

## Pericardial Disease A New Look at an Old Disease 2013 Update



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No conflict of interest

## Pericardial Disease A Simple Problem?

### Diagnosis

Inflammation  
Fluid  
Constriction

## Pericardial Disease A Simple Problem?

### Treatment

Reduce Inflammation  
Remove Fluid  
Remove Pericardium

## Pericardial Disease A Simple Problem?

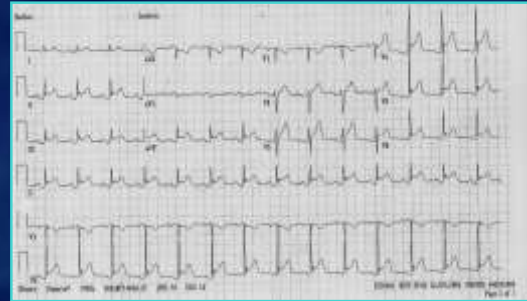
Misdiagnosed  
Under-treated

## Pericardial Disease

A 46 y/o man presents with 2 days of severe pleuritic chest pain, preceded by an URI

On exam BP 120/70 HR 90  
JVP normal Carotid full  
Normal heart sounds  
3 component rub at LSB

## Electrocardiogram



By the way  
What do you call  
two orthopods  
reading an ECG?

A Double-Blind  
Study...

**What  
would you  
do now?**

**Echocardiogram  
Normal LV size function  
No RWMA  
No pericardial effusion**

**What  
would you  
do now?**

**Pericardial Disease**

**You do not need an  
echocardiogram to diagnose  
acute pericarditis  
A normal echocardiogram  
does not rule out acute  
pericarditis**

## Pericardial Disease

### Acute pericarditis

- ✓ Inflammation of the pericardium usually due to a viral infection
- ✓ Diagnosed by history, rub and elevated sed rate + EKG
- ✓ Troponin valuable for risk-stratification
  - ✓ Inpatient admission if positive

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Pericarditis  
Diffuse ST elevation  
"Like a smile"  
PR depression

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## Pericardial Disease

### Other tests needed only in certain circumstances

- Autoimmune profile if recurrent
- Viral titers of little use
- PPD, HIV serology only if high level suspicion
- Echo if high JVP or pulsus paradoxus

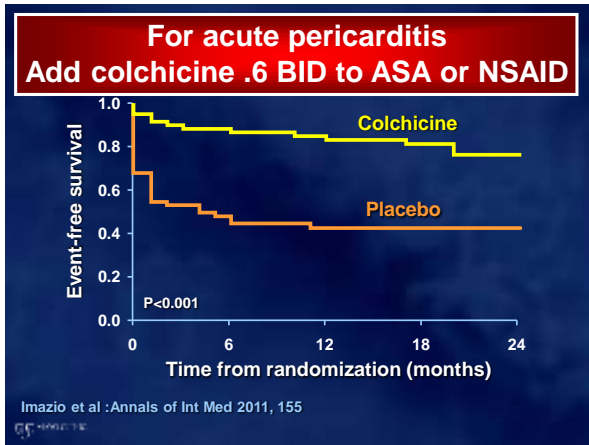
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## Pericardial Disease

### How would you treat this patient?

1. Short burst of steroids
2. NSAID and colchicine
3. ASA and colchicine
4. Interferon
5. Colchicine

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## Pericardial Disease

The patient was treated with steroids for one month (40 taper to 20 mg)

## Pericardial Disease

The patient was treated with steroids for one month (40 taper to 20 mg)

Recurrence 1 month later

Recurrent debilitating pericarditis whenever prednisone is dropped below 15 mg

## Pericardial Disease

Treatment of acute pericarditis

- Best : NSAID or ASA (high dose) for at least one month, then taper slowly (watch sed rate)
- Add colchicine for 6 months
- Do **NOT** use steroids because of risk of relapsing pericarditis

## Pericardial Disease

### Severe relapsing pericarditis

- Multiple recurrent episodes of pericardial pain and high sed rate
- Usually associated with rapid steroid taper



