



Echo Hawaii 2022

Constrictive Pericarditis Never to be Missed

Jae K. Oh, MD

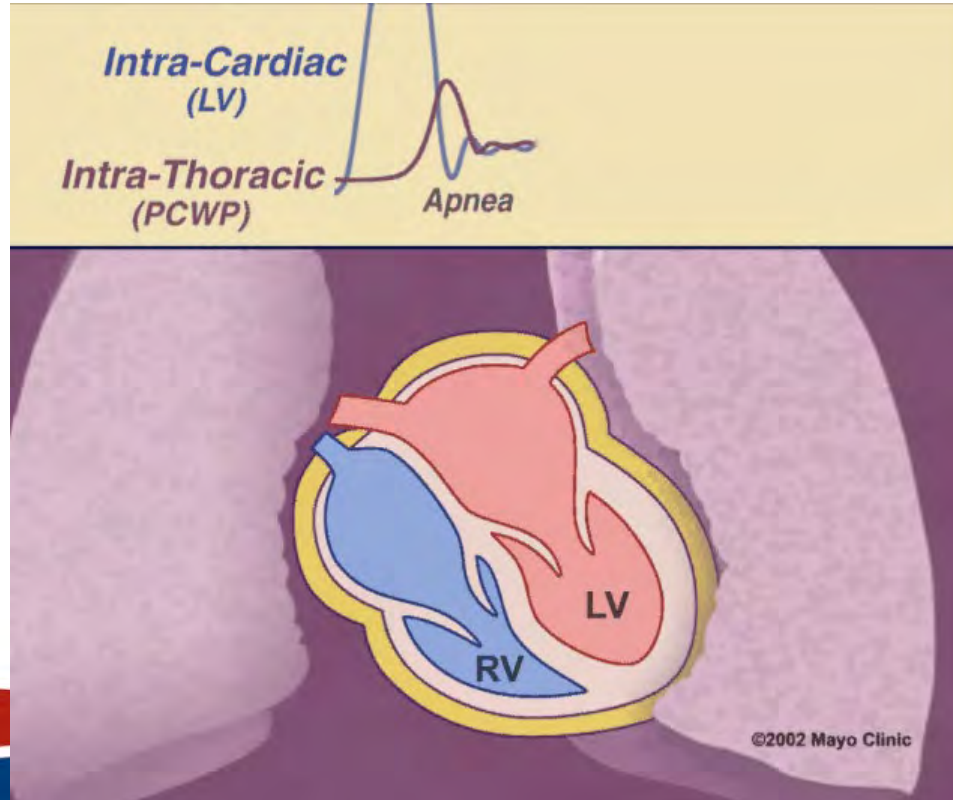
Disclosure for JKO

Section Editor for Pericardial Diseases in UpToDate

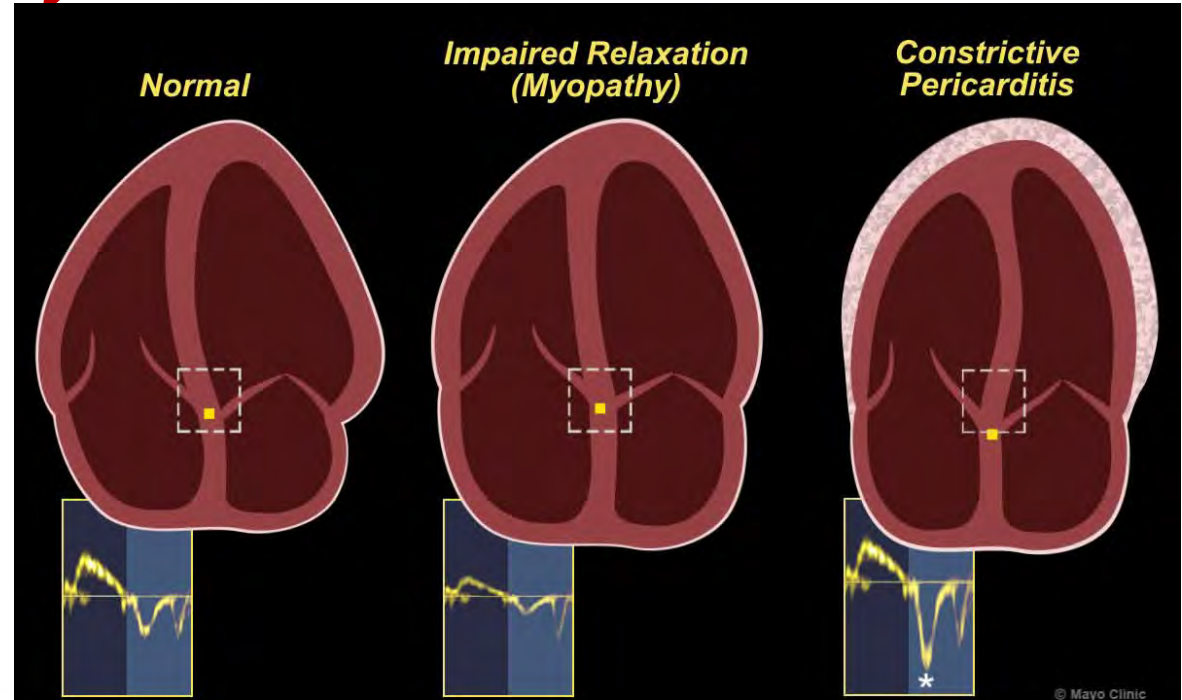
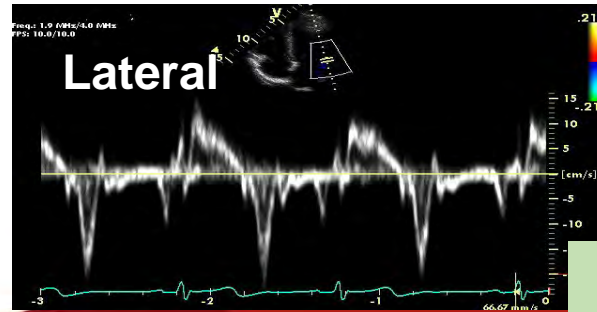
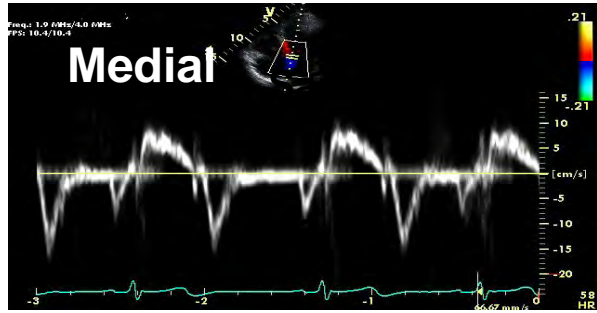
Pericardial Diseases for Echo Hawaii 2022

- **Echocardiographic Diagnostic Criteria for Constrictive Pericarditis**
- **Difference between pure and mixed Constrictive Pericarditis**
- **Prognostic parameters for patients with Constriction**
- **Pericarditis related to COVID 19**

Intracardiac pressure Δ < intrathoracic pressure Δ
Interventricular dependence



Mitral Annulus Tissue Velocity *Constriction vs Myocardial Disease*



“ Mitral medial annulus velocity ≥ 8 cm/s suggests CP in pts with HF and normal EF”

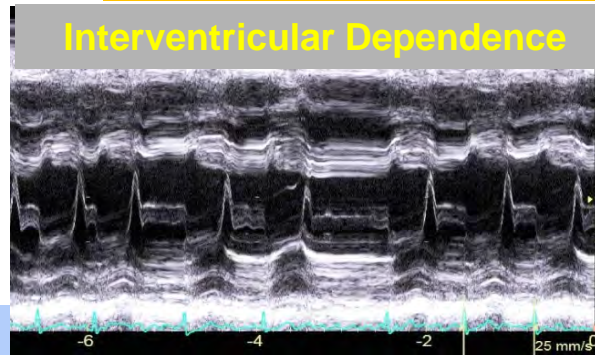
Normal

Echocardiographic Diagnosis of Constrictive Pericarditis: Mayo Clinic Criteria

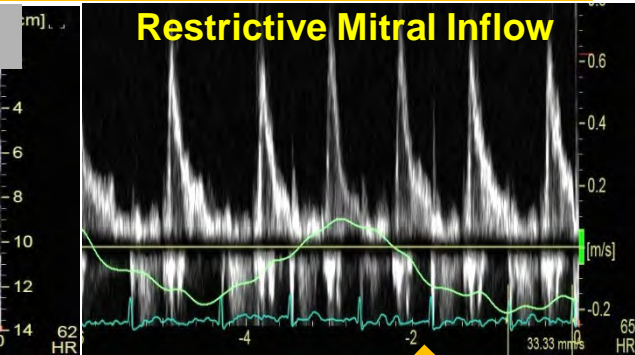
Terrence D. Welch, Lieng H. Ling, Raul E. Espinosa, Nandan S. Anavekar, Heather J. Wiste, Brian D. Lahr, Hartzell V. Schaff and Jae K. Oh

