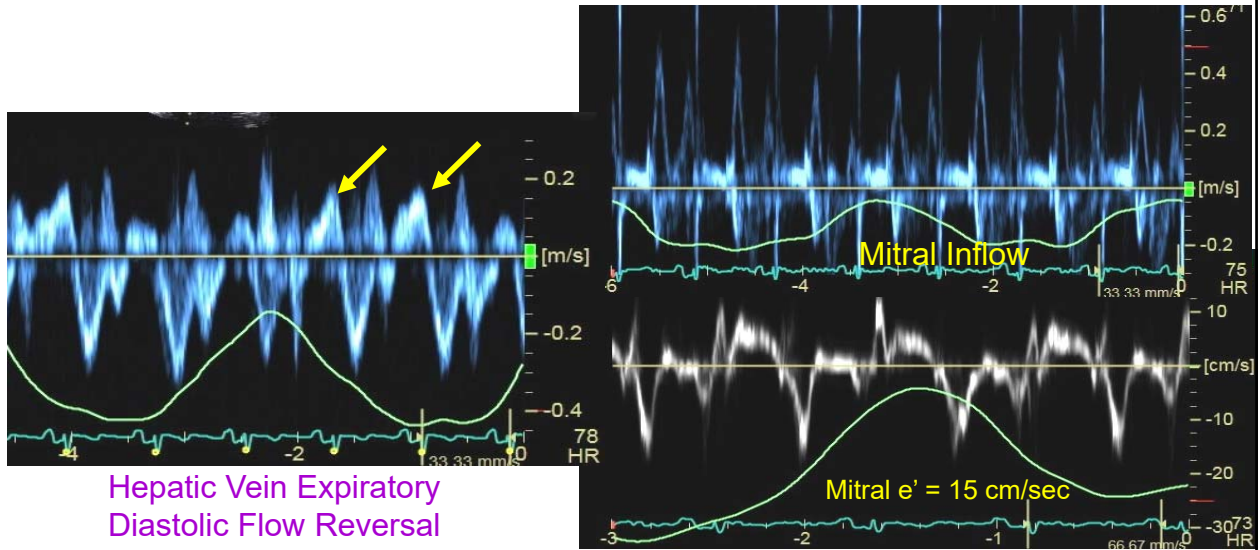
- Pericardial fluid ...studies were *negative*
- Not feeling better
- RUQ abdominal pain and fatigue
- U/S...Enlarged gallbladder and liver
- Consideration of cholecystectomy



Interventricular Dependence and IVC Plethora Constrictive Pericarditis



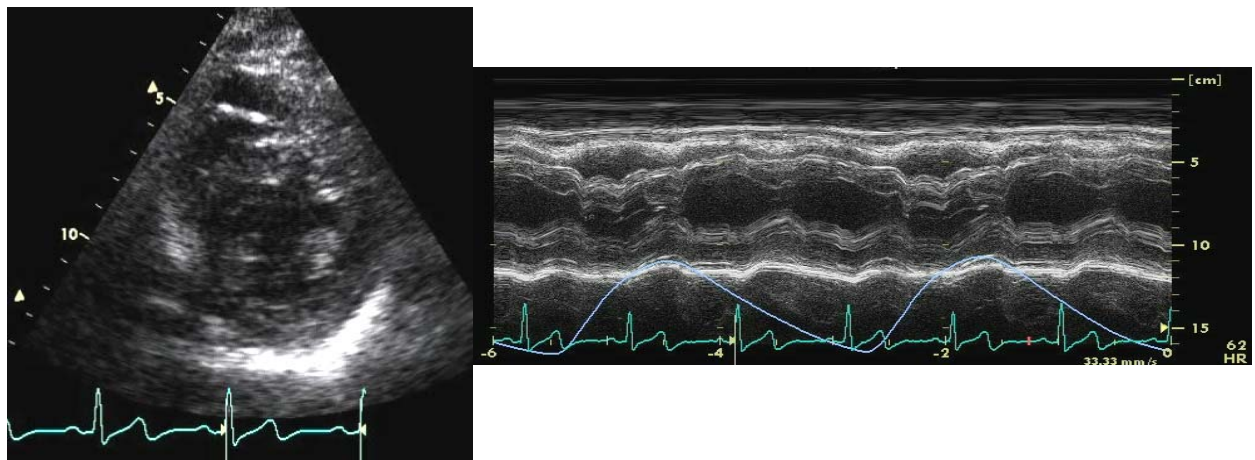
27 yo man after pericardial window



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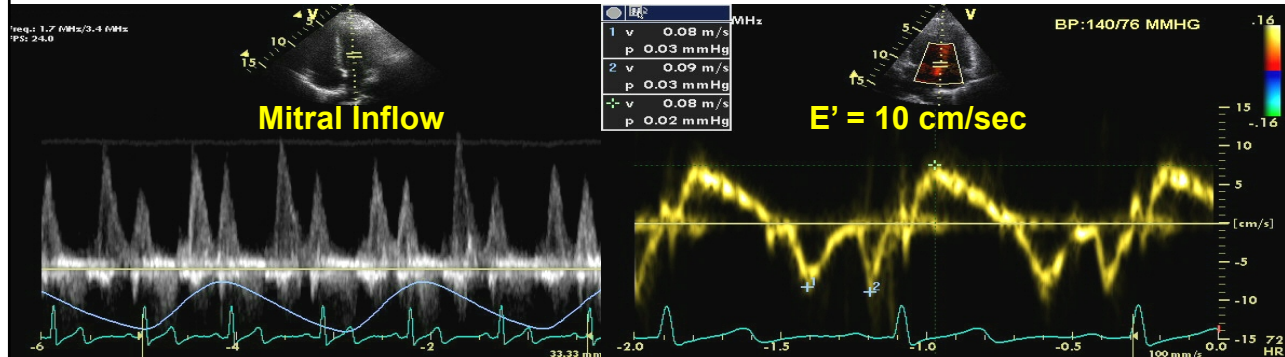
Case #2

A 27 yo woman with dyspnea Marked Septal Motion Abnormality



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A 27 yo woman with dyspnea Constrictive Pericarditis?