## Pericardial Disease

### Severe relapsing pericarditis

#### Medical Rx

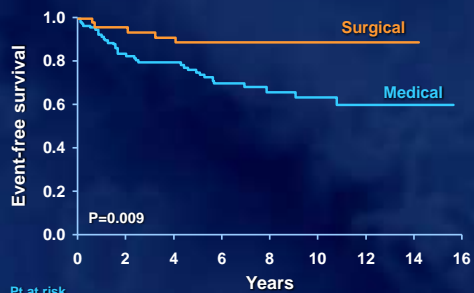
High dose ASA - slow taper off  
prednisone while on ASA (level 10-20)

Colchicine

Complete pericardiectomy



### Surgical Pericardiectomy for Relapsing Pericarditis



## Pericardial Disease

# Pericardial Effusion





## Pericardial Disease

### Pericardial Effusion

#### Benign

Normal JVP  
No pulsus

Subtle Doppler  
findings

#### Tamponade

Elevated JVP  
Pulsus paradoxus

## Echo-Directed Pericardiocentesis

### Indication

Large effusion  
Any effusion with tamponade  
Any effusion with subclinical tamponade

## The Diagnostic Challenge

## Clinical Presentations

The 72 y/o man presents with weight loss and severe edema of both extremities for cancer workup



## Clinical Presentations

The 52 y/o runner who has just "lost steam"



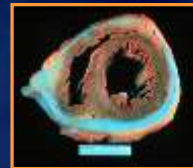
## Clinical Presentations

The 66 y/o woman with severe SOB following aortic valve replacement 10 months ago



## Constrictive Pericarditis

- ✓ Right heart failure out of proportion to left sided disease
- ✓ A treatable etiology of heart failure





## Constrictive Pericarditis

**Early diagnosis and treatment is critical**

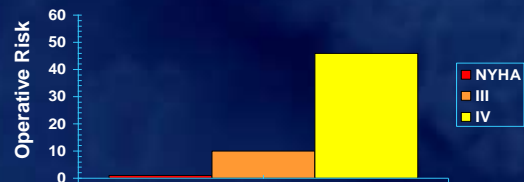
**Operative risk**

**Long term outcome**

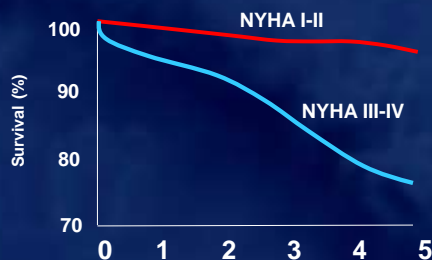


## Constrictive Pericarditis

Mayo Data  
313 pts



## Constrictive Pericarditis Post-op Survival



JTCVS 90:506 1985



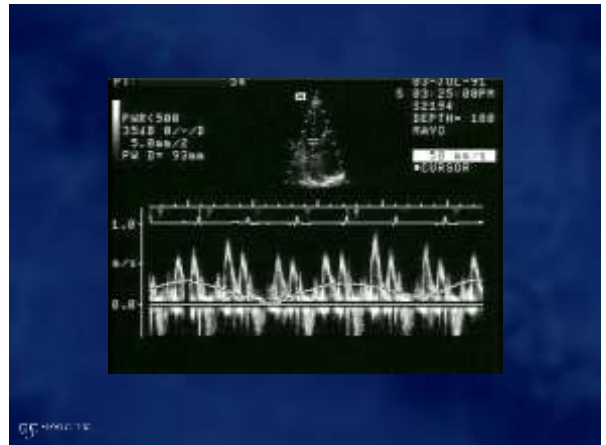
## Case History

**44 y/o woman**

Prior radiation Hodgkins 15 yrs ago  
Now presents with 2 yrs edema, ascites  
and fatigue