75 yo male with heart failure and atrial fibrillation

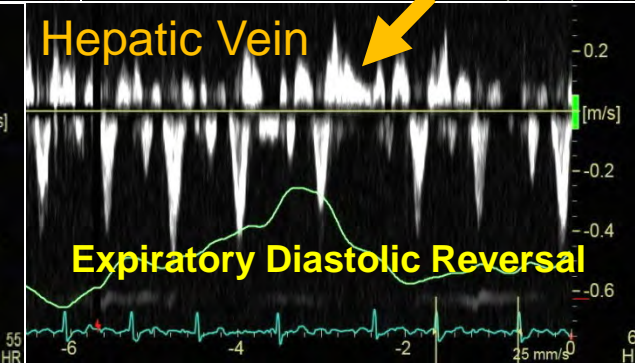
Interventricular Dependence



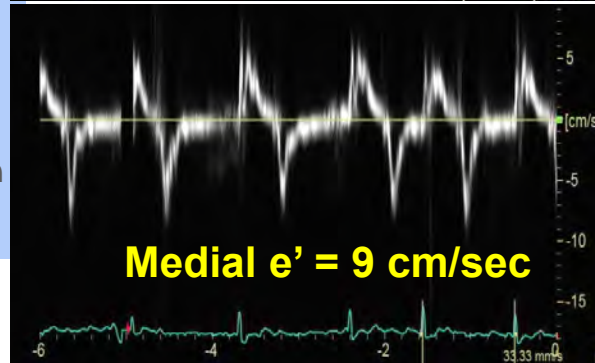
Restrictive Mitral Inflow



Hepatic Vein



Medial e' = 9 cm/sec



Expiratory Diastolic Reversal

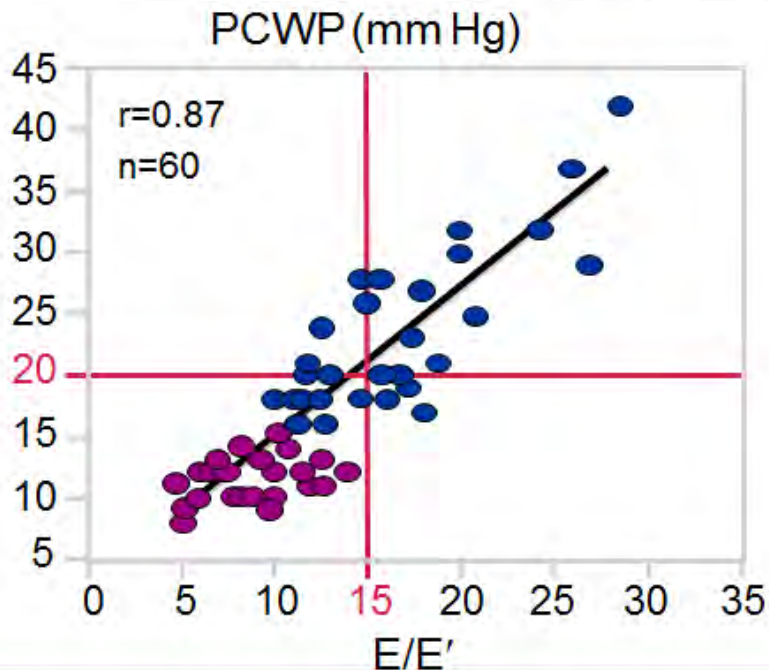


1. Respiratory Ventricular Septal Motion Change
2. Restrictive Mitral Inflow with or without Resp Variation
3. Medial e' Vel ≥ 8 cm/sec
4. Expiratory Diastolic Flow Reversal in the Hepatic Vein

Annulus Paradoxus

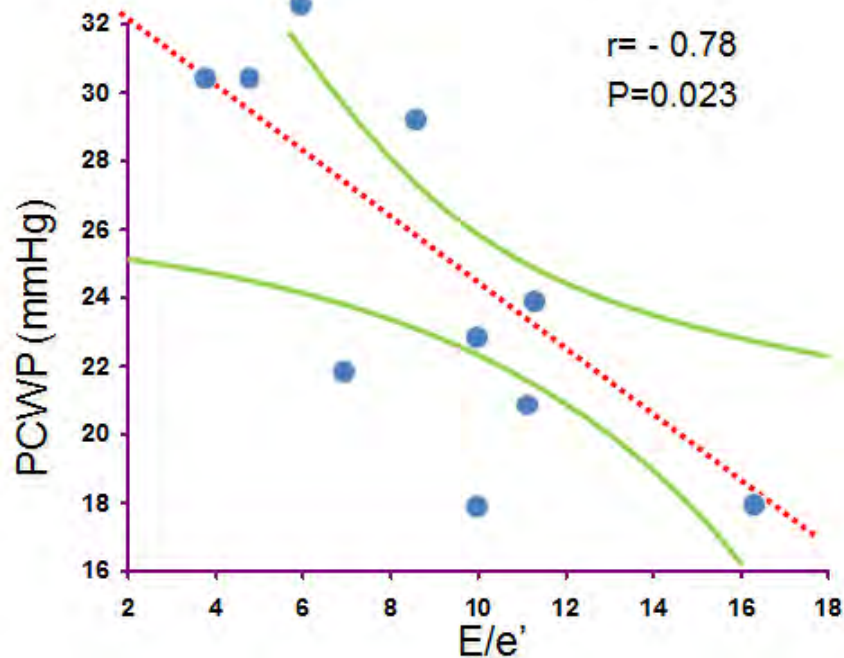
Transmitral Flow Velocity to Mitral Annular Velocity Ratio Is Inversely Proportional to Pulmonary Capillary Wedge Pressure in Patients With Constrictive Pericarditis

Jong-Won Ha, MD, PhD; Jae K. Oh, MD; Lieng H. Ling, MD; Rick A. Nishimura, MD; James B. Seward, MD; A. Jamil Tajik, MD



Myocardial Diseases

Nagueh et al JACC 1997

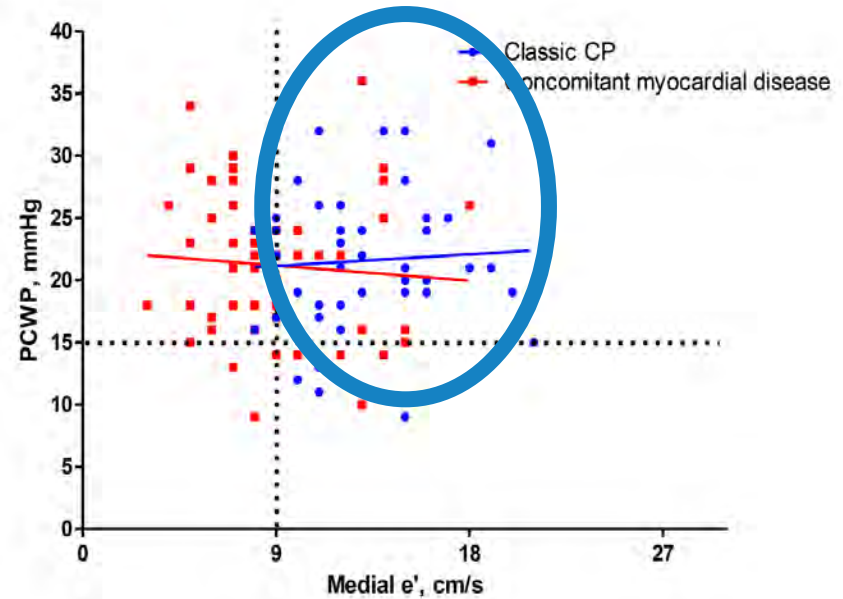
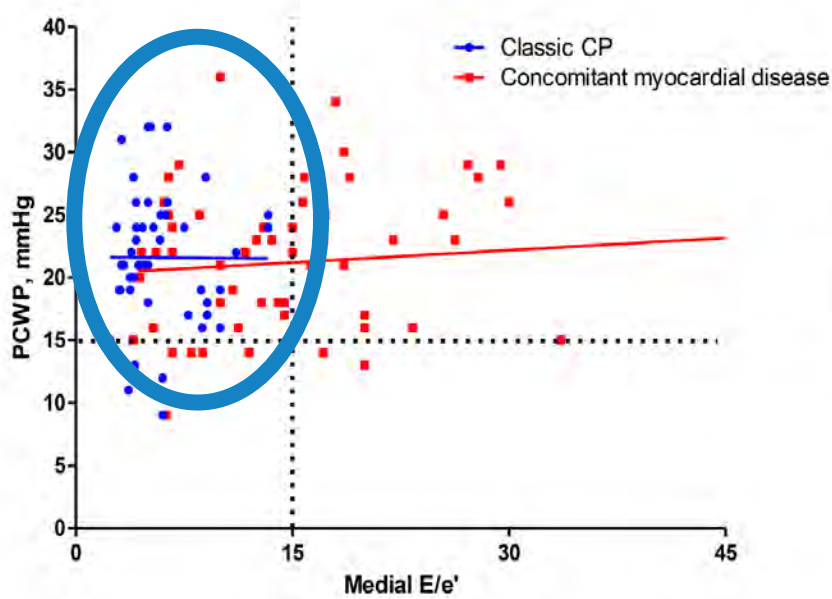


Constrictive Pericarditis

Ha et al Circulation 2001

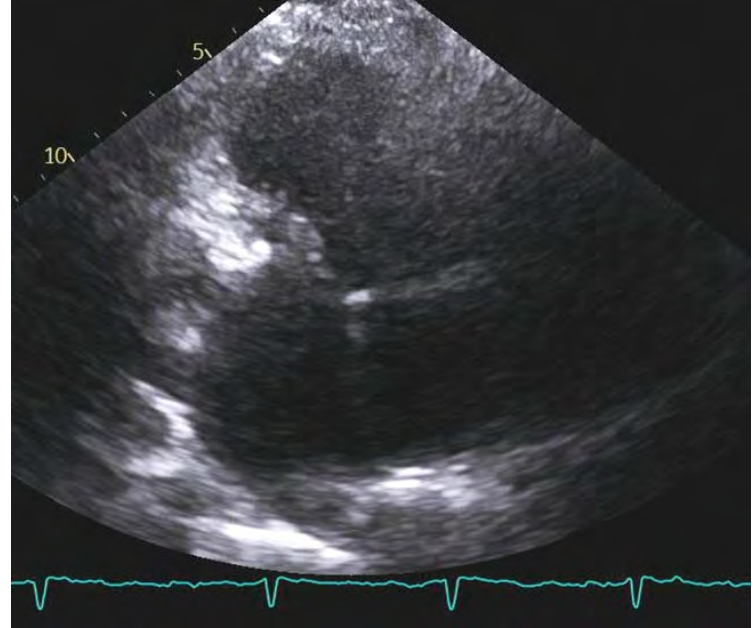
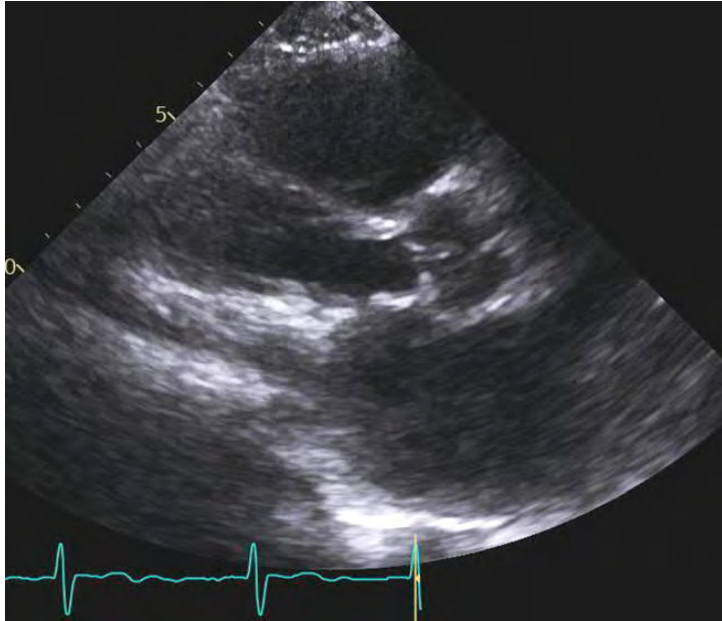
Pure vs Mixed (with CM) Constrictive Pericarditis