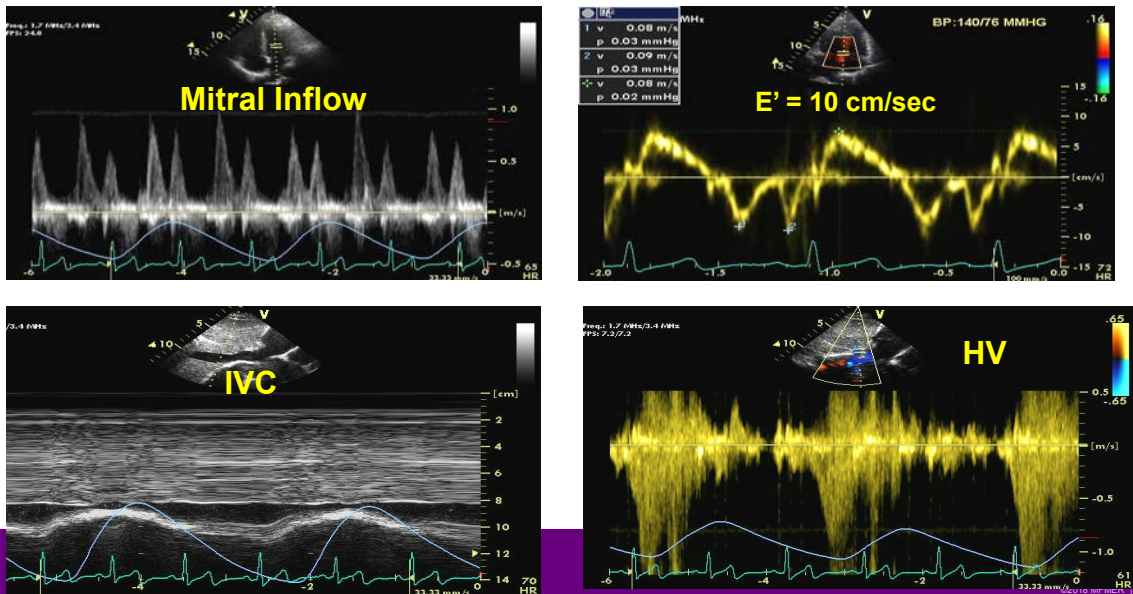


1. E' is increased
2. Septal motion abnormality
3. Mitral inflow variation



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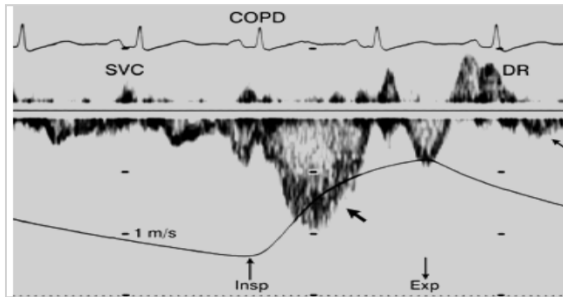
A 27 yo woman with dyspnea Pulsus Paradoxus with Asthma



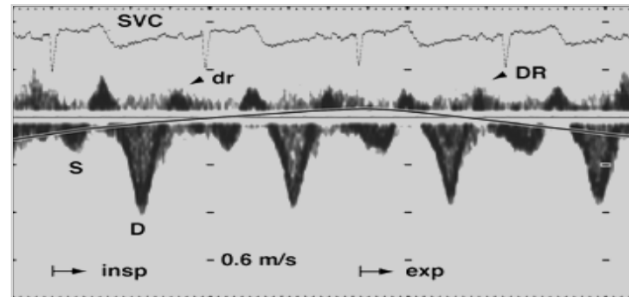
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Constrictive vs COPD/Asthma SVC Flow Velocities

COPD



Constriction



Boonyaratavej S, et al. J Am Coll Cardiol 1998 Dec; 32 : 2043-8

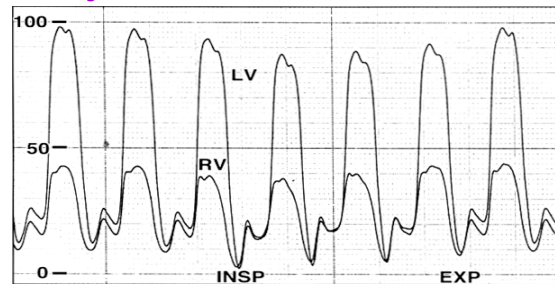


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71 year old man with dyspnea 2 years after CABG

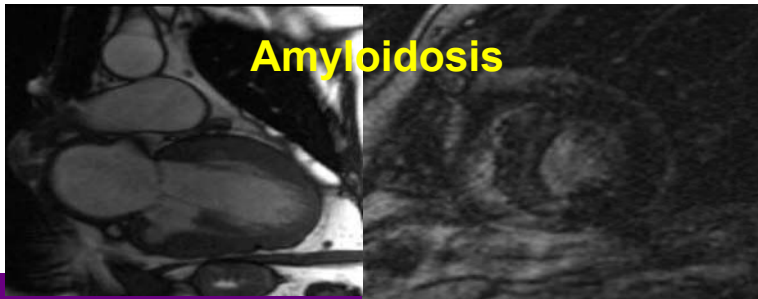
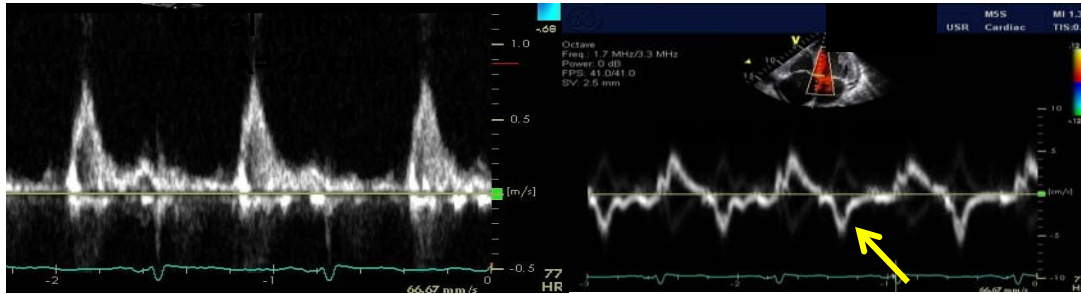
Case # 3