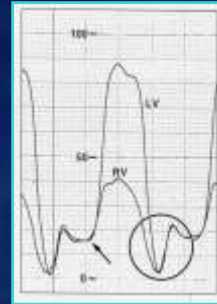
Exam: JVP 20 cm with rapid Y descent  
No murmurs or knocks audible



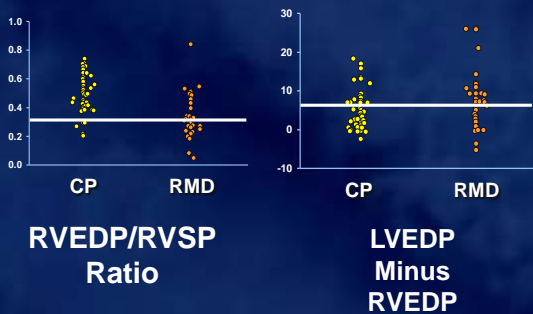


## What to do next?

1. MRI
2. Cath
3. Medical Rx
4. Surgical exploration



**Cath criteria: CP**  
 End equaliz pressures  
 $LVEDP = RVEDP$   
 $RVEDP > 1/3 RVSP$   
 $PA < 50 \text{ mmHg}$



## Constrictive Pericarditis



## Pericardial Thickness: CT/MRI

Normal pericardium on CT/MRI:  
22% pts with proven CP

Thickened pericardium: 70% pts  
after radiation or bypass



## Constrictive Pericarditis

Differential Diagnosis - 2013

Constrictive  
Pericarditis

Restrictive  
Cardiomyopathy



## Constrictive Pericarditis

Differential Diagnosis - 2013

Usually after:  
Radiation  
Prior open heart



## History and Exam

### Classic presentation

- Right heart failure
- Elevated JVP
- Rapid X and Y descent



CP103595-3

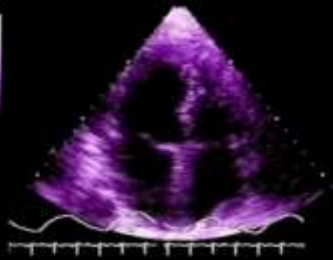
## Echo Evaluation of Constrictive Pericarditis

Referral: CHF  
See: Normal LV function  
Normal valves

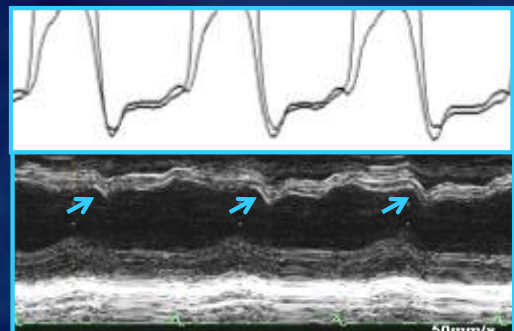
## Echo Evaluation of Constrictive Pericarditis

Look for: Septal shudder  
Septal shift (insp)  
Dilated IVC

Apical 4-Chamber View



Expiration      Inspiration



## Echo Evaluation of Constrictive Pericarditis

If you see: Septal shudder  
Septal shift (insp)  
Dilated IVC

Get hemodynamic information



## Constrictive Pericarditis

The hemodynamics are dynamic during the respiratory cycle and reflect:

Dissociation between intrathoracic and intracardiac pressures

Increased ventricular interaction



## Constrictive Pericarditis

Apnea



Insp



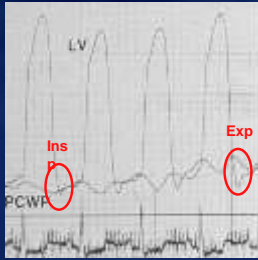
## Constrictive Pericarditis

Normal  
RCM

Little change in the transmitral driving pressure during respiration



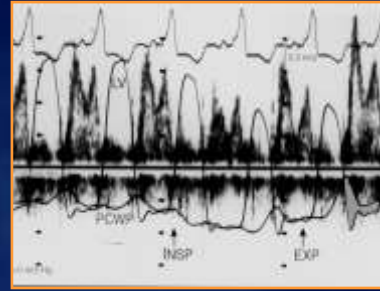
## Constrictive Pericarditis



### Constriction

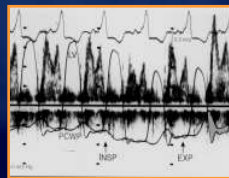
Decrease in the transmitral driving pressure during inspiration

