# ECOCARDIOCHIRURGIA 2012

## La pericardite costrittiva ed effusivo-costrittiva.

## Le patologie rare talora sono tali perché non riconosciute.

*Alcuni suggerimenti all'ecocardiografista clinico per una diagnosi corretta e tempestiva*

VI CONGRESSO NAZIONALE DI ECOCARDIO CHIRURGIA
MILANO 15-17 OTTOBRE 2012

Giovanni Corrado, FESC
Unità Operativa di Cardiologia
Ospedale Valduce – Como

H. VALDUCE 1879
Como - Italy

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*Alcuni suggerimenti all'ecocardiografista clinico per una diagnosi corretta e tempestiva*

**Giovanni Corrado, FESC**

***CONFLITTI DI INTERESSI : NESSUNO***

# UNA DIAGNOSI DIFFICILE…

A PATIENT'S JOURNEY

## Constrictive pericarditis

After progressing through several specialties, Ian Oliver was diagnosed with constrictive pericarditis. He underwent a successful pericardiectomy, but has been uncomfortable with subsequent drug treatment

Ian Oliver *patient* [1], Tom Treasure *professor* [2]

[1A1] Haddington, East Lothian, UK; [2A2] Clinical Operational Research Unit, Department of Mathematics, University College London, London WC1H 0BT, UK

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BMJ Helping doctors make better decisions

In April 2010 I noticed that almost overnight I had developed a beer belly. As I do not drink much alcohol and am normally slim I began to worry. About this time I also became breathless and easily fatigued, and I developed swollen ankles caused by fluid retention. My general practitioner referred me to my local hospital for an ultrasound, which indicated that I had a swollen spleen and liver.

The cardiologist eventually made a diagnosis of constrictive pericarditis, which he said was a rare condition that some doctors may not recognise. He also said that few data were available on this condition and that its cause was known in only 50% of cases, of which 15% were found to be tuberculosis related.

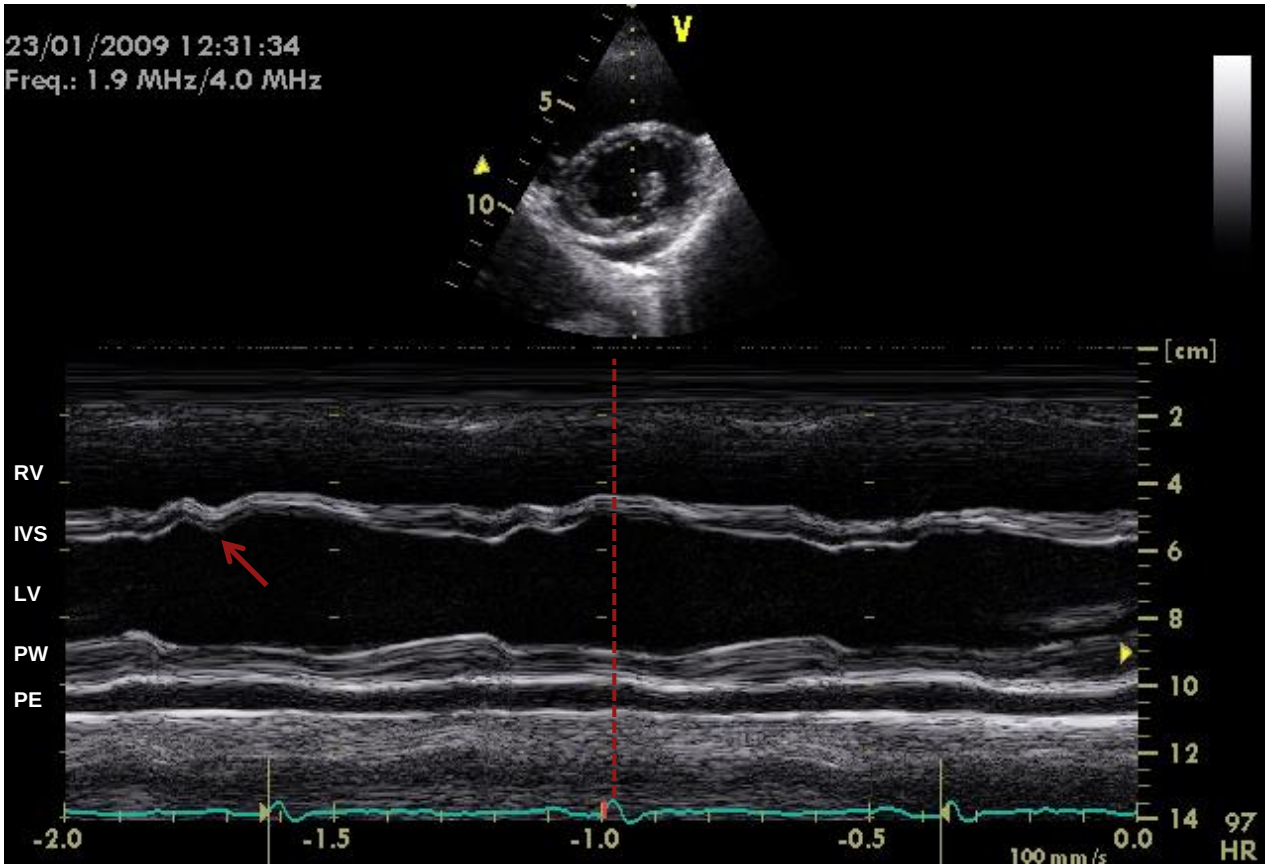
# UN CASO REALE

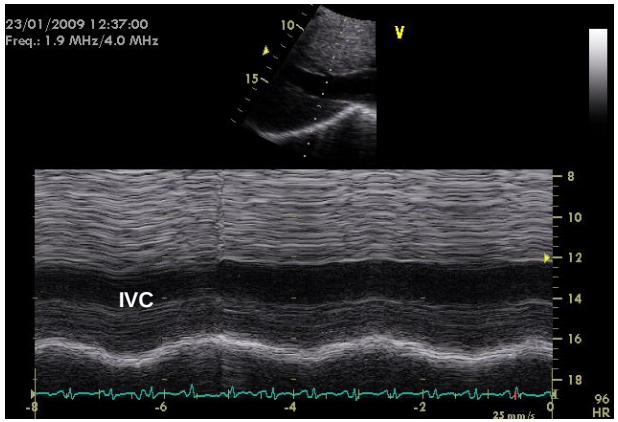
- ♀ di aa 18.
- Storia da numerosi anni di facile stancabilità da sforzo
- Inviata a consulenza epatologica per epatomegalia con versamento ascitico.
- Un esame ecocardiografico viene richiesto a completamento dello screening per epatopatia di ndd (nel sospetto di fegato da stasi).

The diagnosis of CP should always be considered in patients presenting with predominant right heart failure symptoms

Talreja DR et al JACC 2008;51:315

# ECOCARDIOGRAMMA



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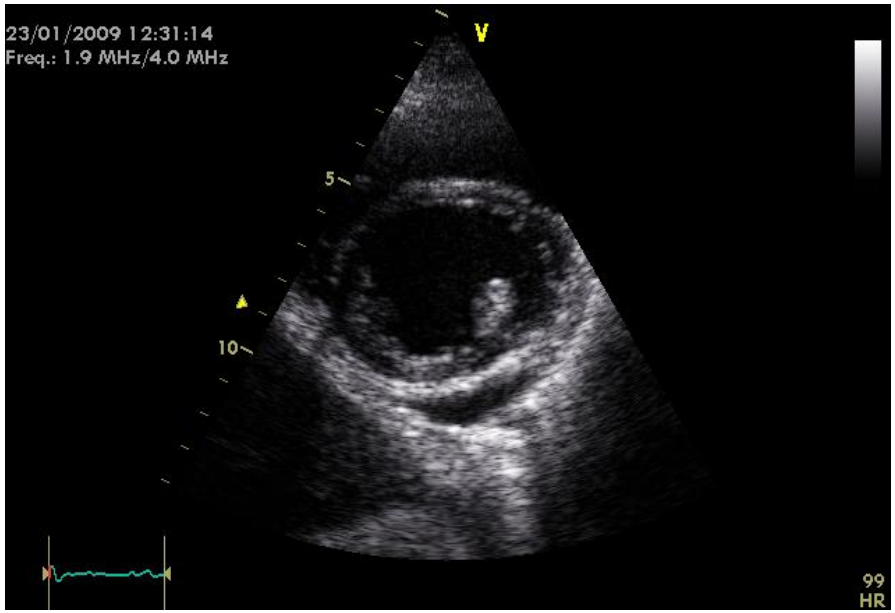