- Physical Examination
 - JVP elevation
 - Prominent S3
 - Peripheral edema
- Cath : Equalized end-diastolic pressures
- CT was obtained: Calcified Pericardium



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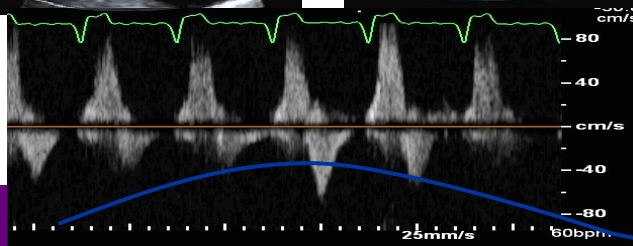
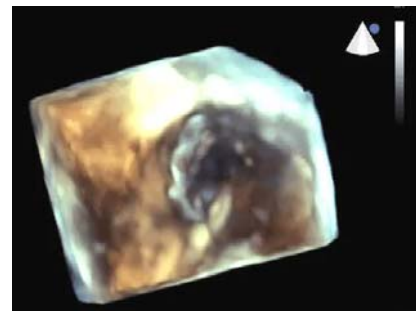
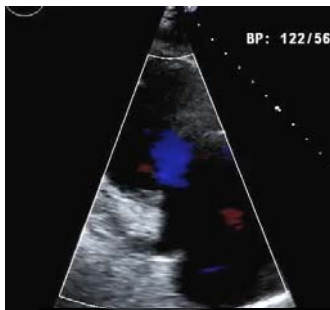
71 year old man with calcified pericardium



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72 yo woman with massive edema/ascites and JVP elevation was referred to pericardial disease clinic for ? pericardiectomy

Case #4



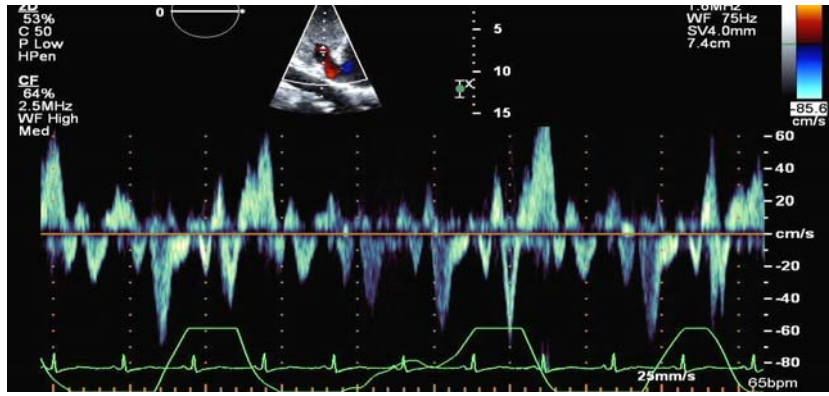
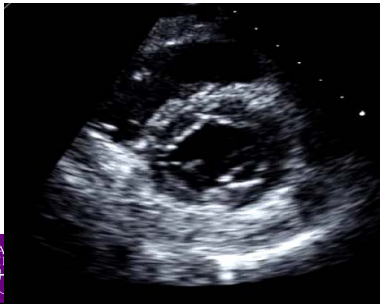
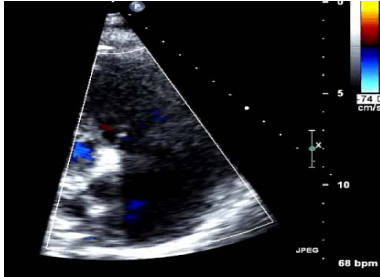
Severe TR with Systolic Flow Reversals in the HV



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Case #5

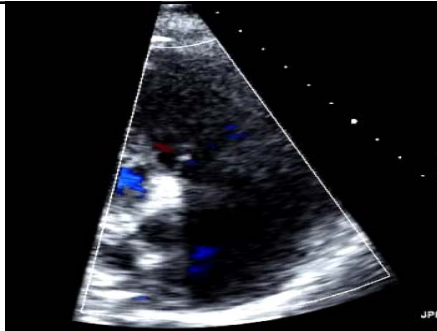
Heart failure with ascites and leg edema Referred for TV repair