Annulus Paradoxus

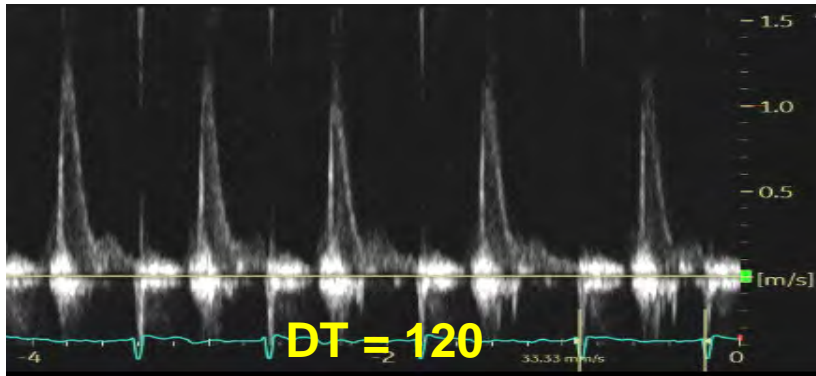


Mitral medial e' velocity is > 9 cm/s and E/e' ratio is < 15 in almost all patients with pure constrictive pericarditis

52 yo man with HF, atrial fibrillation, and anasarca

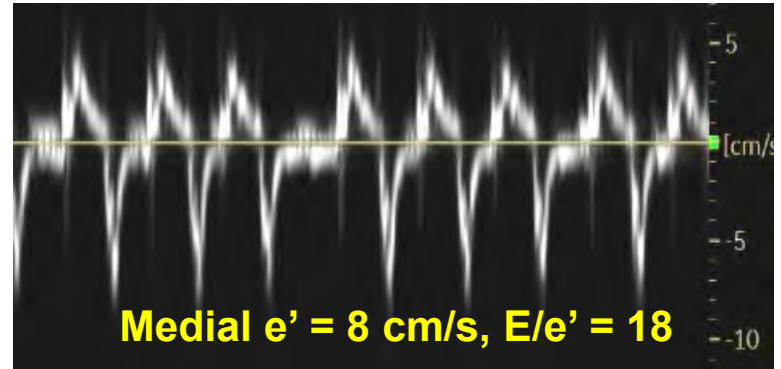


52 yo man with HF, atrial fibrillation, and anasarca

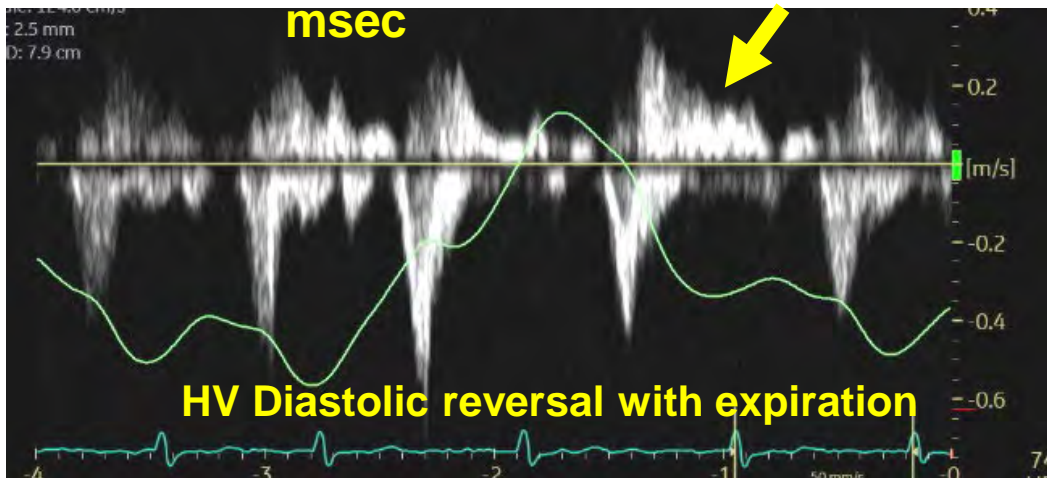


DT = 120

msec



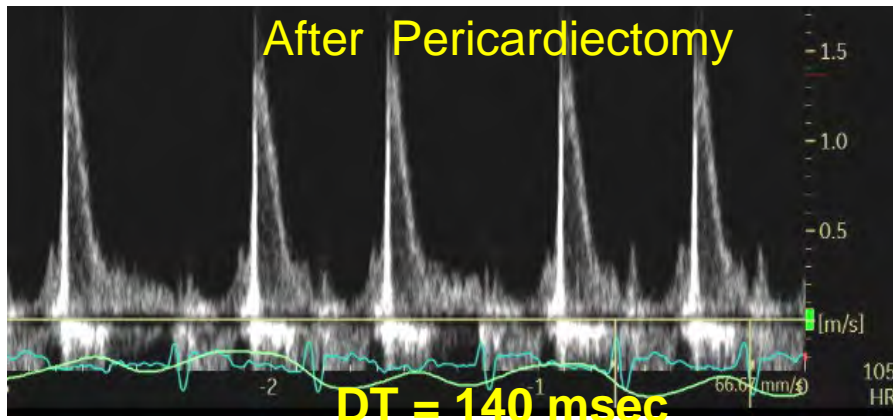
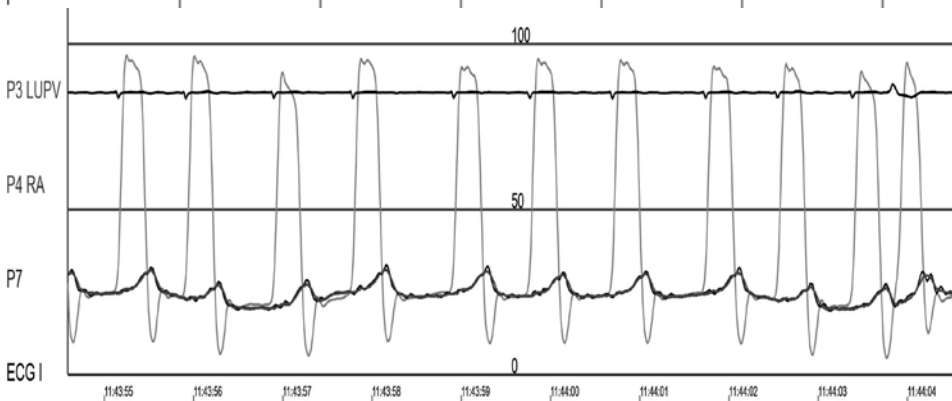
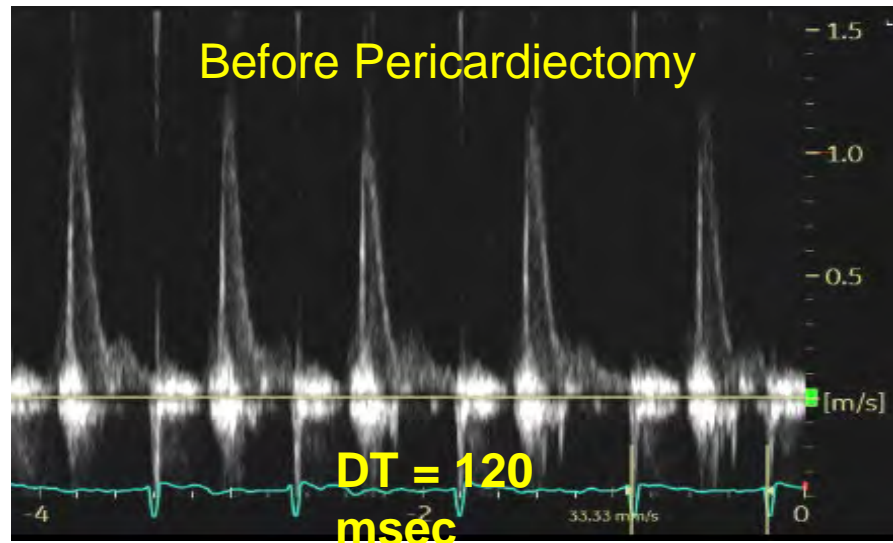
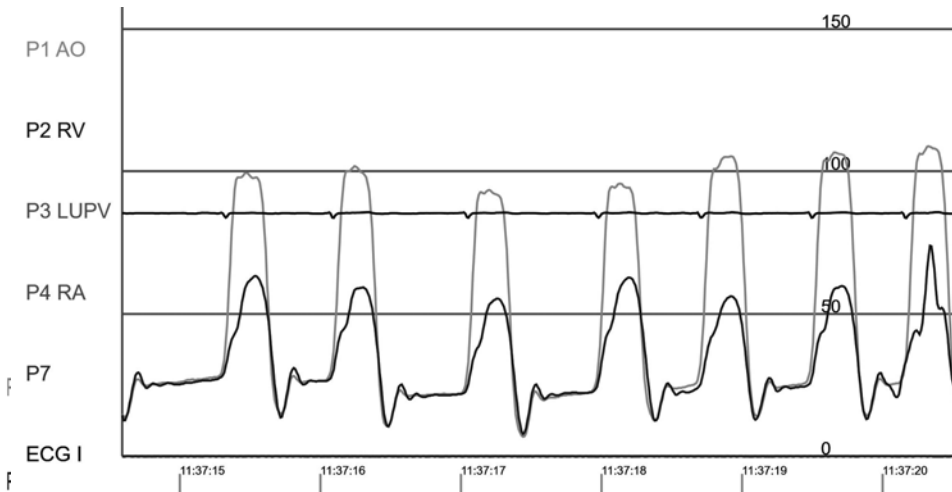
Medial e' = 8 cm/s, E/e' = 18