## Constrictive Pericarditis



### History and exam

2DE Doppler



### Classic presentation

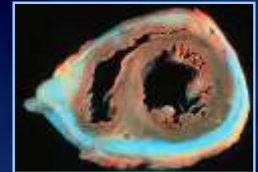
- Septal bounce
- Mitral flows

CP1033505-4

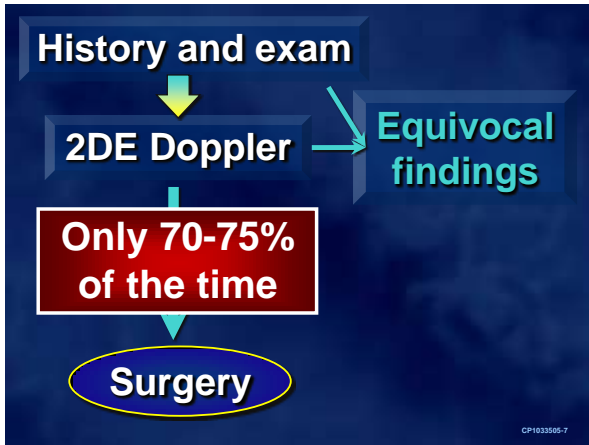
### History and exam

2DE Doppler

Surgery



CP1033505-5

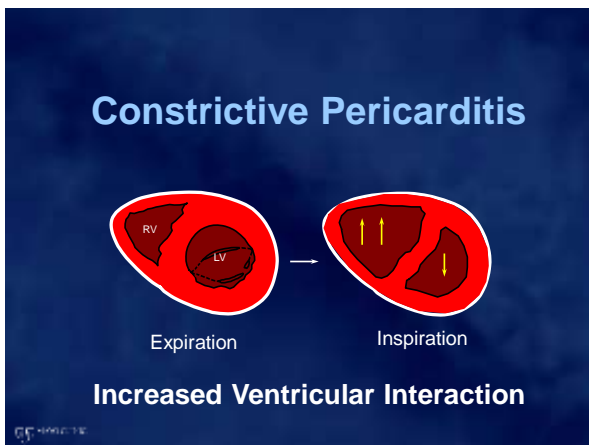


## Constrictive Pericarditis

The hemodynamics are dynamic during the respiratory cycle and reflect:

- Dissociation between intrathoracic and intracardiac pressures
- Increased ventricular interaction