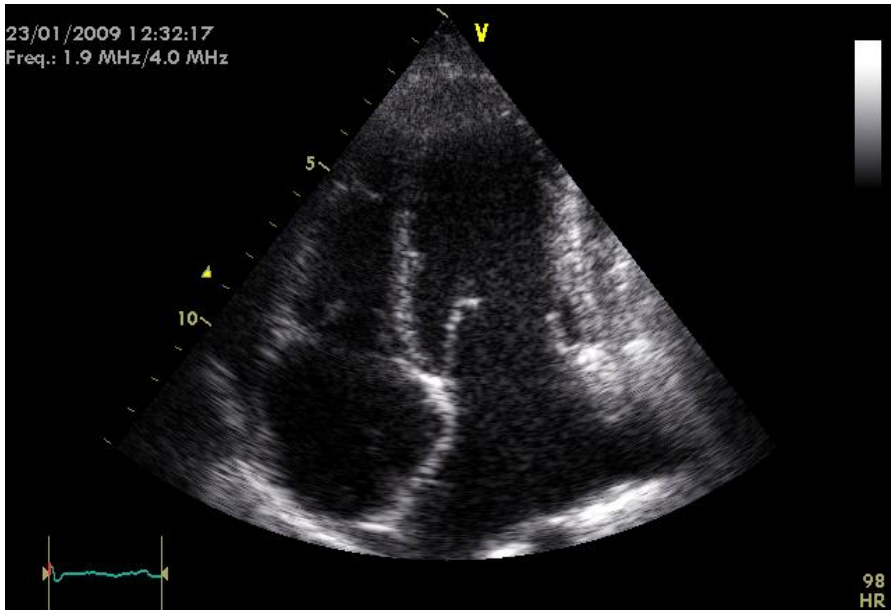

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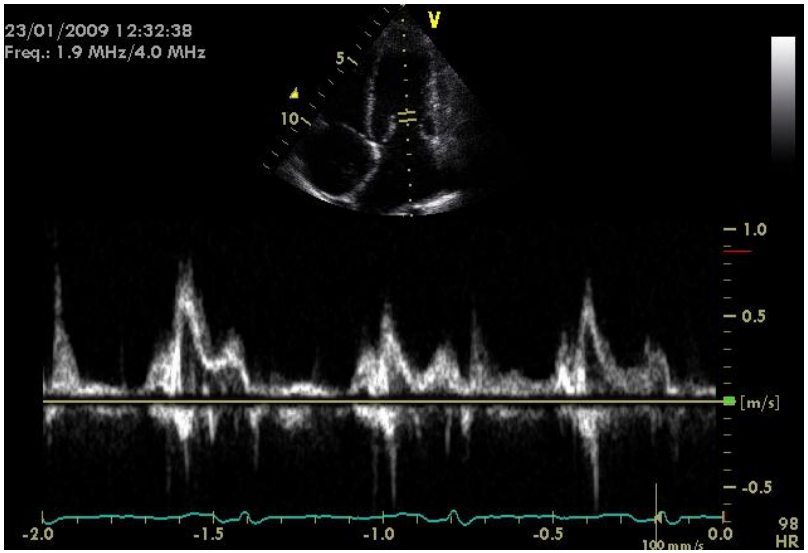