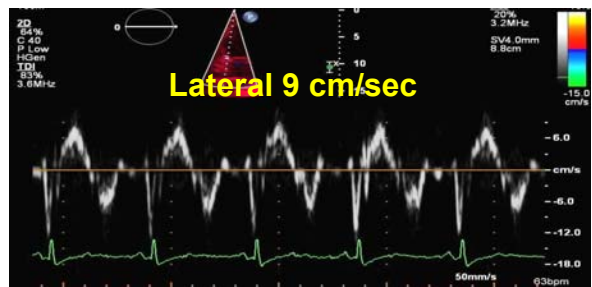
Diastolic Flow Reversals in the HV



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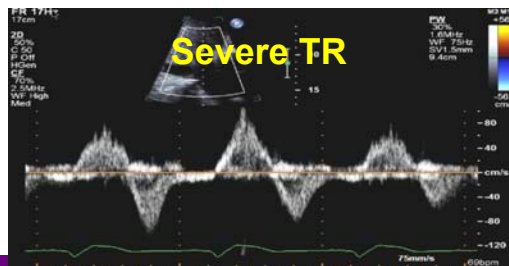
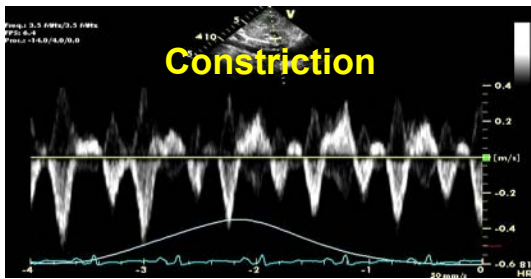


Annulus Reversus Severe TR and CP



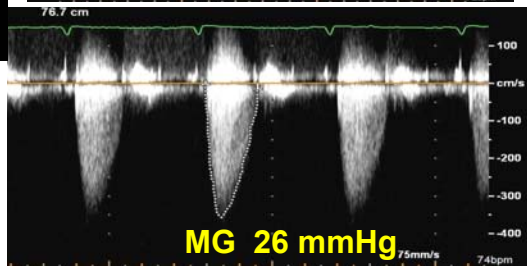
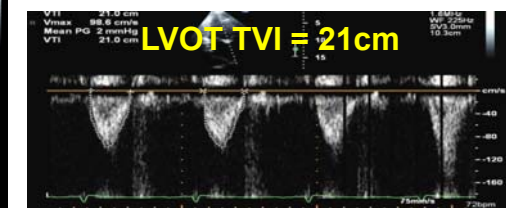
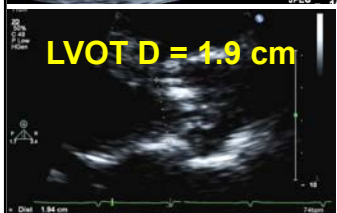
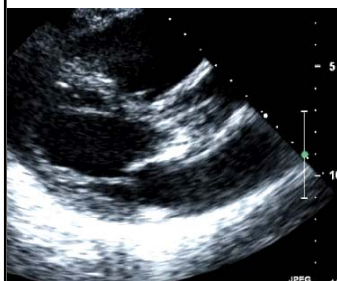
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Hepatic Vein Doppler is a Key



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67 year old man with severe AS came for AVR Low Flow Low Gradient AS



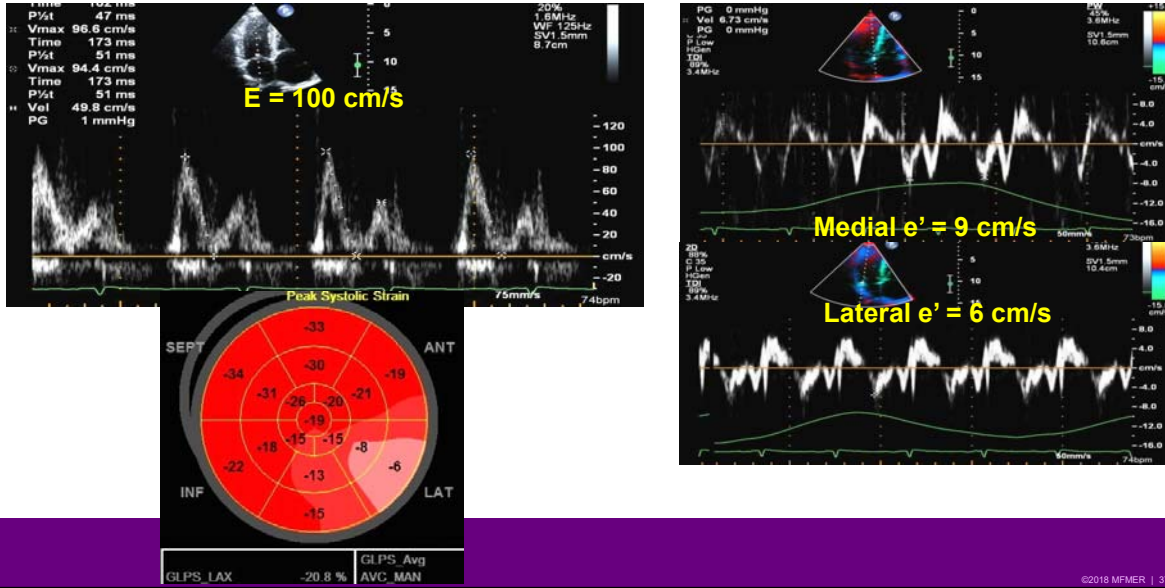
$$SV = (1.9)^2 \times 0.785 \times 21 = 60 \text{ cc}$$

$$AVA = 60 / 76 = 0.79 \text{ cm}^2$$

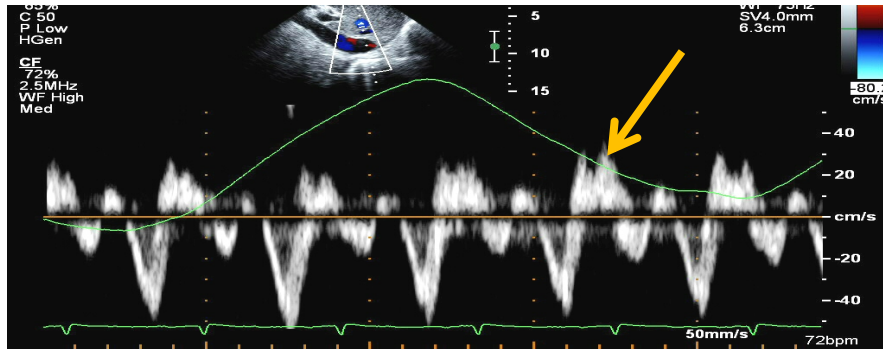


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67 year old man with heart failure and LFLG AS Mitral Annulus Tissue Doppler