CP103305-7

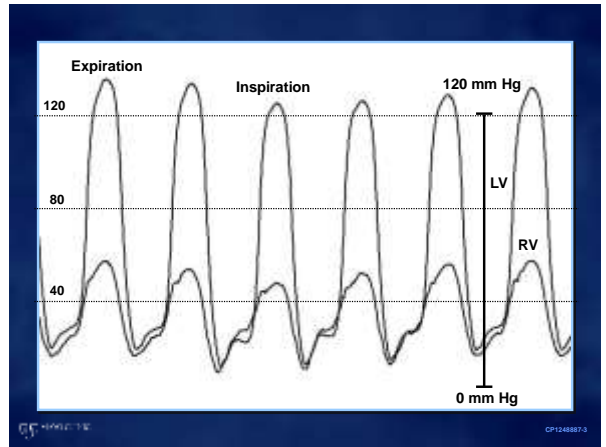
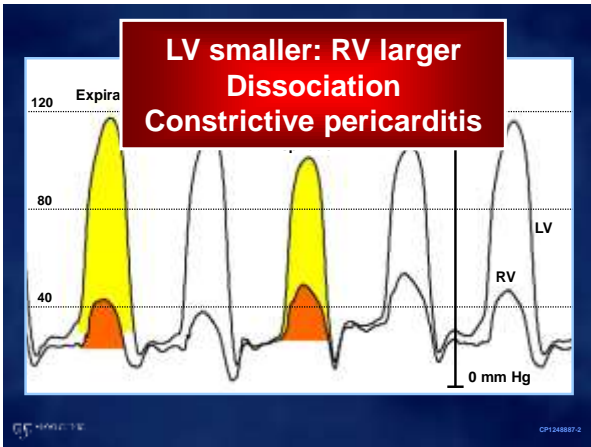
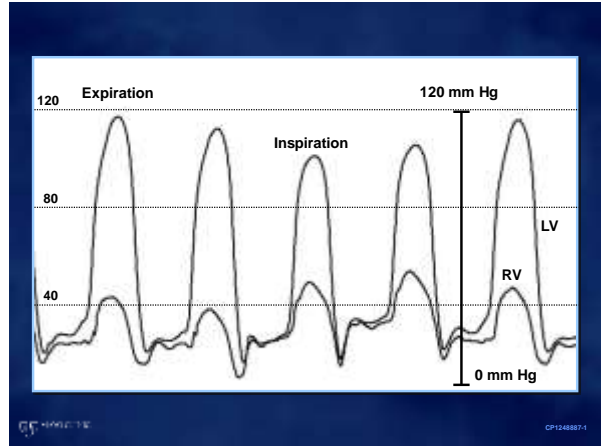
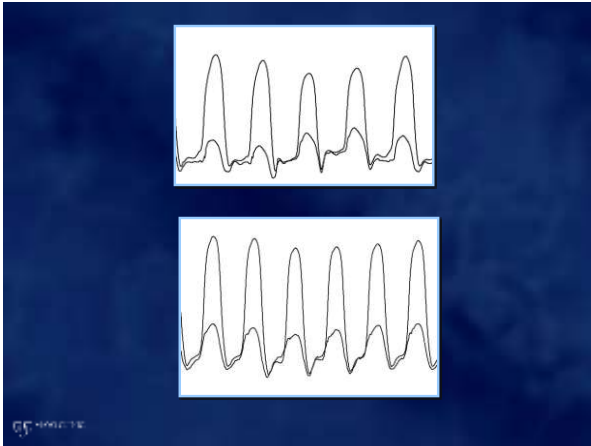


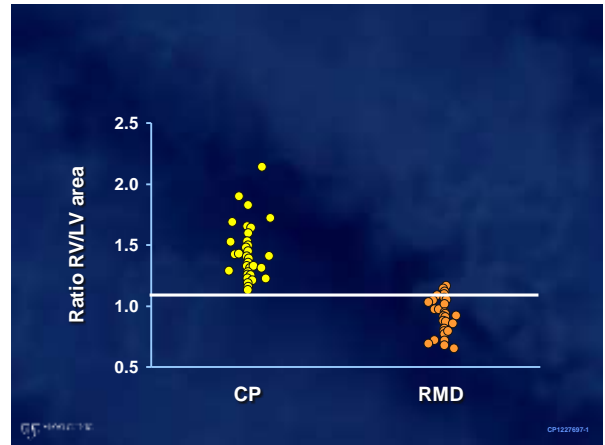
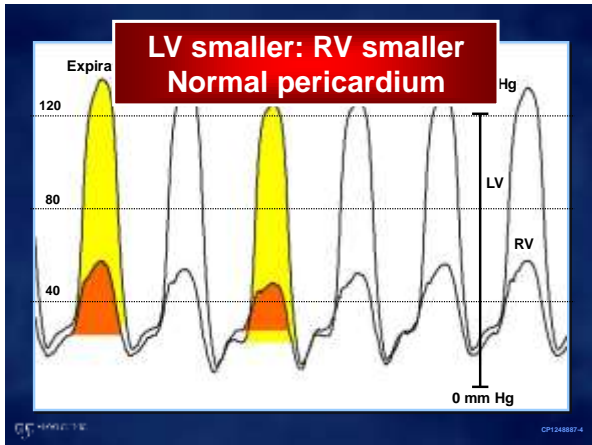
## Constrictive Pericarditis