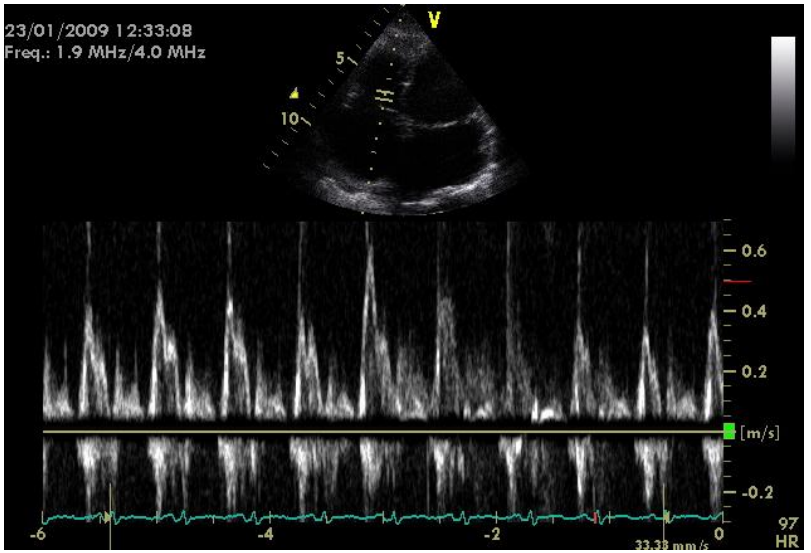


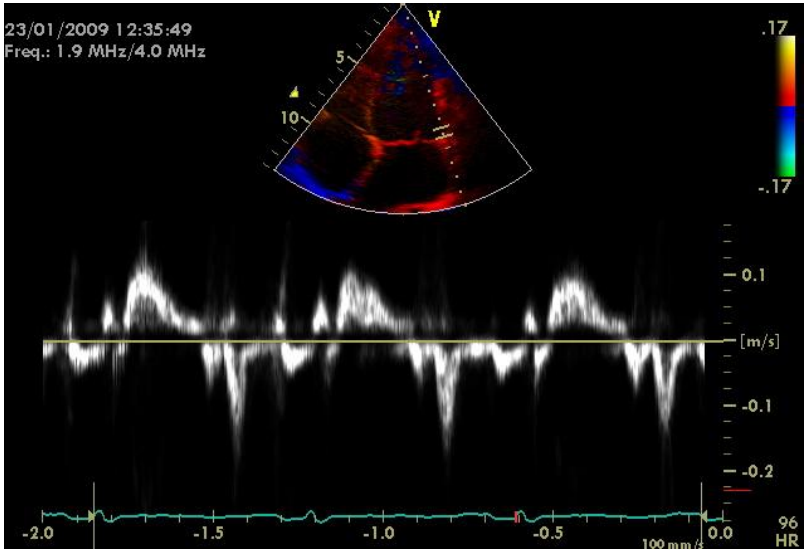


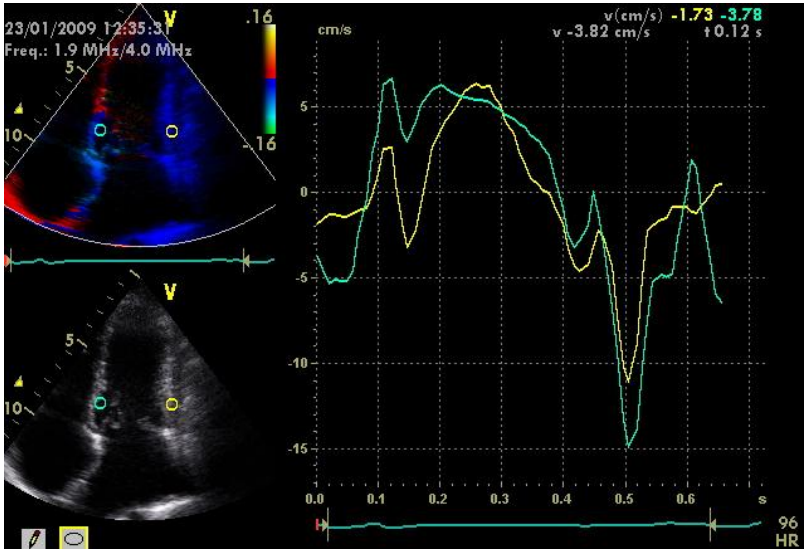

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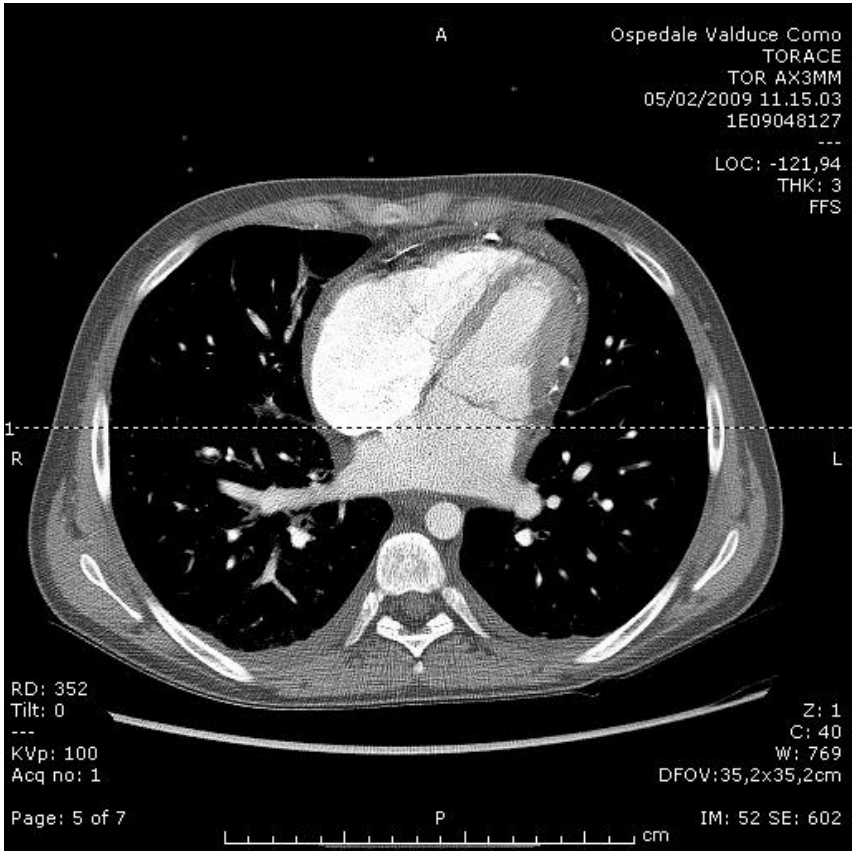
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KVp: 100
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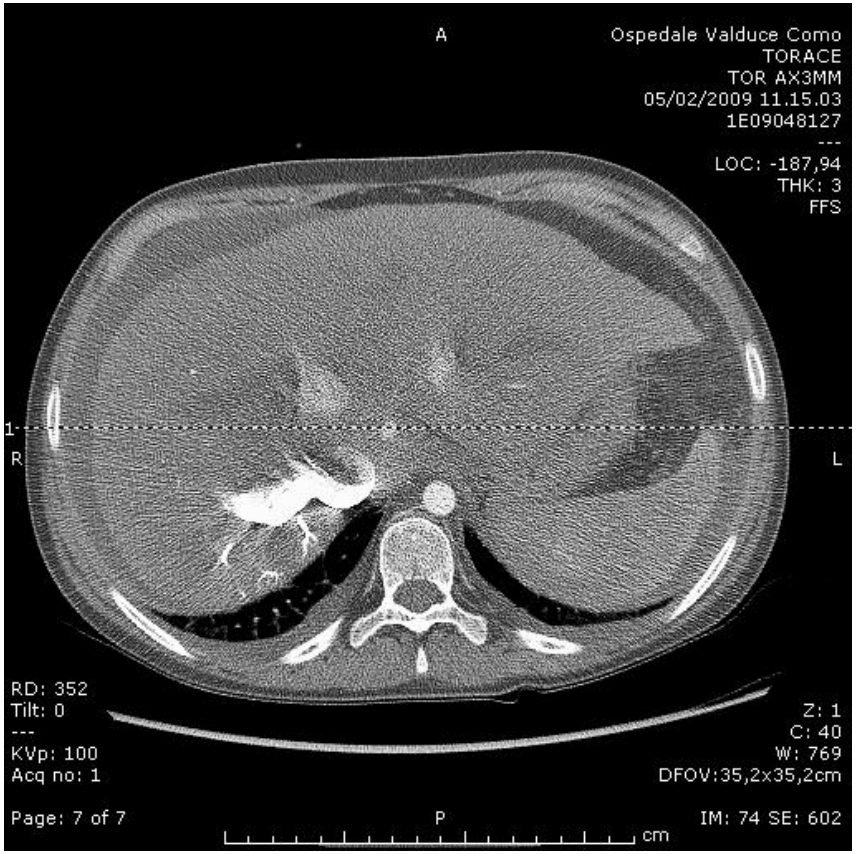
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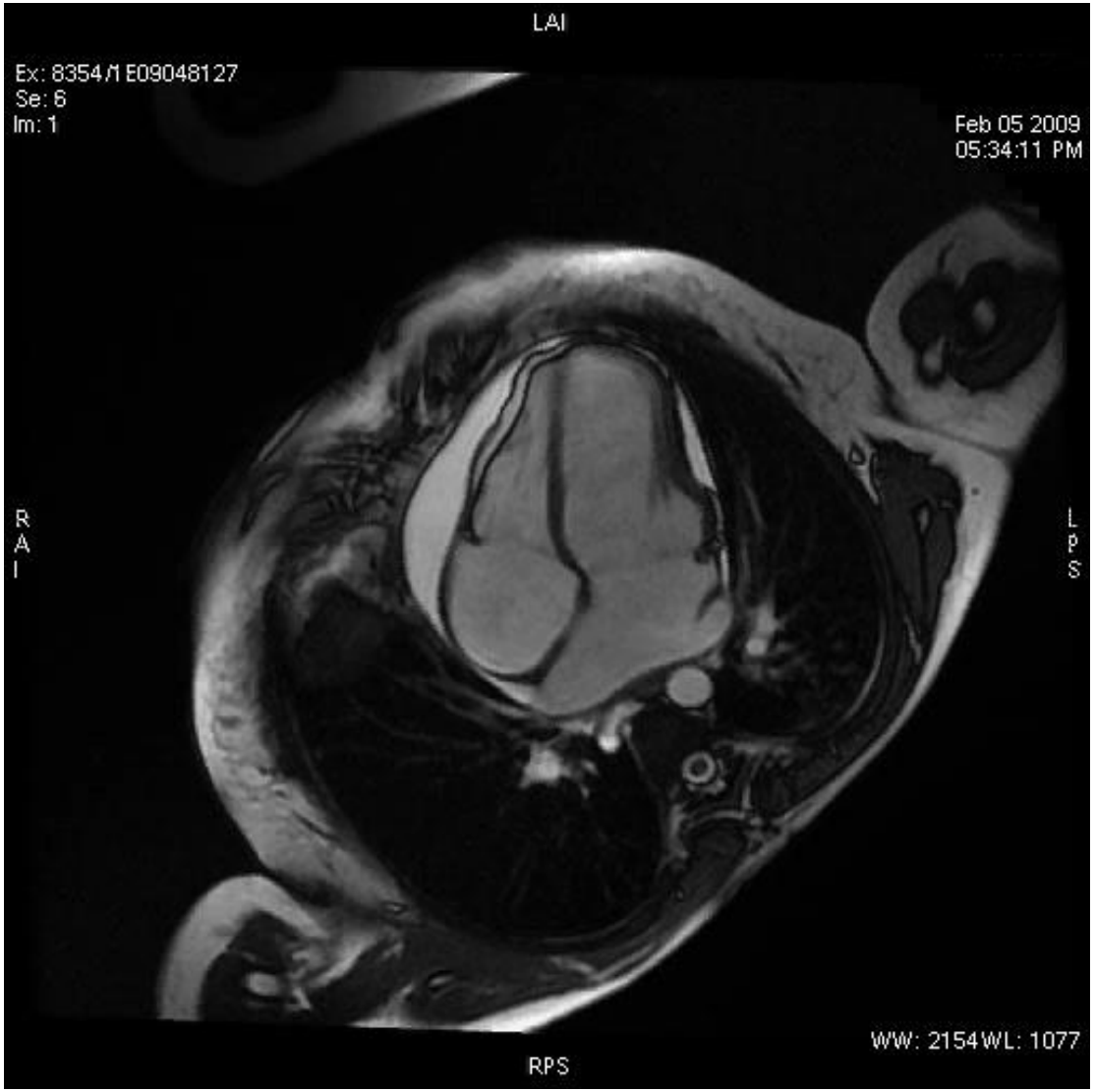
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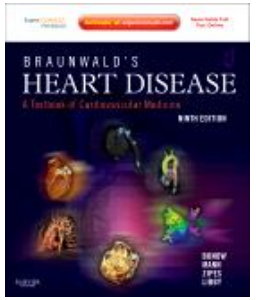
# PERICARDITE COSTRITTIVA. EZIOLOGIA