67 year old man with AS and Constriction Hepatic Vein Doppler c/w constriction



Radiation Heart Disease

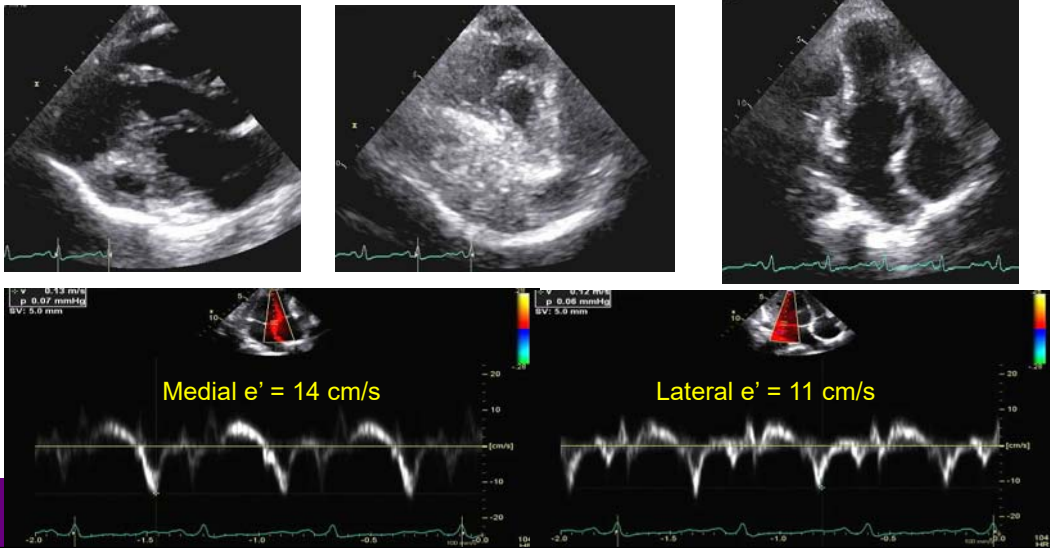
Valvular Heart Disease

Circulation CV Imaging 2015

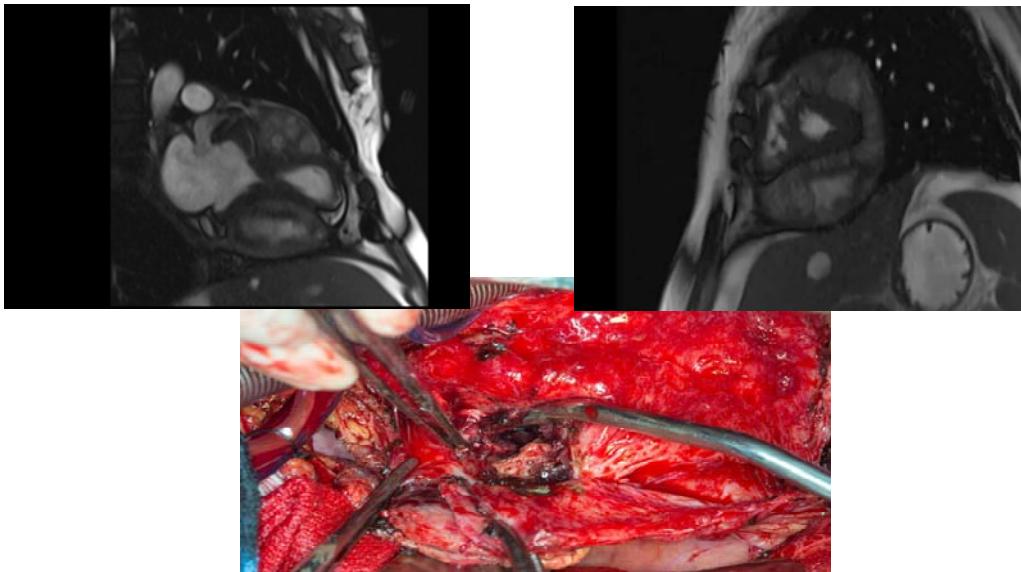
**Low-Flow, Low-Gradient Severe Aortic Stenosis
in the Setting of Constrictive Pericarditis**
Clinical Characteristics, Echocardiographic Features, and Outcomes

Michael Y.C. Tsang, MD; Jin-Oh Choi, MD, PhD; Barry A. Borlaug, MD;
Kevin L. Greason, MD; Stephen S. Cha, MSc; Rick A. Nishimura, MD; Jae K. Oh, MD

23 year old woman from Middle East with
ascites several month after acute pericarditis and pericardial
effusion