**Now go to the cath lab...**

CP103305-7







Enhanced ventricular interaction is the most sensitive and specific finding for constrictive pericarditis

CP1248887-4

**Time for a Clinical Case**  
Diagnostic Challenge

CP1227687-1

75 y/o prominent MD from academic center  
Referred for "restrictive cardiomyopathy"

**Past history complicated**

1998 PTCA LAD for "atypical chest pain"  
1999 Bradycardia PPM  
6/00 Acute chest pain – emergency angio  
Diagnosis acute pericarditis  
5/01 Recurrent pericarditis – colchicine  
8/01 Onset progressive SOB and edema  
Requiring increasing diuretics  
Now 120 mg furosemide BID

Multiple work-ups – multiple institutions  
Several catheterizations

RA 12 mmHg – up to 20 mmHg  
with fluid

Endomyocardial biopsy – fibrosis  
with myocyte hypertrophy

Labs : proteins, iron, thyroid normal

Skeletal muscle biopsy "atypical  
inclusion bodies"

**Diagnosis : restrictive cardiomyopathy**

**Exam: BP 128/70 P 70**

JVP 18 cm – large "V"

Lungs – clear

LV quiet 1+ parasternal lift

S1 normal S2 narrowly split

Soft 1/6 barely audible

Holosystolic murmur

Early diastolic filling sound

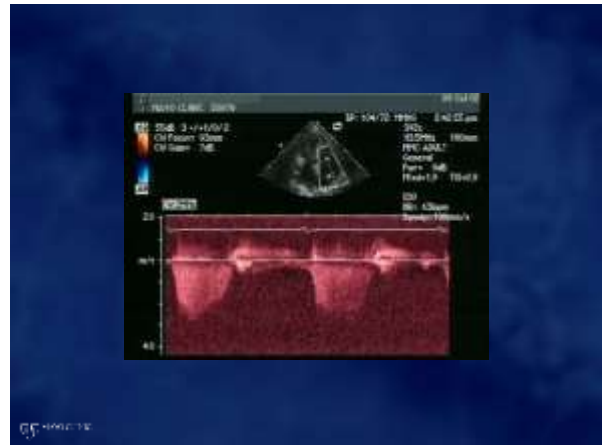
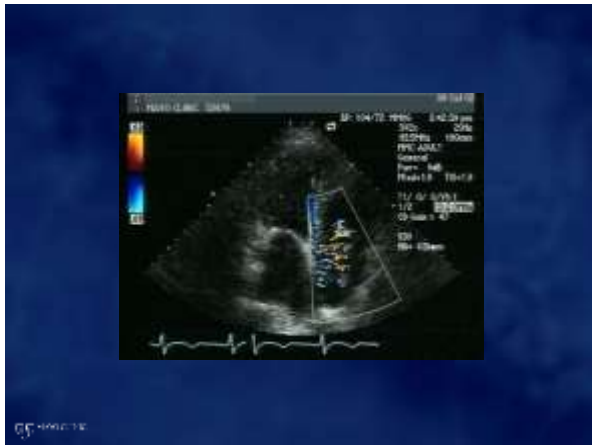
Bilateral pitting edema



CXR: mild cardiomegaly, dual chamber PPM  
No pulmonary venous congestion

What would you do now?





**Final Impressions**

1. Normal left ventricular size.
2. Calculated left ventricular ejection fraction; 71 %.
3. Mild right ventricular enlargement.
4. Moderate left atrial enlargement.
5. Moderate right atrial enlargement.
6. Mild aortic valve regurgitation.
7. Mild-moderate mitral valve regurgitation.
8. Moderate tricuspid valve regurgitation.
9. Estimated right ventricular systolic pressure; 51 mmHg.
10. Indeterminate left ventricular diastolic function.