**TABLE 75-5 -- Causes of Constrictive Pericarditis**

- Idiopathic
- Irradiation
- Postsurgical
- Infectious
- Neoplastic
- Autoimmune (connective tissue) disorders
- Uremia
- Post-trauma
- Sarcoid
- Methysergide therapy
- Implantable defibrillator patches



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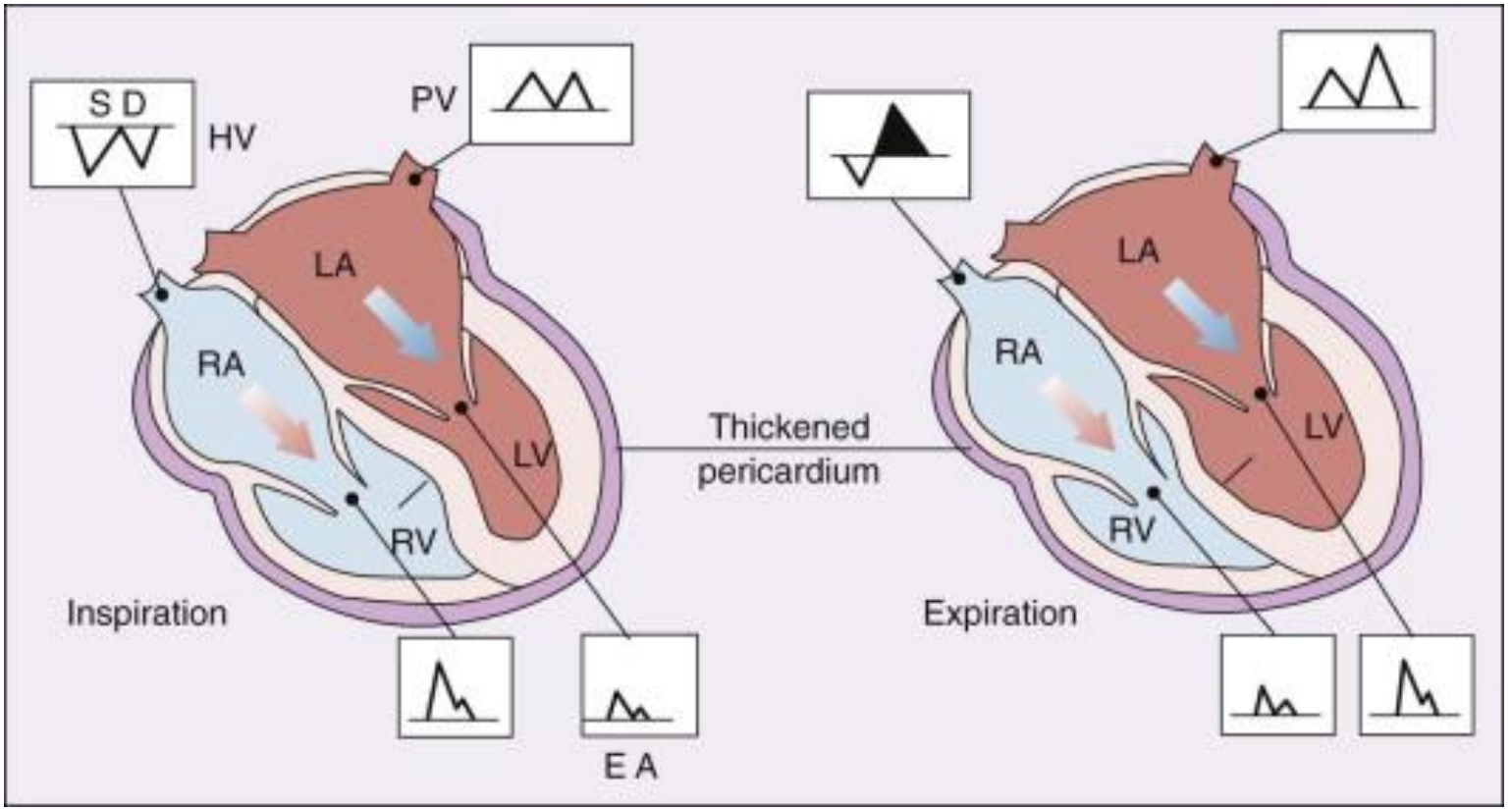
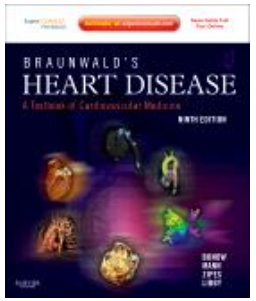
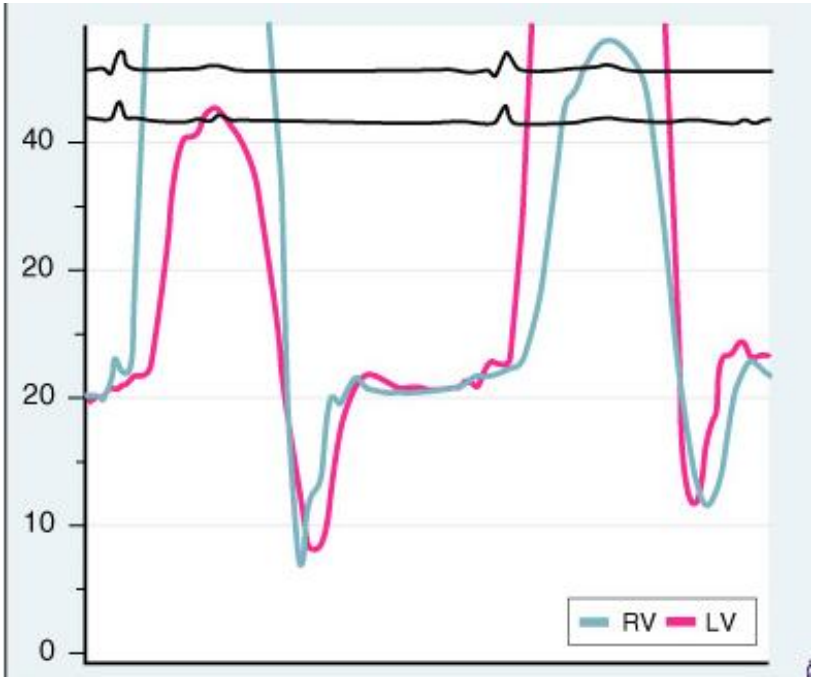
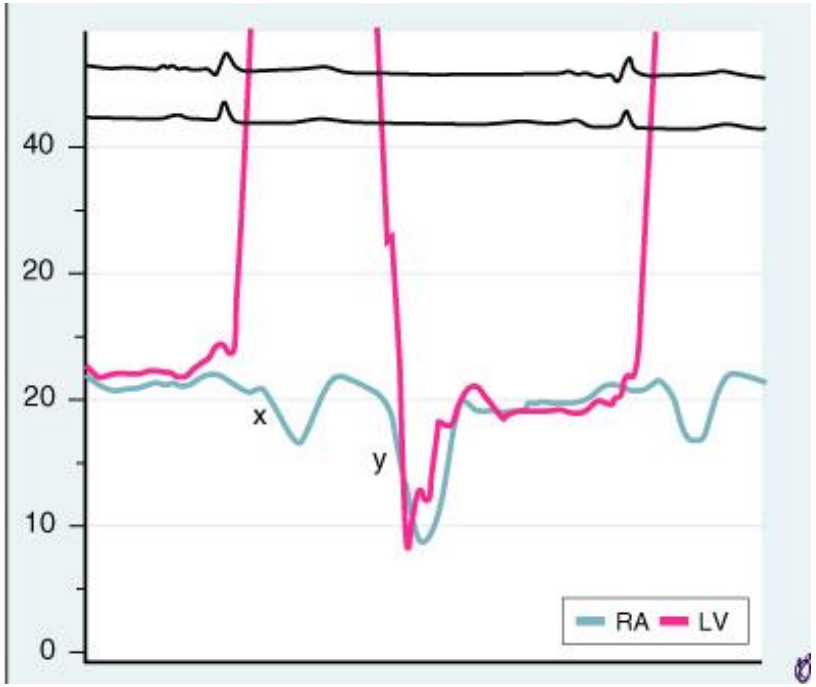