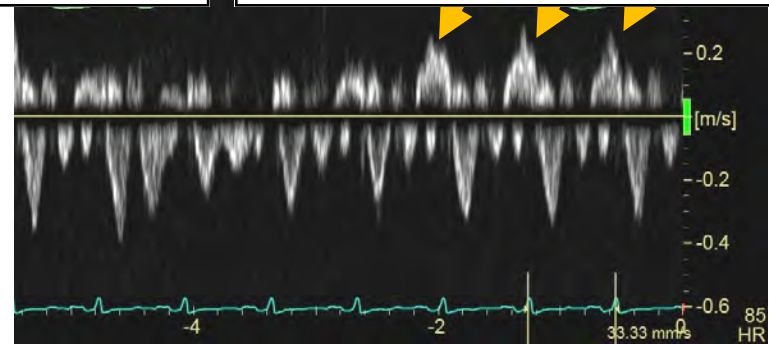
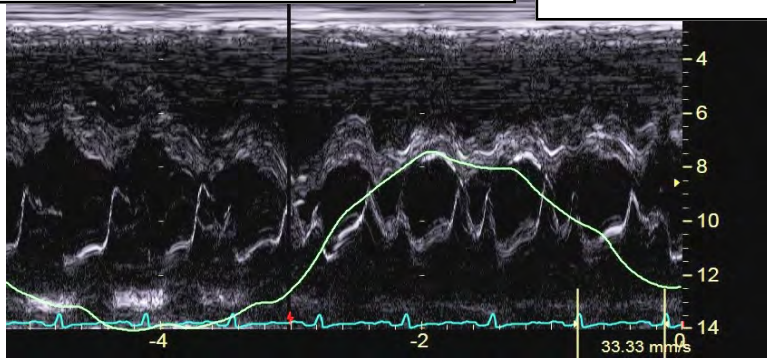
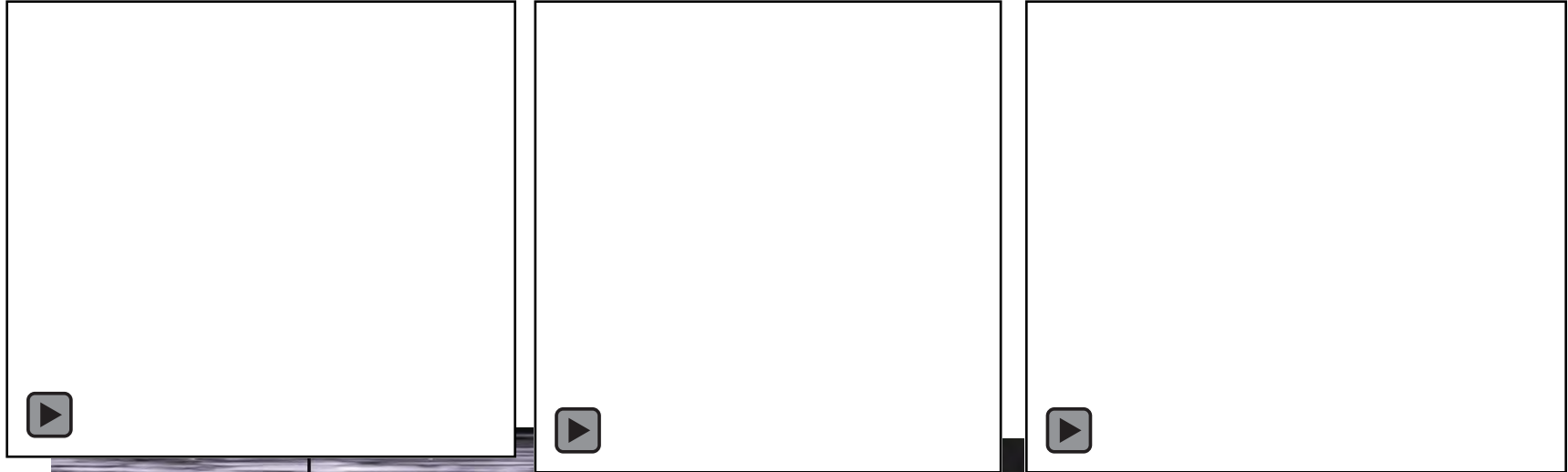
HV Diastolic reversal with expiration

**Constrictive Pericarditis
with superimposed
myocardial disease**

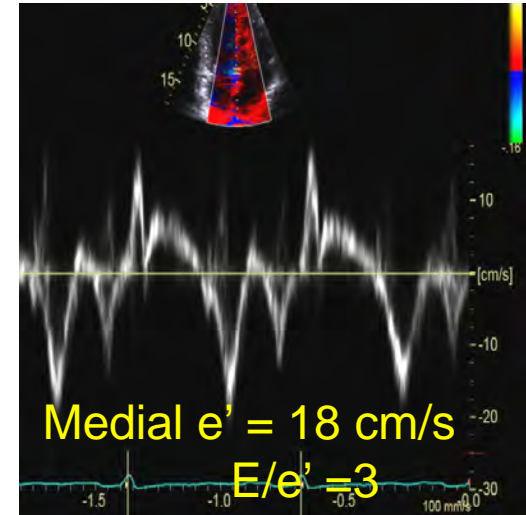
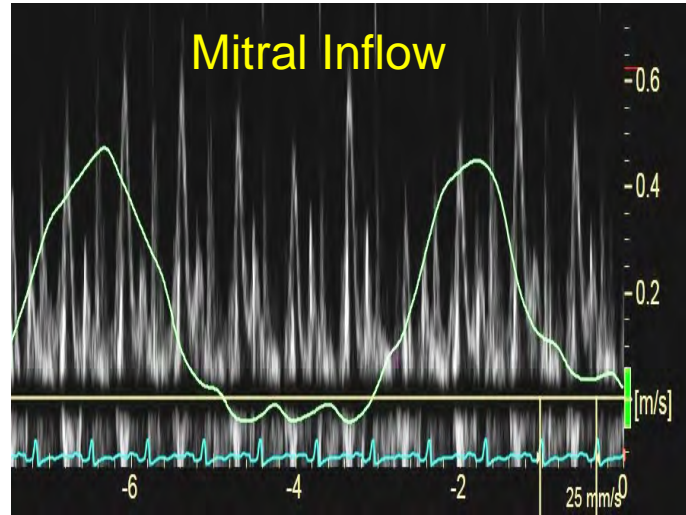
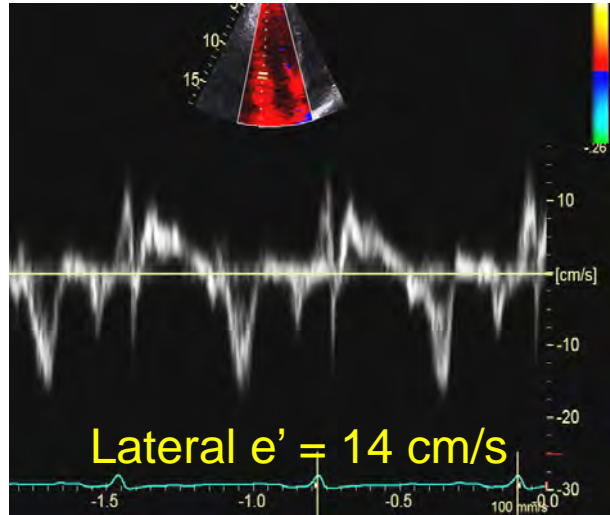
52 yo man with HF, atrial fibrillation, and anasarca



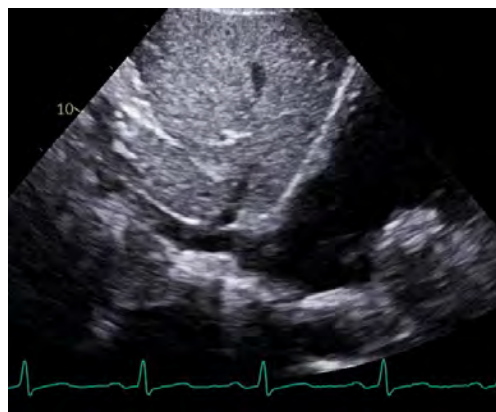
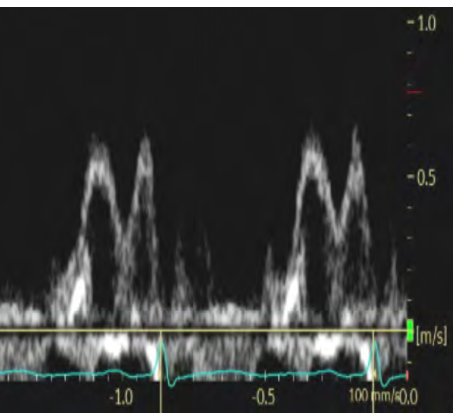
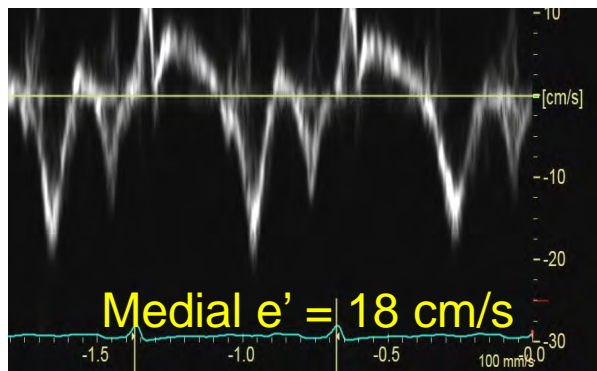
44 yo male with anasarca presented to ED, then to GI Liver biopsy at home hospital



44 yo male with anasarca presented to ED, then to GI
Liver biopsy at home hospital

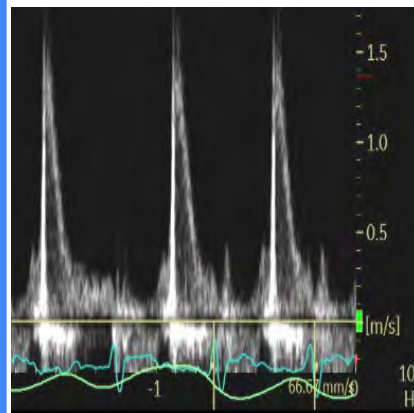
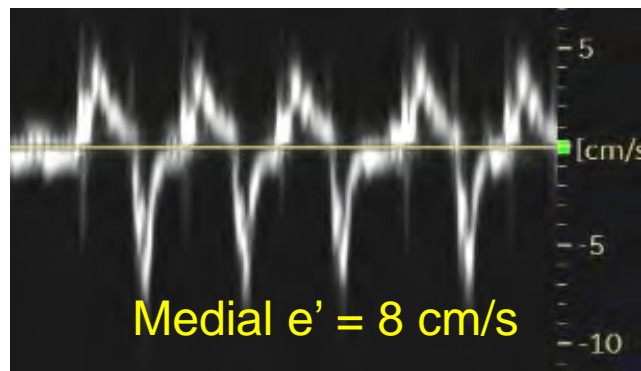