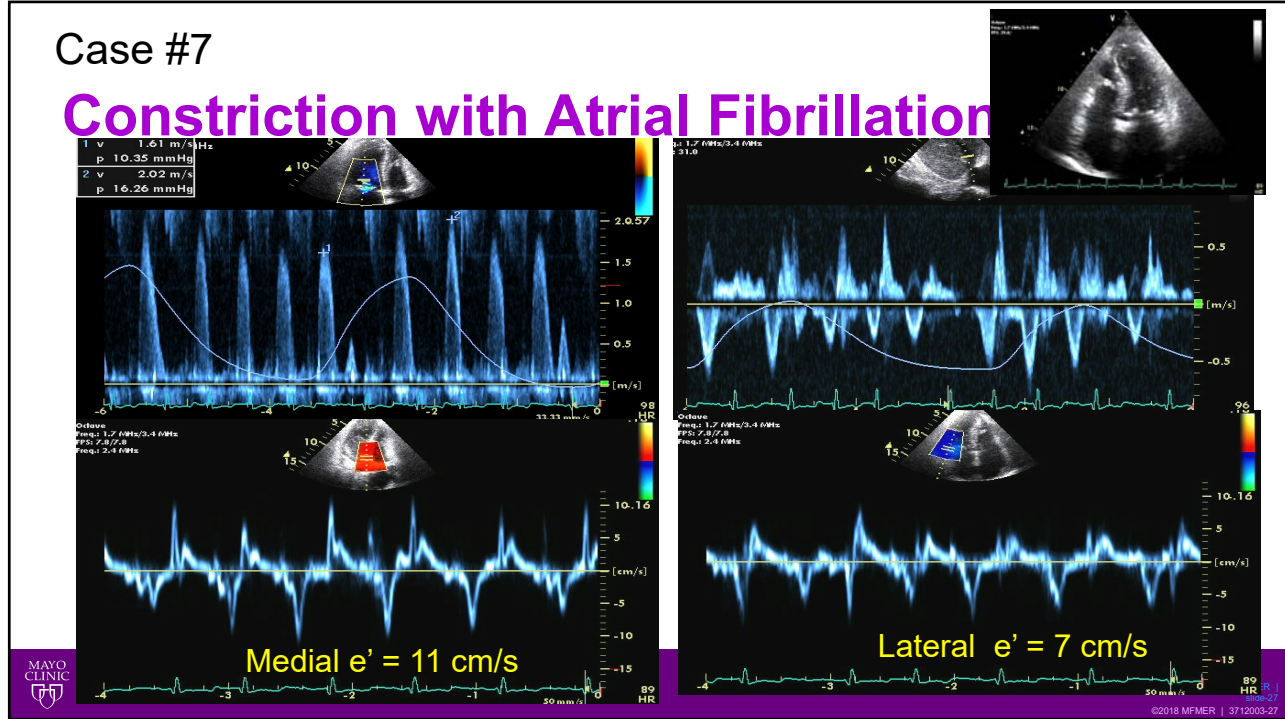
Case #8 23 year old female with thrombotic CP



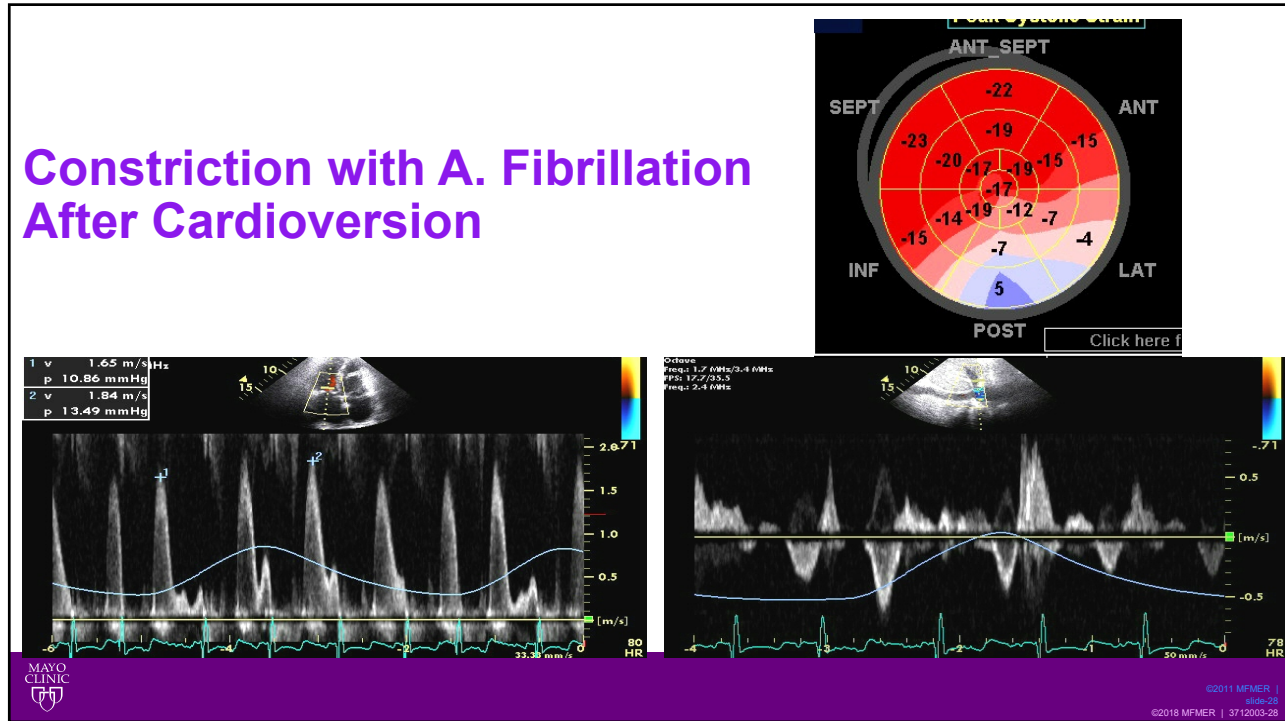
Courtesy of H. Schaff, MD

Case #7

Constriction with Atrial Fibrillation



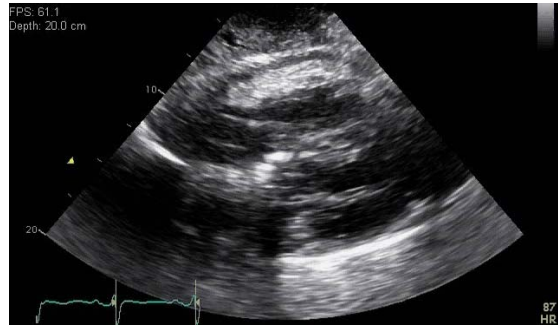
Constriction with A. Fibrillation After Cardioversion