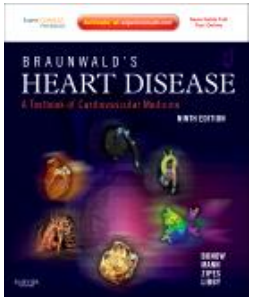

- Riempimento restrittivo
- Esagerata interdipendenza ventricolare



# PERICARDITE COSTRITTIVA. FISIOPATOLOGIA



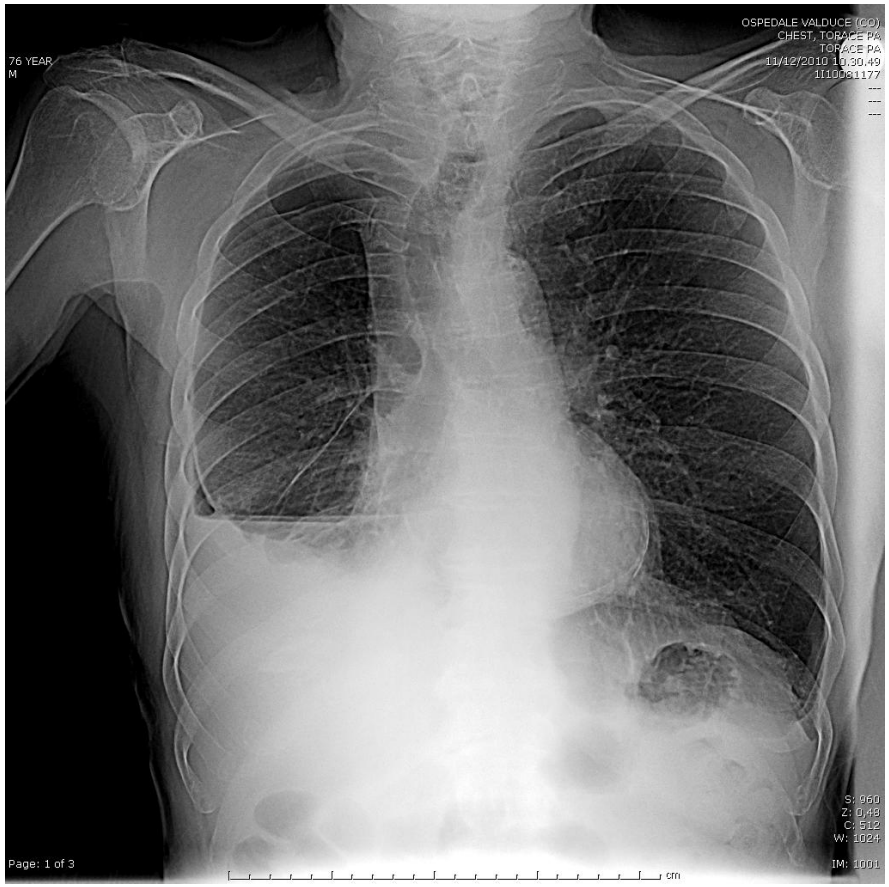



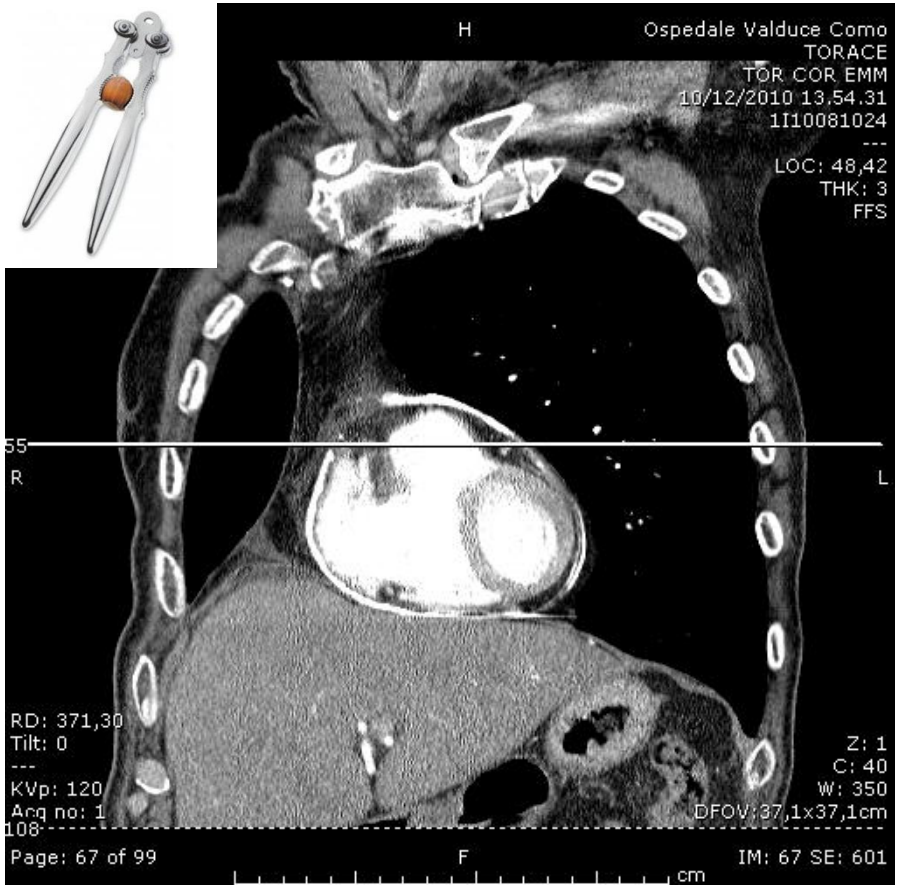



# PERICARDITE COSTRITTIVA

- **Ispessimento del pericardio** (v.n < 3 mm)
  - Difficile da rilevare con gli ultrasuoni
  - Possibili shadowing se calcificazioni.
  - Meglio apprezzabile con TAC RNM
  - Possibile pericardite costrittiva senza significativo ispessimento del pericardio
- **Riempimento restrittivo**
- **Aumentata interdipendenza ventricolare**