44 yo male with anasarca



F/U DT 200 msec , IVC small

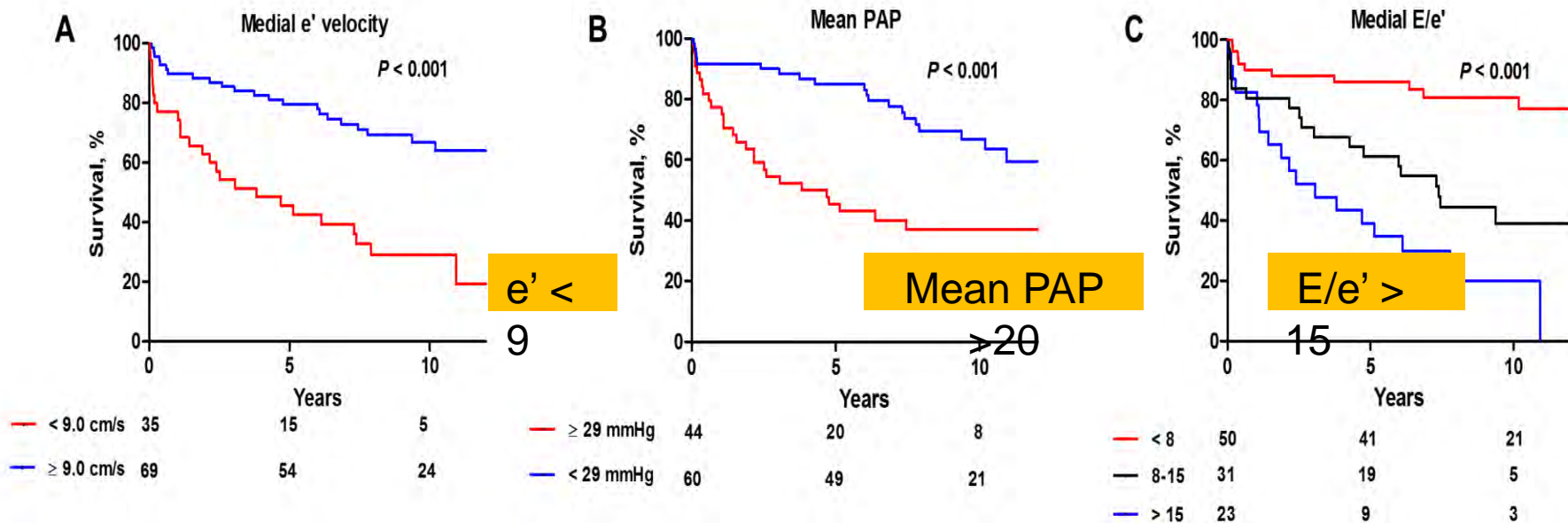
52 yo male with anasarca



F/U DT 140 msec , IVC large

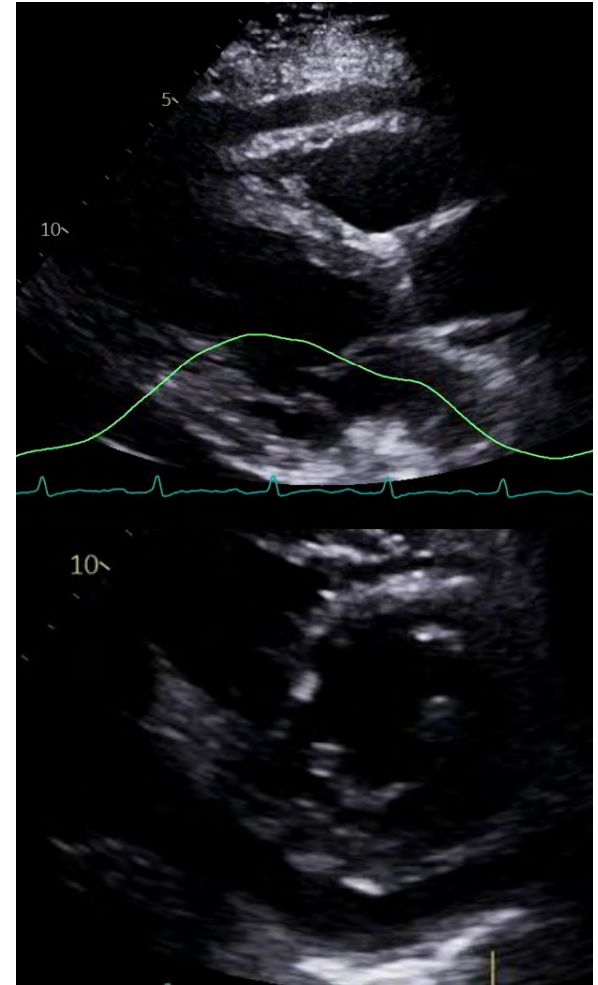
Constrictive Pericarditis

e' velocity and E/e' are most prognostic !



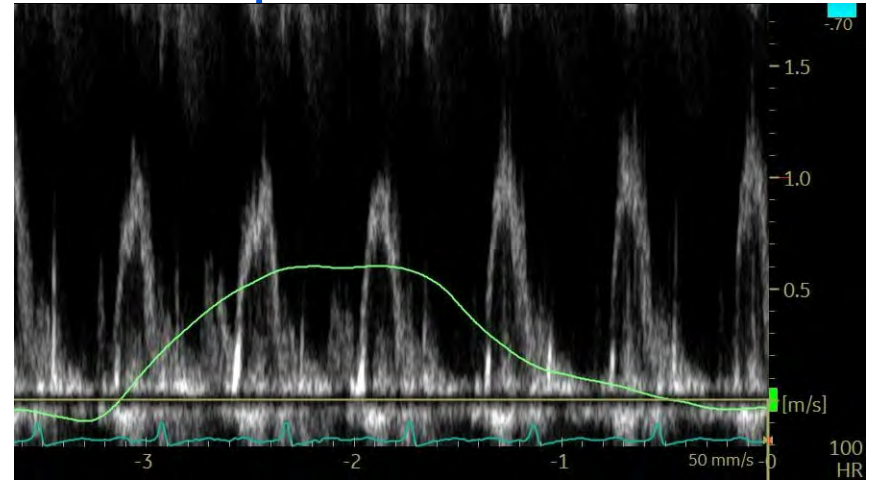
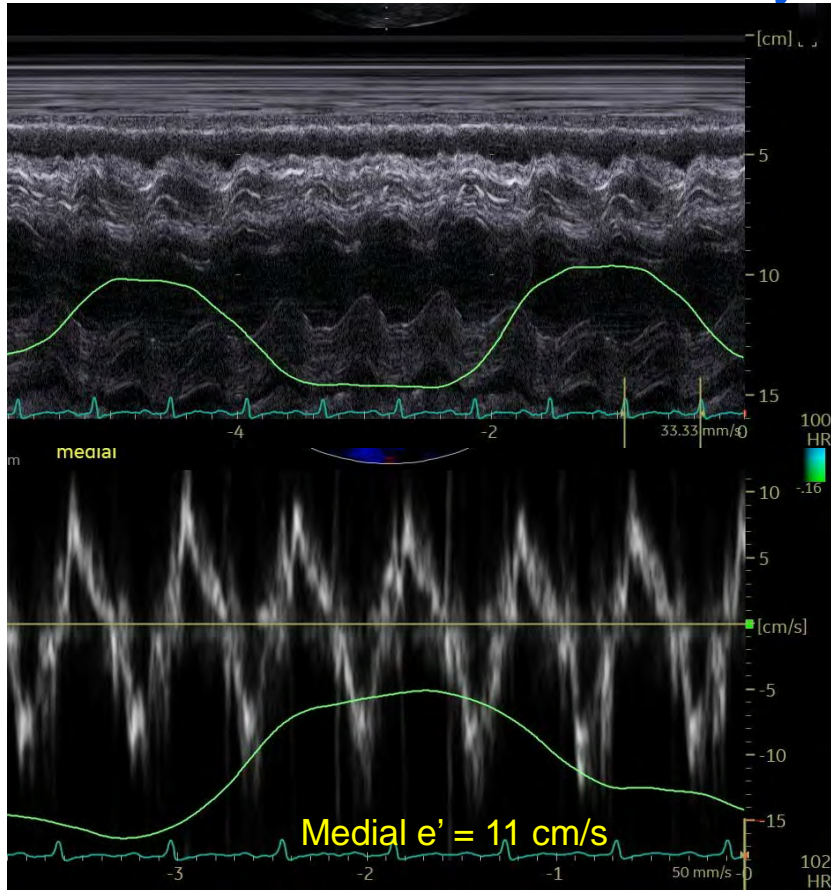
49 yo male with recurrent pericardial effusion COVID 19

- COVID 19 infection in July of 2021
- Gradual worsening of exertional dyspnea
- Large pericardial effusion treated with
 - Pericardiocentesis
 - Pericardial window x 2
- His dyspnea continues
- Referred to Mayo Clinic in Aug 2021
 - CRP elevated to 67
 - SARS COVID PCR Positive



49 yo male with pericardial effusion after COVID 19

What is your next step?

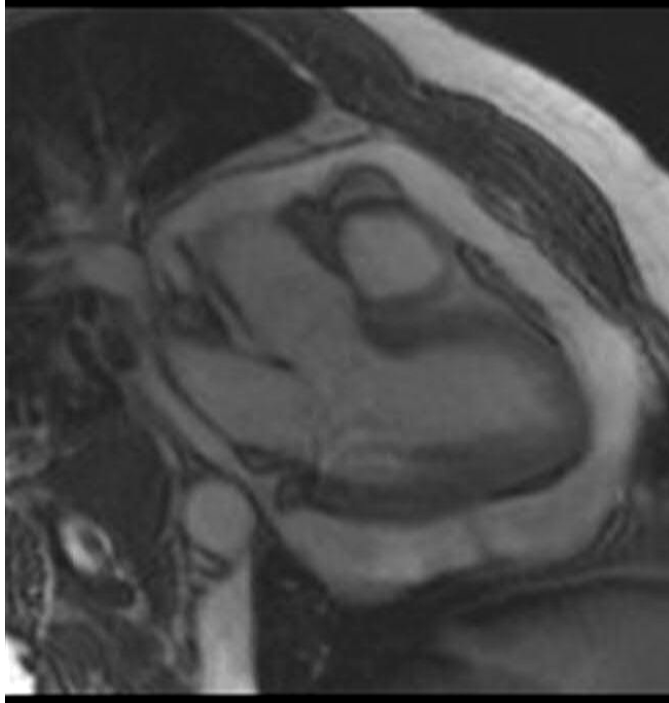


1. NSAID and Colchicine
2. Rilonacept
3. Pericardiocentesis
4. Pericardiectomy

Indicators of Poor Prognosis *Acute Pericarditis in 453 pts*

- A specific cause found in 76 (17%)
- Complications in 95 (21%)
 - *Recurrence in 83 (18%)*
 - *Tamponade in 14 (3%)*
 - *Constriction in 7 (1.5%)*
- Women, large effusion, tamponade, failure of ASA/NSAID, steroid use were associated with increased complications