**Findings**

Normal left ventricular systolic function. Normal global LV wall thickness. No regional wall motion abnormalities. Normal left ventricular wall thickness. Normal right ventricular size. Normal right ventricular function. Aortic valve moderate aortic regurgitation. Mild-moderate mitral regurgitation. Moderate tricuspid valve regurgitation. Normal aortic valve calcification. Normal aortic valve area. Normal size of the aorta. Size of P2/A2 ratio. Mildly to moderately enlarged right atrium and right ventricle.

**Final Impressions**

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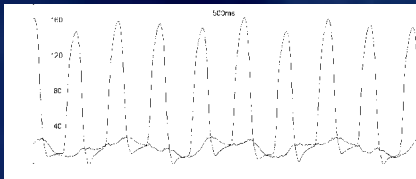
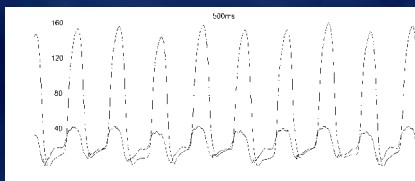
What would you do now?

CT scan

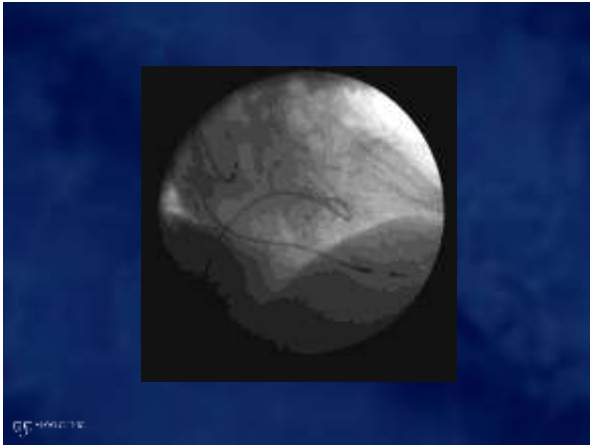
Mild patchy pericardial thickening



What would you do now?



What would you do now?



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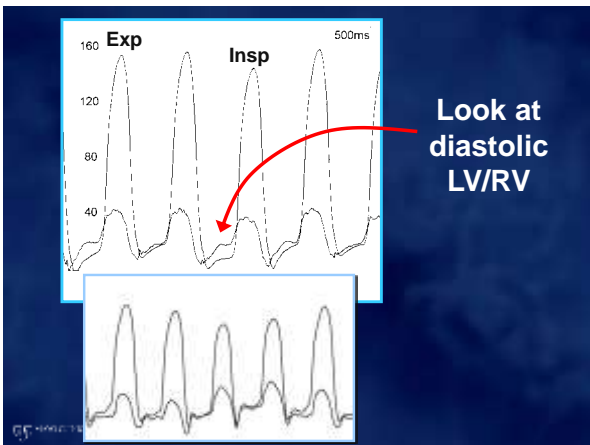
**Heart Rhythm Disorders**

**Severe Symptomatic Tricuspid Valve  
Regurgitation Due to Permanent Pacemaker  
or Implantable Cardioverter-Defibrillator Leads**

Qunor Liu, MD,\* Erik A. Nadeau, MD, FACC,\* Hesh M. Connolly, MD, FACC,<sup>†</sup>  
Joseph A. DeMarco, MD,<sup>†</sup> Thom F.M. Strack III, MD,<sup>†</sup> David L. Hayes, MD, FACC<sup>†</sup>  
*Analysis: Advances*

**Look at LV/RV diastolic pressures  
Inspiration**

**Constriction: equal  
TR or RV dysfunction: RV>LV**



**Severe Tricuspid Regurgitation**

- ✓ Increasing incidence from PPM and AICD
- ✓ Simulates constrictive pericarditis
- ✓ Subtle changes in diastolic pressures

## Pericardial Disease A Simple Problem?

Misdiagnosed  
Under-treated

Which patient needs a needle vs “cold steel”?