# ISPESSIMENTO DEL PERICARDIO



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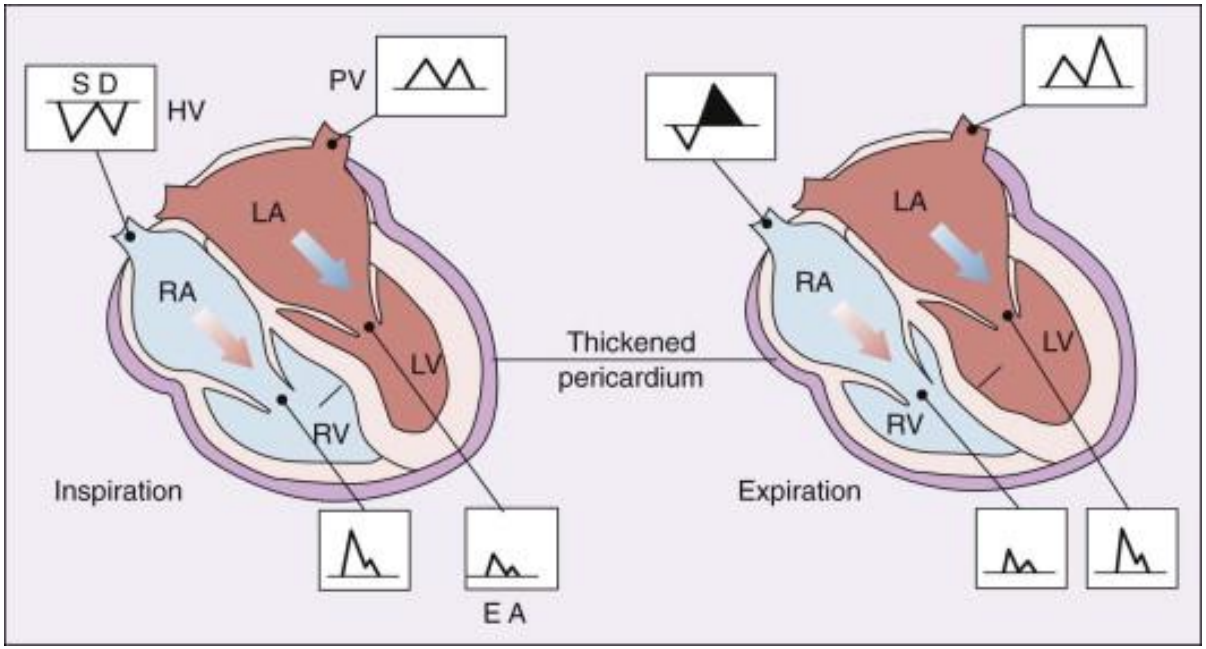


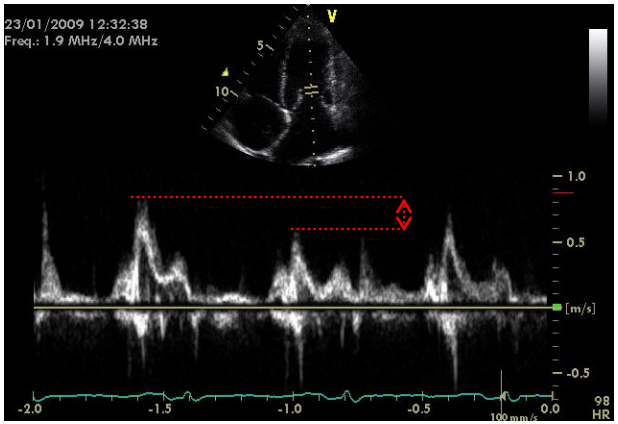


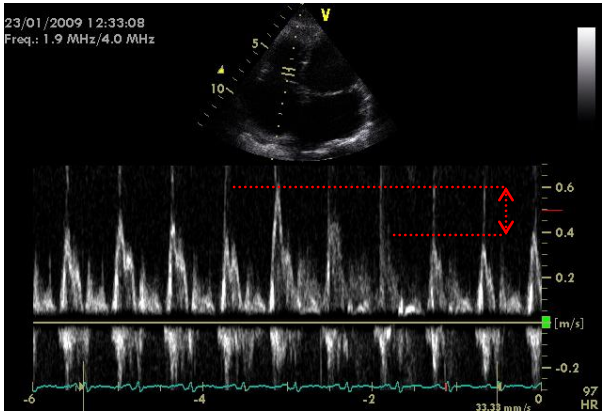

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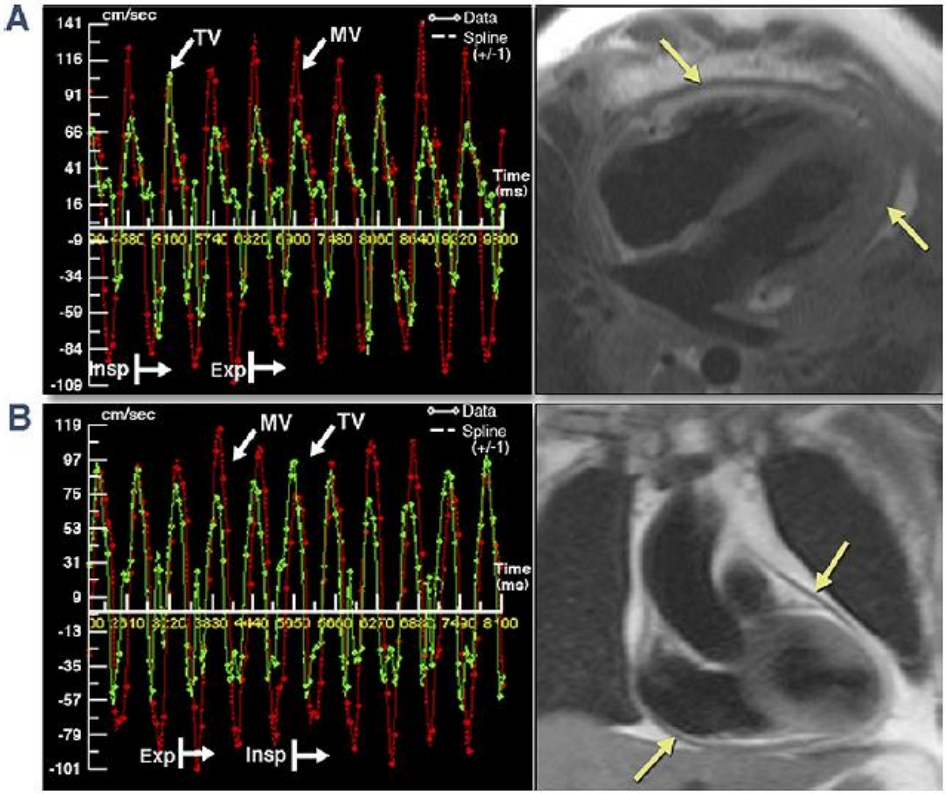


JACC: CARDIOVASCULAR IMAGING
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Simultaneous Right and Left Heart Real-Time, Free-Breathing CMR Flow Quantification Identifies Constrictive Physiology

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*Columbus, Ohio*

**J Am Coll Cardiol Img 2012;5:15–24**


**Figure 2. Respirophasic Variation in MV and TV Inflow Velocities by RT-PC CMR**

Two representative examples of RT-PC velocities across MV (**red bars**) and TV (**green bars**) show respirophasic variation, and the same patients' corresponding dark blood images (half Fourier single-shot turbo spin echo and T1-weighted turbo spin echo) illustrate thickened pericardium. (A and B) Represent patients #8 and #3 from Table 2. Patient #3's heart rate was 103 beats/min at acquisition resulting in E and A fusion (B). A = late mitral diastolic peak velocity; CMR = cardiac magnetic resonance; E = early mitral diastolic peak velocity; Exp = expiratory; Insp = inspiratory; other abbreviations as in Figure 1.