49 yo male with Effusive Constrictive Pericarditis COVID 19



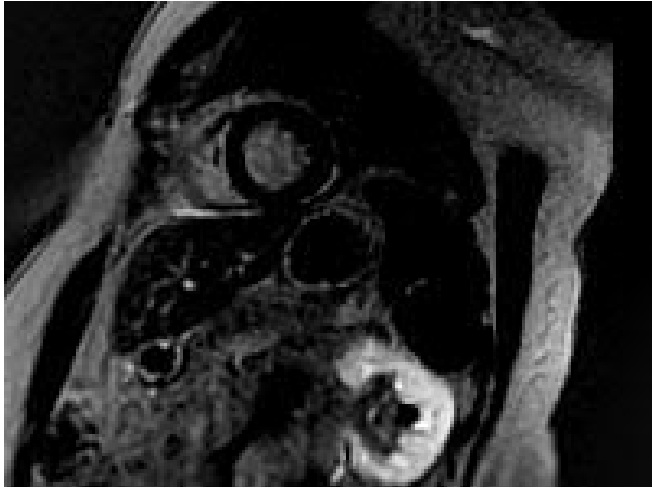
Managed with Pericardiocentesis and Colchicine/Indocin x 3 months
No recurrent pericardial effusion or symptoms in Nov. 12th 2021

50 yo woman with recurrent pericarditis

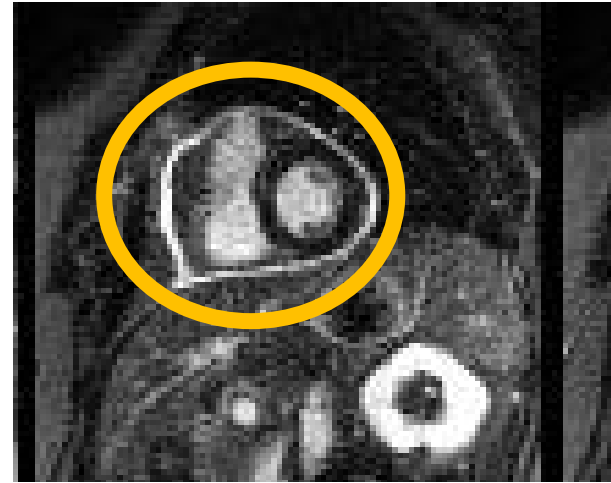
Doing well with gradual tapering of steroid

From 40 mg to 7 mg daily with 1 mg/2 weeks taper

Worst chest pain after 2nd dose COVID vaccination



November 2020



April 2021


Anti-inflammatory therapies for pericardial diseases in the COVID-19 pandemic: safety and potentiality

Massimo Imazio^a, Antonio Brucato^b, George Lazaros^c, Alessandro Andreis^a, Mirko Scarsi^d, Allan Klein^{e,*}, Gaetano Maria De Ferrari^{a,*} and Yehuda Adler^{f,*}

Same as other acute and recurrent pericarditis

- **Acute pericarditis**
 - NSAID x 1 month and Colchicine 0.6 mg BID x 3 months
- **Recurrent pericarditis**
 - NSAID x 3 month and Colchicine 0.6 mg BID x 6 months
- **If above treatment fails**
 - Steroid
 - Anakinra or Rilonacept
 - Pericardiectomy

Life-threatening cardiac tamponade complicating myo-pericarditis in COVID-19

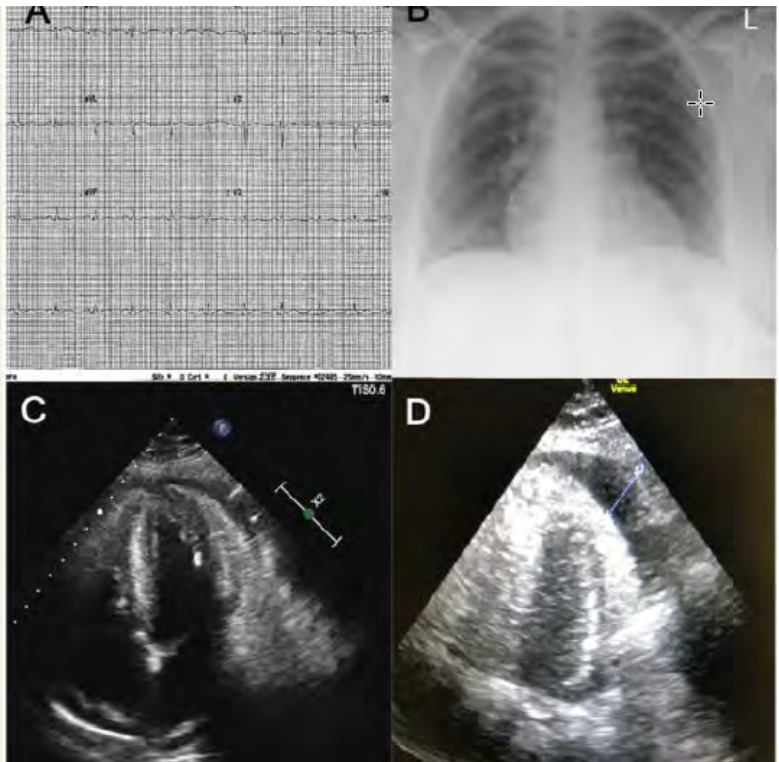
Alina Hua , Kevin O’Gallagher, Daniel Sado, and Jonathan Byrne*

ECHOCARDIOGRAPHY IN COVID-19 CLINICAL INVESTIGATION

Indications for and Findings on Transthoracic Echocardiography in COVID-19

 Check for updates

Sneha S. Jain, MD, MBA, Qi Liu, MD, Jayant Raikhelkar, MD, Justin Fried, MD, Pierre Elias, MD, Timothy J. Poterucha, MD, Ersilia M. DeFilippis, MD, Hannah Rosenblum, MD, Elizabeth Y. Wang, MD, Bjorn Redfors, MD, Kevin Clerkin, MD, MSc, Jan M. Griffin, MD, Elaine Y. Wan, MD, Marwah Abdalla, MD, MPH, Natalie A. Bello, MD, MPH, Rebecca T. Hahn, MD, Daichi Shimbo, MD, Shepard D. Weiner, MD, Ajay J. Kirtane, MD, SM, Susheel K. Kodali, MD, Daniel Burkhoff, MD, PhD, LeRoy E. Rabbani, MD, Allan Schwartz, MD, Martin B. Leon, MD, Shunichi Homma, MD, MHCDS, Marco R. Di Tullio, MD, Gabriel Sayer, MD, Nir Uriel, MD, MSc, FACC, and D. Edmund Anstey, MD, MPH, *New York, New York*



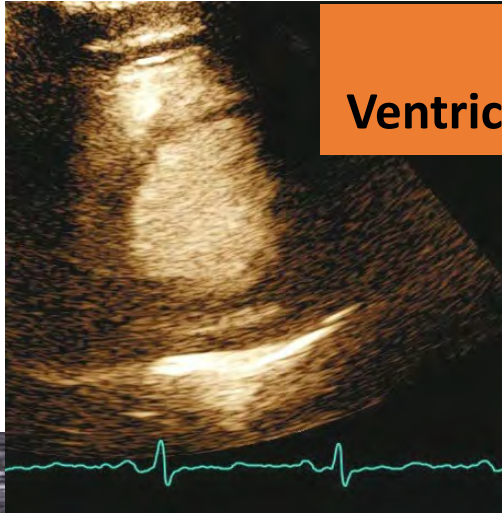
| | Pericardial Effusion, n (%) |
|------------------|-----------------------------|
| None | 50 (69.4%) |
| Trace | 16 (22.2%) |
| Small | 3 (4.2%) |
| Moderate | 0 (0%) |
| Large | 0 (0%) |
| Unable to Assess | 3 (4.2%) |

Use of mRNA COVID-19 Vaccine After Reports of Myocarditis Among Vaccine Recipients: Update from the Advisory Committee on Immunization Practices — United States, June 2021

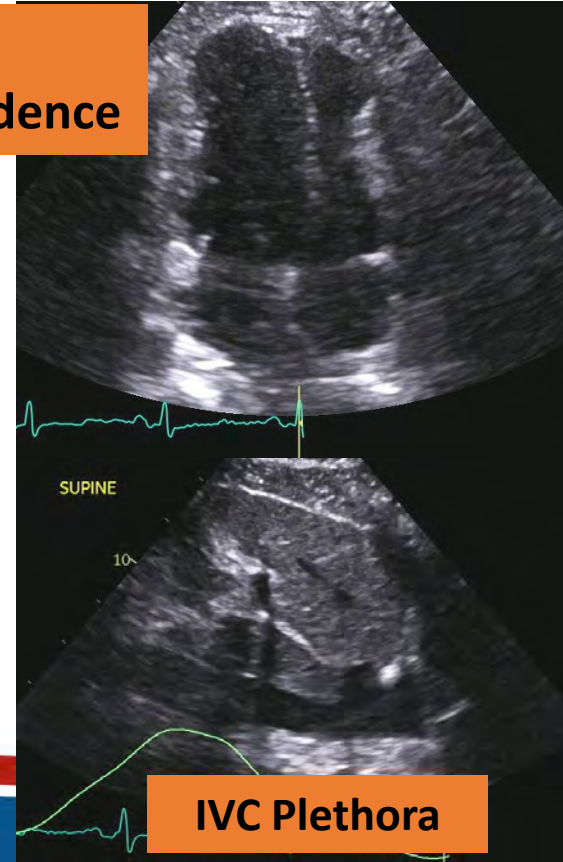
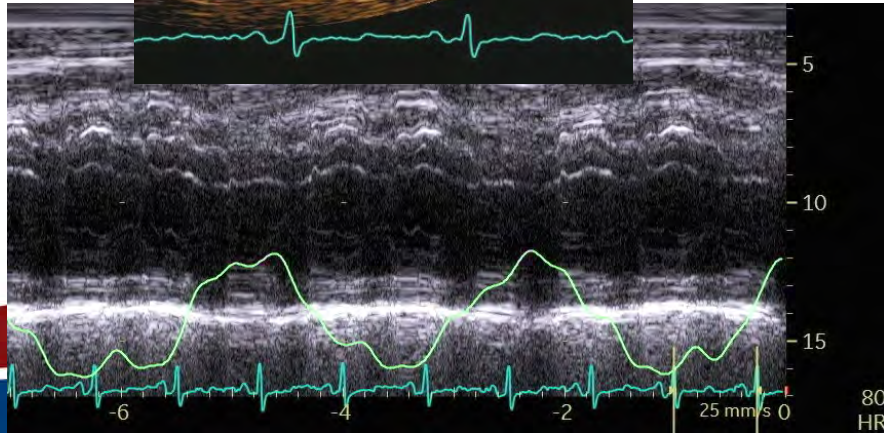
Julia W. Gargano, PhD^{1,*}; Megan Wallace, DrPH^{1,*}; Stephen C. Hadler, MD¹; Gayle Langley, MD¹; John R. Su, MD, PhD¹; Matthew E. Oster, MD¹; Karen R. Broder, MD¹; Julianne Gee, MPH¹; Eric Weintraub, MPH¹; Tom Shimabukuro, MD¹; Heather M. Scobie, PhD¹; Danielle Moulia, MPH¹; Lauri E. Markowitz, MD¹; Melinda Wharton, MD¹; Veronica V. McNally, JD²; José R. Romero, MD³; H. Keipp Talbot, MD⁴; Grace M. Lee, MD⁵; Matthew F. Daley, MD⁶; Sara E. Oliver, MD¹