77 yo man with severe aortic stenosis *TAVR and PM implantation*



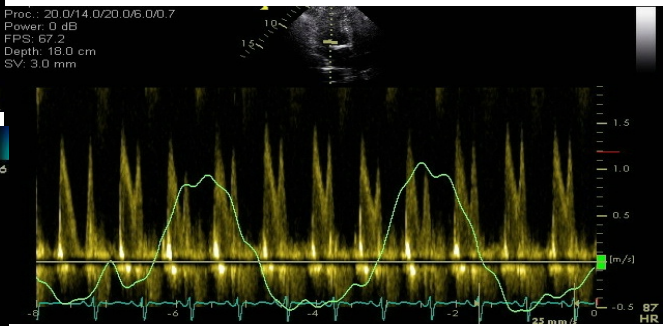
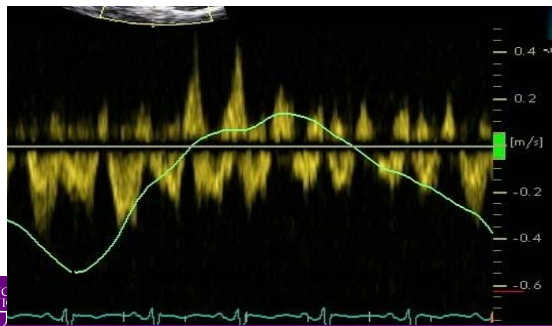
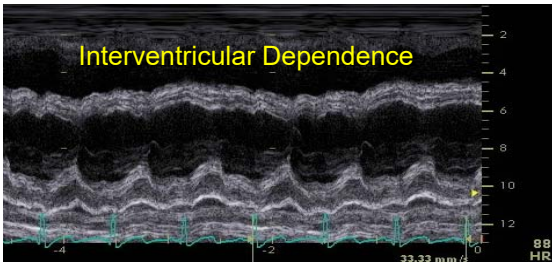
Pericardiocentesis yielded
125 cc of bloody fluid



Increasing HF and edema
2 months later



Effusive-Constrictive Pericarditis



Effusive-Constrictive Pericarditis After Pericardiocentesis



Incidence, Associated Findings, and Natural History

Kye Hun Kim, MD,^{a,b} William R. Miranda, MD,^a Larry J. Sinak, MD,^a Faisal F. Syed, MChB,^a
Rowlens M. Melduni, MD,^a Raul E. Espinosa, MD,^a Garvan C. Kane, MD,^a Jae K. Oh, MD^a

- 205 consecutive patients with pericardiocentesis
- ECP was diagnosed in 33 (16%)
 - More frequent hemo-pericardium (33% vs 13%)
 - Higher % of neutrophils
 - Baseline medial mitral annulus e' higher
 - Expiratory diastolic flow reversal in HV more frequent
 - 2 required pericardiectomy in 3.8 year follow-up



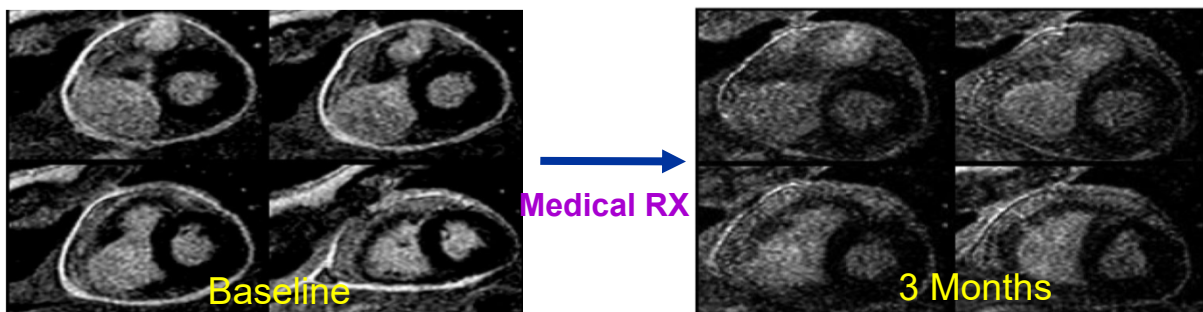
Kim KH, Miranda W, Oh JK et al JACC Imaging Nov 2017

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Cardiac Magnetic Resonance Imaging Pericardial Late Gadolinium Enhancement and Elevated Inflammatory Markers Can Predict the Reversibility of Constrictive Pericarditis After Antiinflammatory Medical Therapy

A Pilot Study

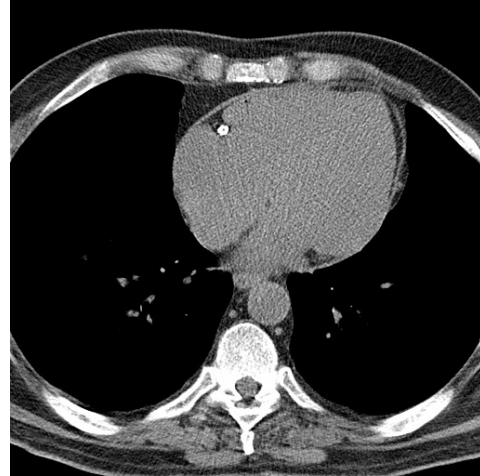
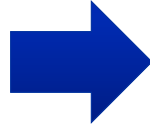
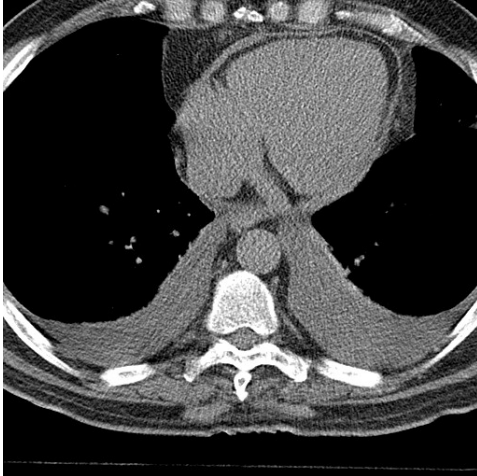
DaLi Feng, MD; James Glockner, MD, PhD; Kye-hun Kim, MD; Matthew Martinez, MD;
Imran S. Syed, MD; Philip Araoz, MD; Jerome Breen, MD; Raul E. Espinosa, MD;
Thoralf Sundt, MD; Hartzell V. Schaff, MD; Jae K. Oh, MD