# COSTRIZIONE VS RESTRIZIONE

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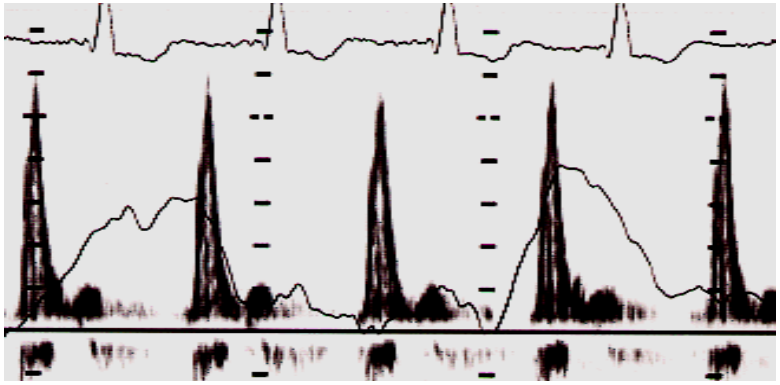

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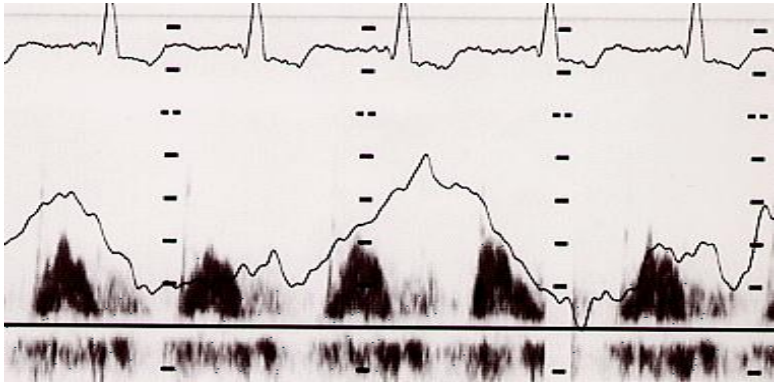

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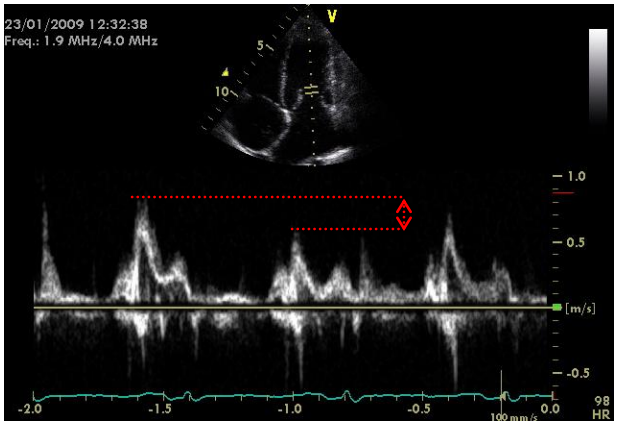


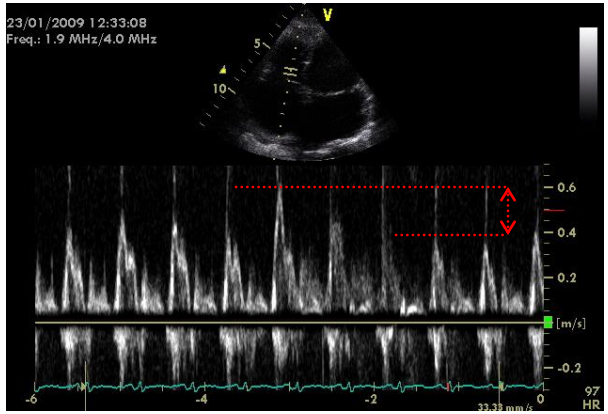


**COSTR**

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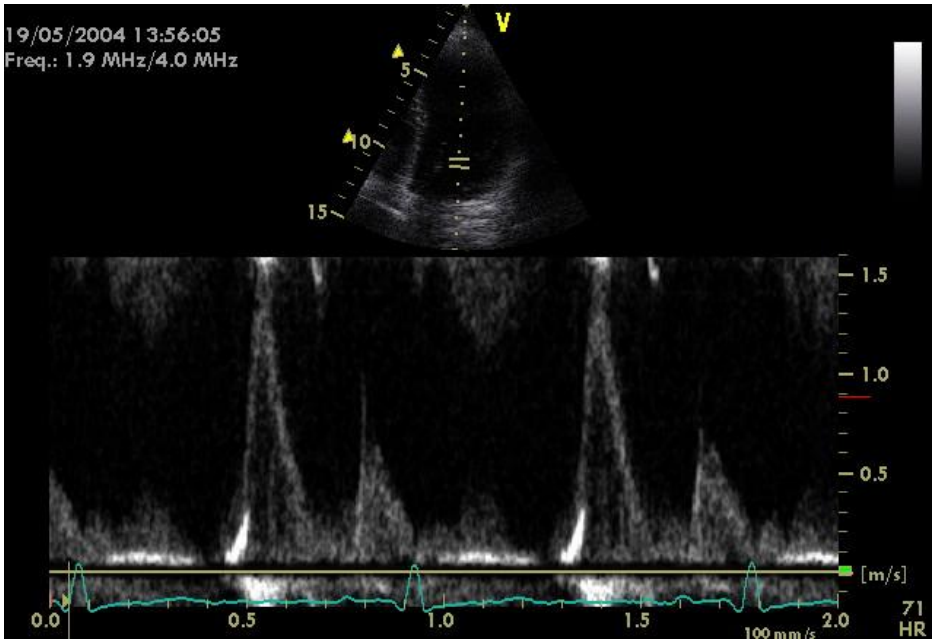