- 3,336 pericarditis from > 400 million doses
- Median Age 18 – 20 days (16 -42)
- Males 67 – 81 %
- 2nd dose > 1st dose
- Pfizer-BioNTech = Moderna

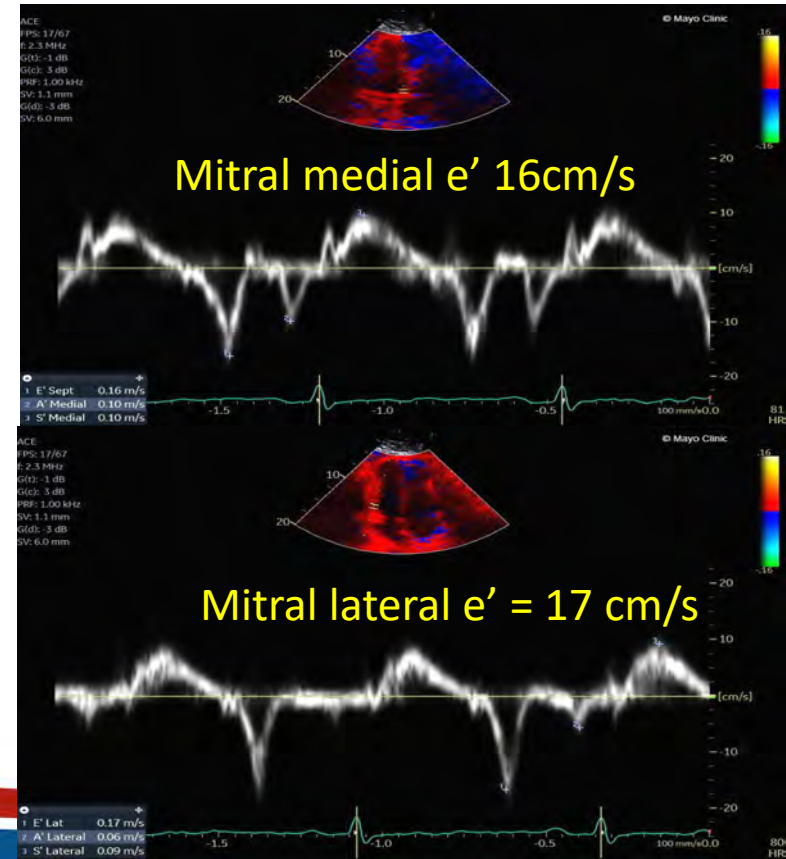
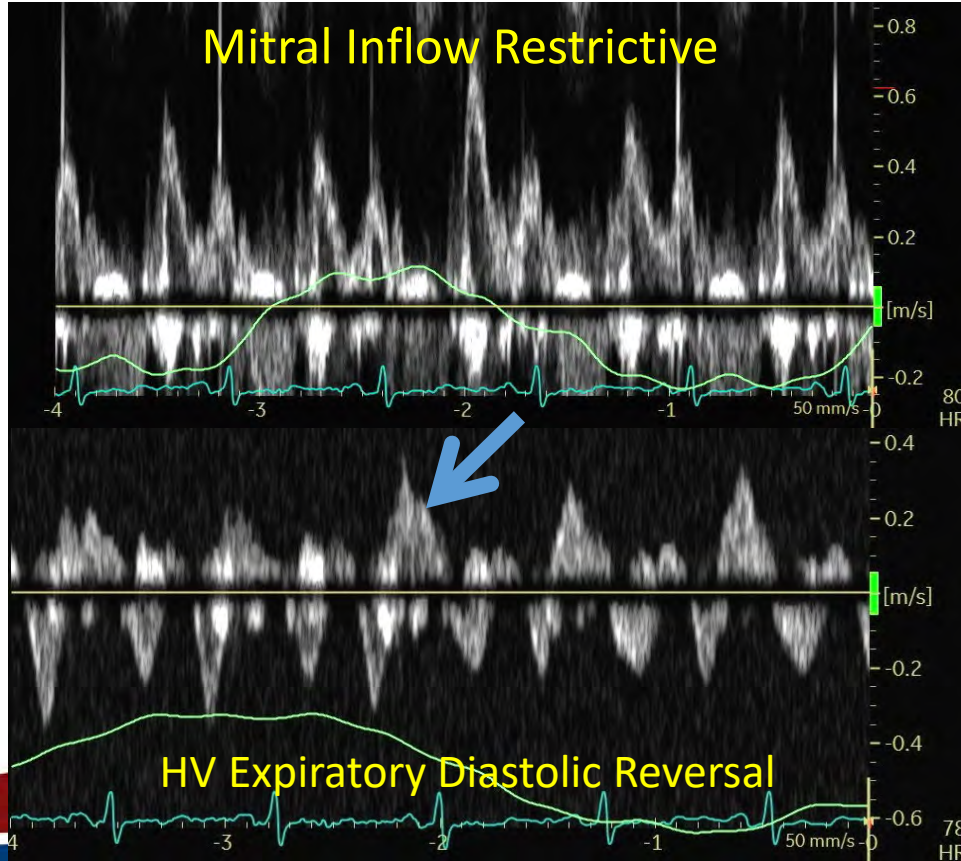
40 yo Female with Acute Pericarditis 1 yr Ago Persistent SOB/Fluid Retention after Pericardial Window



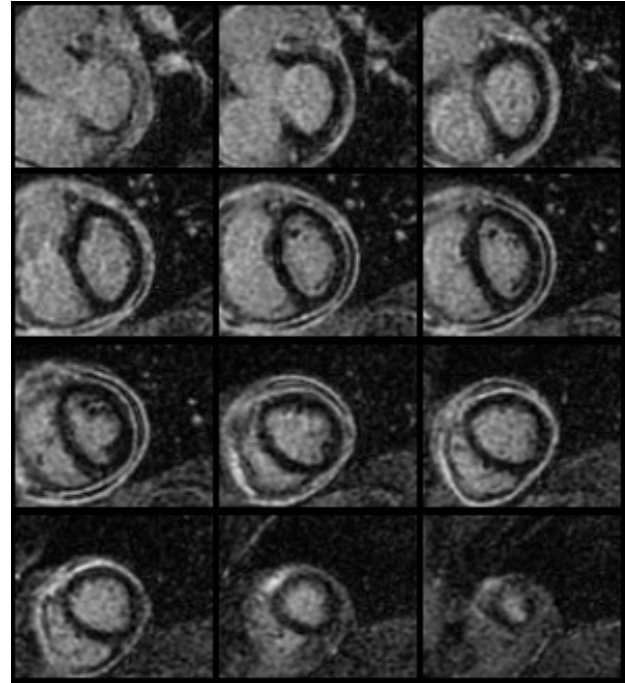
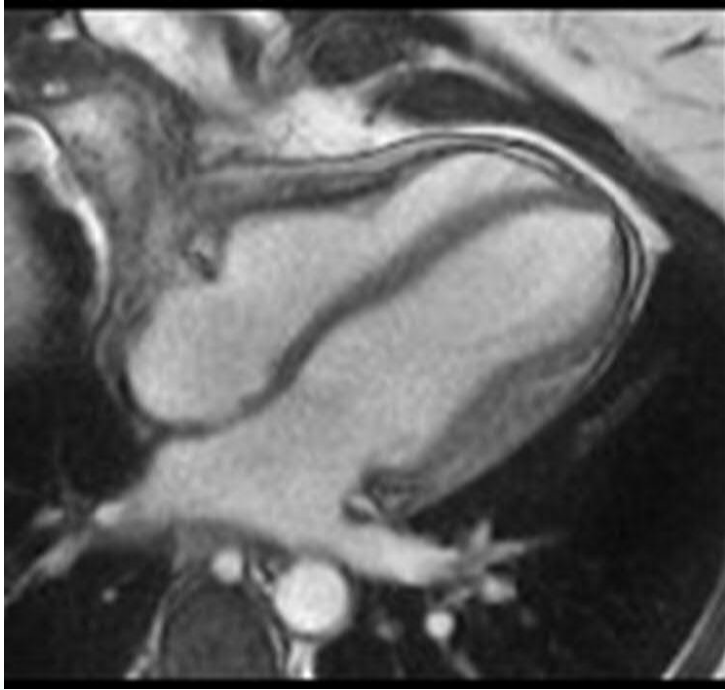
VS motion
Ventricular Interdependence



40 yo Female with Constrictive Pericarditis



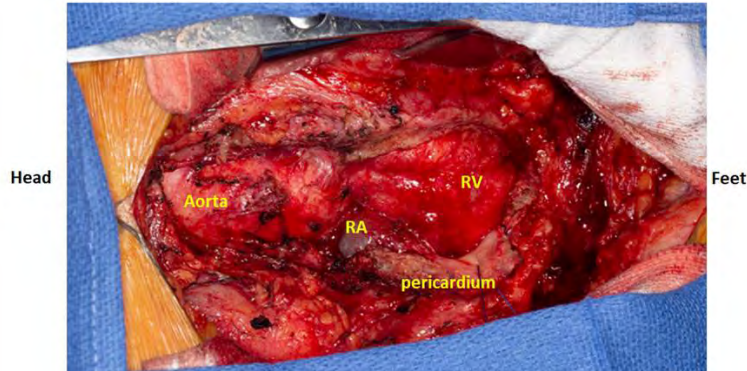
40 yo Female with Constrictive Pericarditis Cardiac MRI