Circulation Oct 3rd 2011

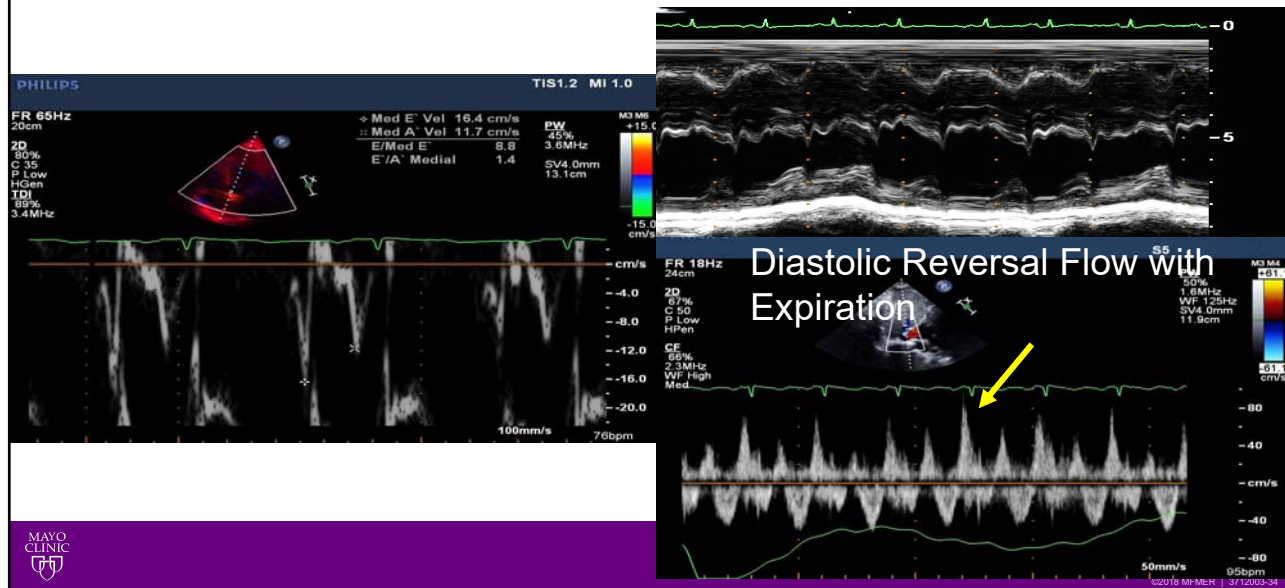
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Transient Constrictive Pericarditis One week of Steroid Rx



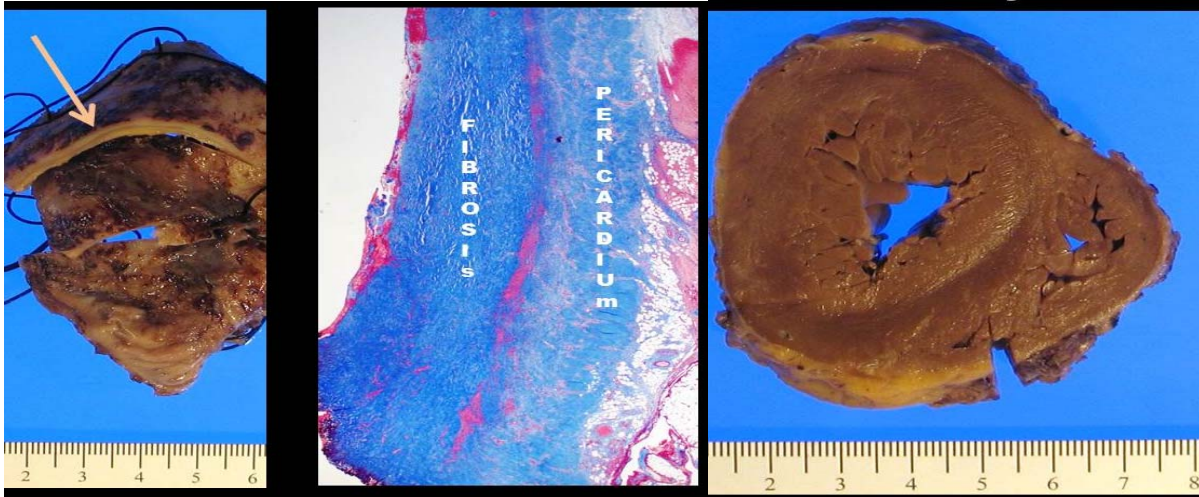
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An e-mail from a junior staff
52 year old man waiting for heart transplantation
(had Echo, Cath, and MRI)



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Explanted Heart



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Teaching Points : It is now easy to diagnose CP *Do Not Miss Constriction*

- We can identify constriction by 4 parameters
 - Ventricular septal motion abnormality
 - Mitral inflow velocity \geq Grade 2
 - Mitral annulus medial $e' \geq 8$ cm/sec
 - Hepatic vein diastolic expiratory flow reversal
- We should be able to identify mimickers of constriction
 - Restrictive CM
 - Severe TR
 - Interventricular dependence of other causes



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Thank You for Listening !
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Questions & Discussion



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