Pericardiectomy

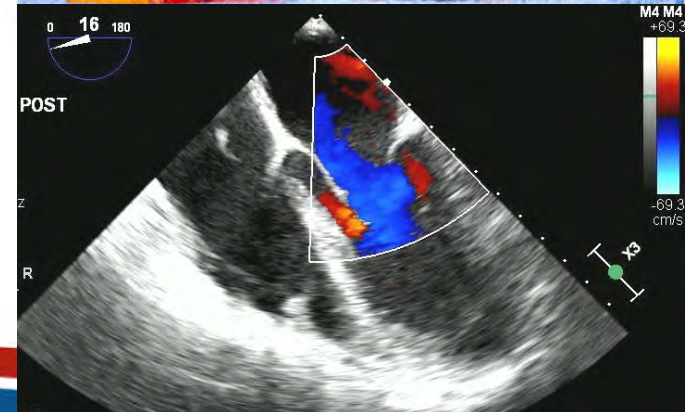
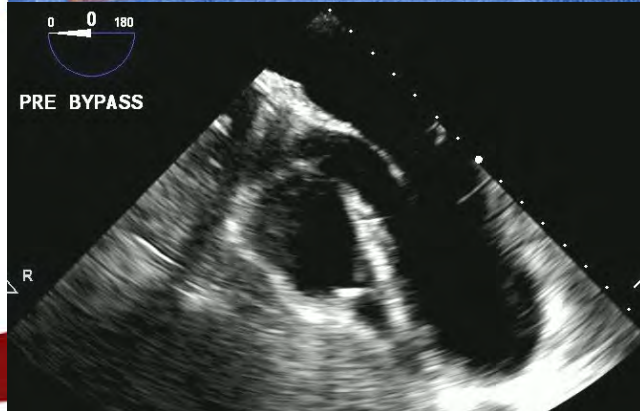
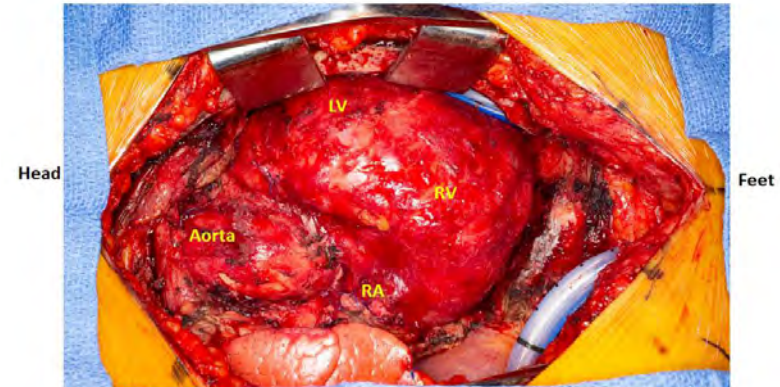
Beginning
Pericardiectomy

Left



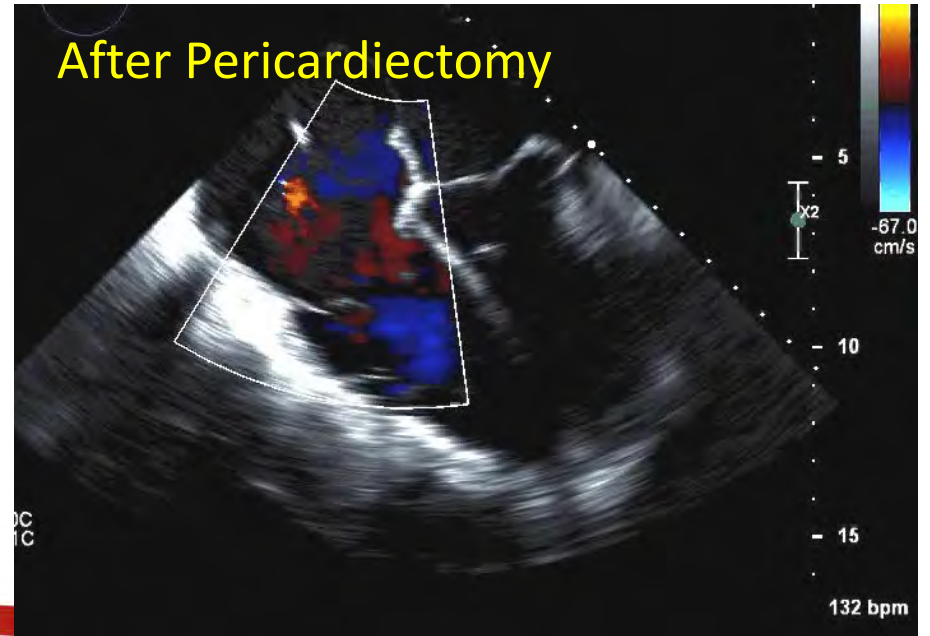
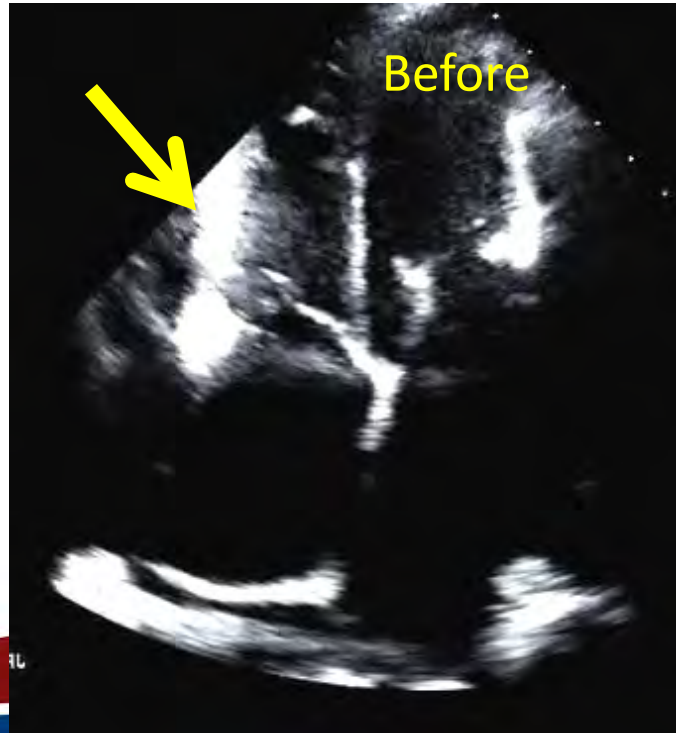
Final Result

Left

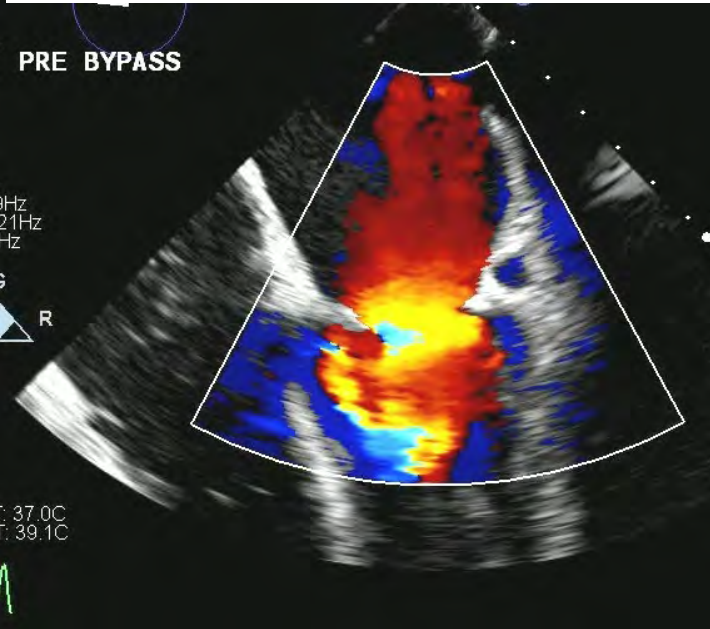
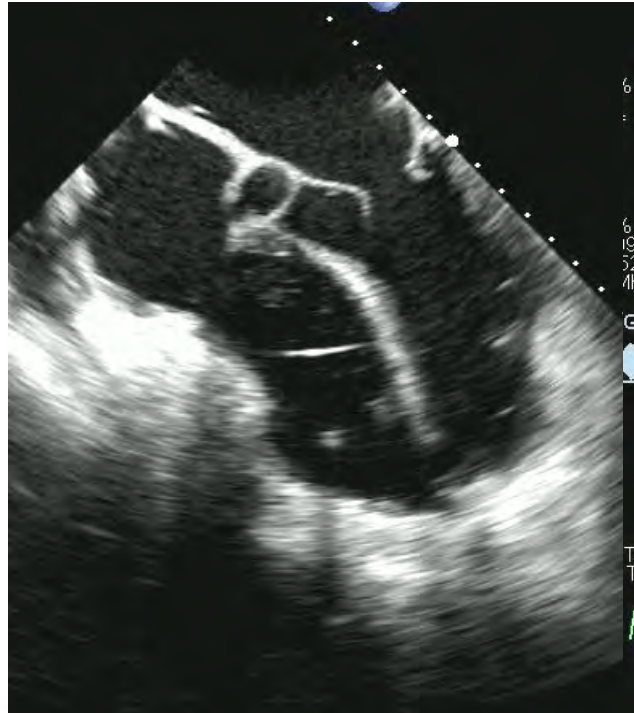


Worsening Tricuspid Regurgitation Following Pericardiectomy for Constrictive Pericarditis*

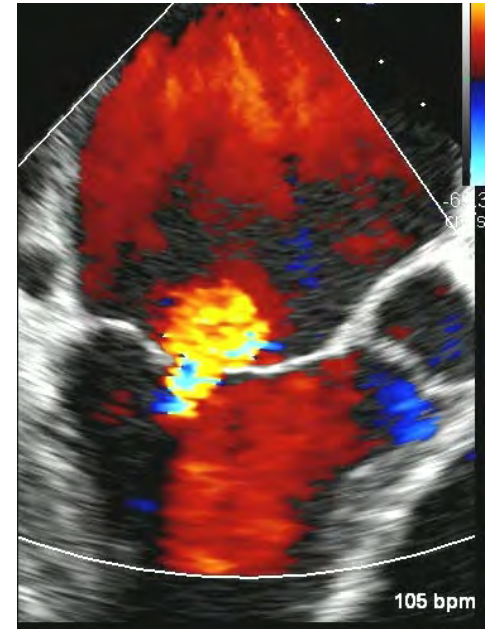
*Todd L. Johnson, M.D., Ph.D.; William B. Bauman, M.D.;
and Richard A. Josephson, M.S., M.D.*



Worsening Mitral Regurgitation after Pericardiectomy Intraoperative TEE



Baseline



After Pericardiectomy

THANK YOU
oh.jae@mayo.edu

*The glory of medicine is that it is constantly
moving forward, that there is always more to
learn.*
Dr. Will Mayo



Clinical significance of pulmonary hypertension in patients with constrictive pericarditis

Kyunghee Lim ¹, Jeong Hoon Yang ^{2,3}, William R Miranda ⁴,
 Sung-A Chang ², Dong Seop Jeong ⁵, Rick A Nishimura ⁴, Hartzell Schaff ⁶,
 Wern Miin Soo ⁷, Kevin L Greason ⁶, Jae K Oh ^{2,4}