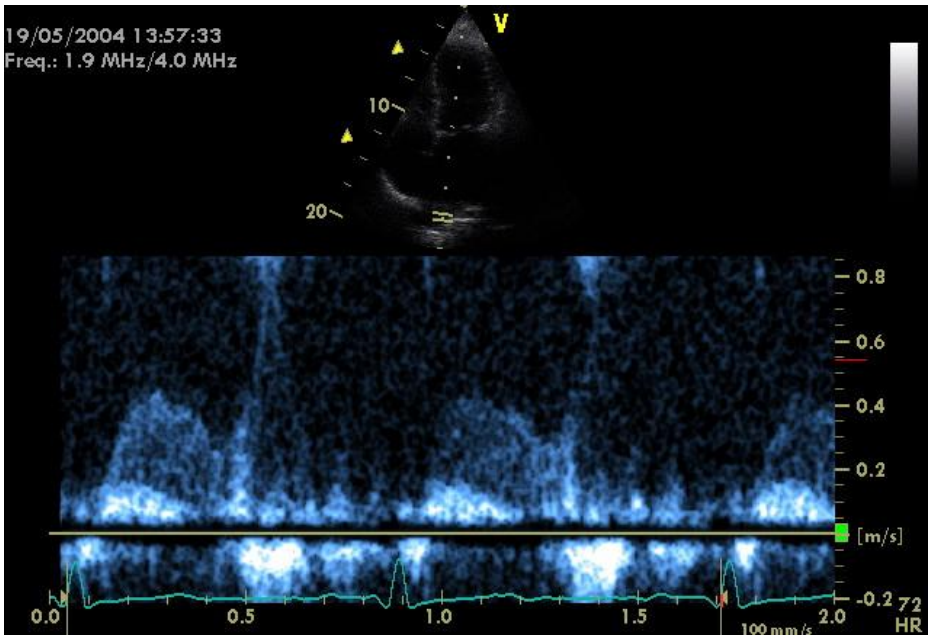


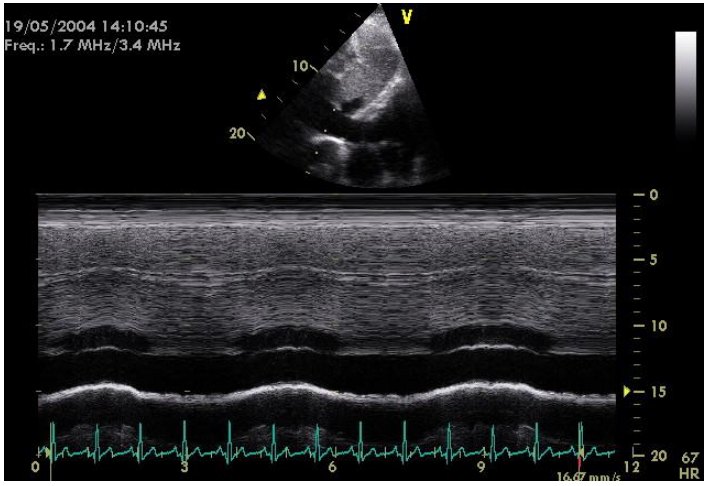

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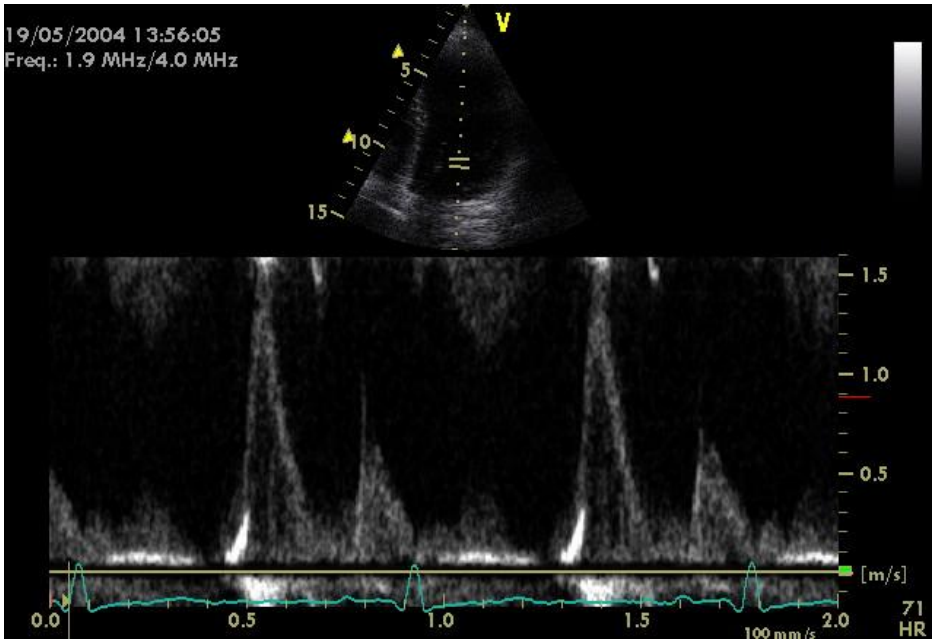
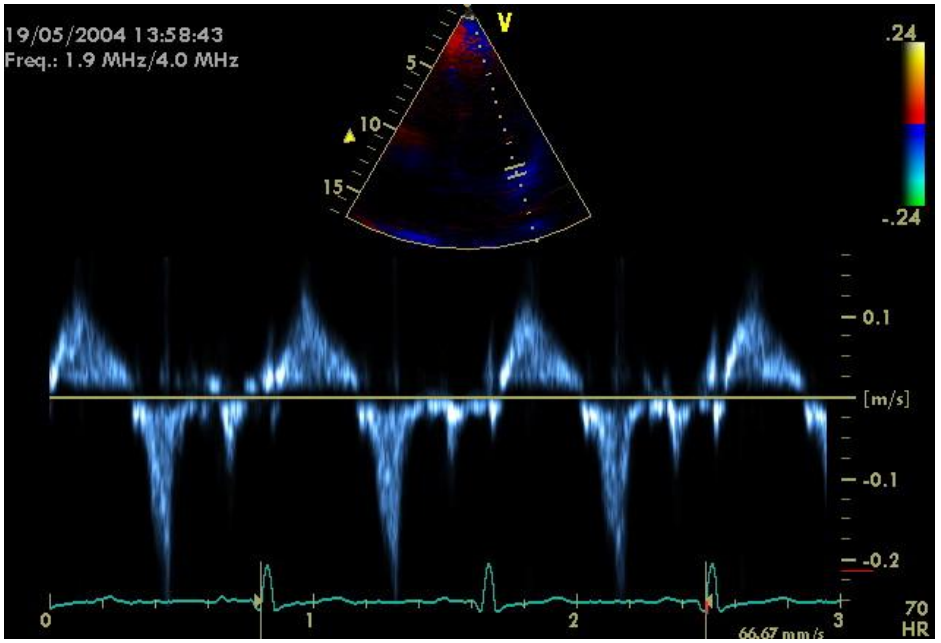
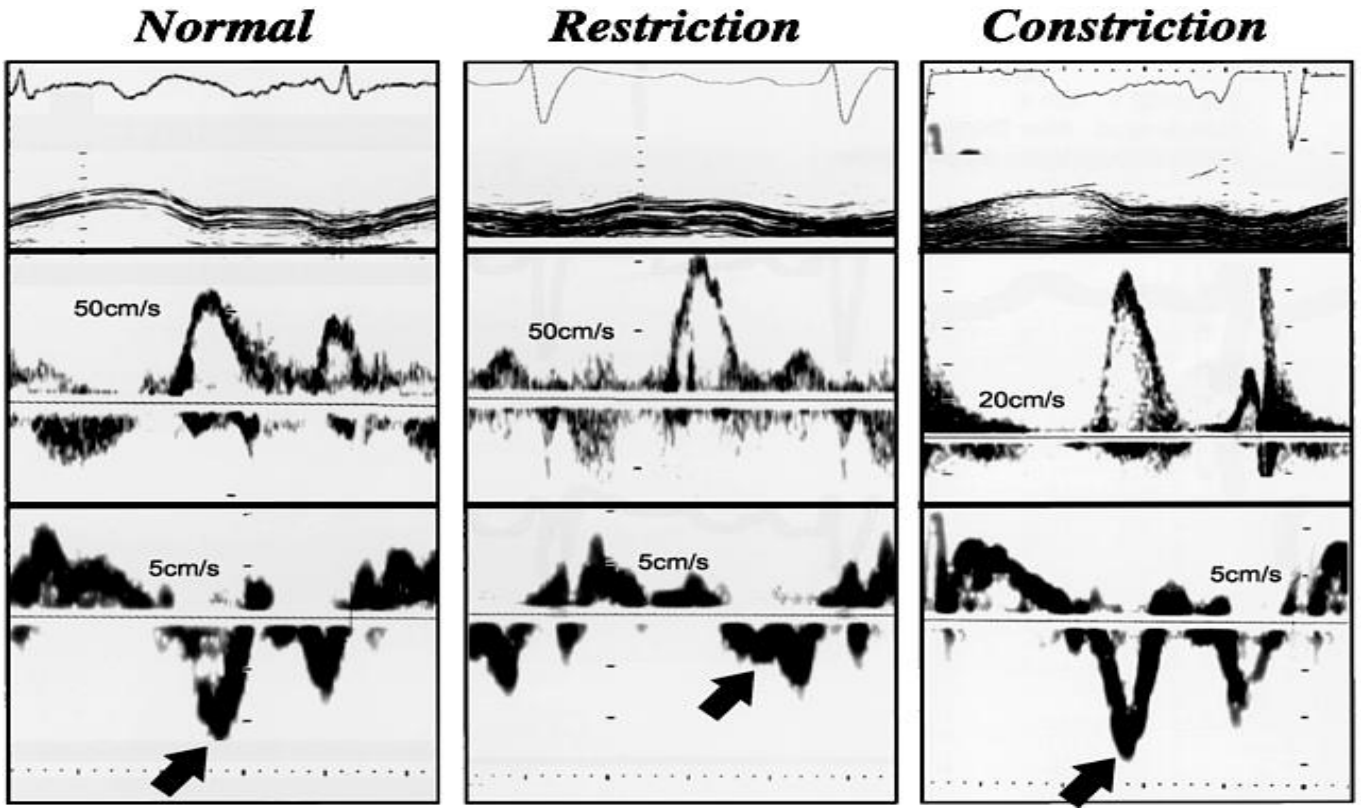
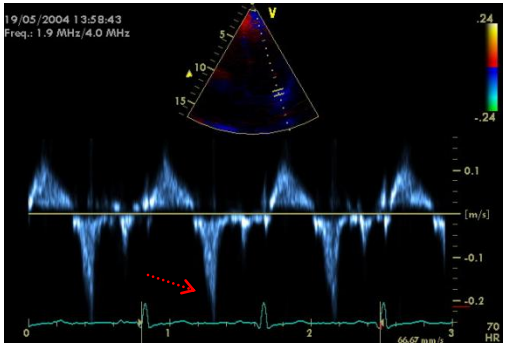
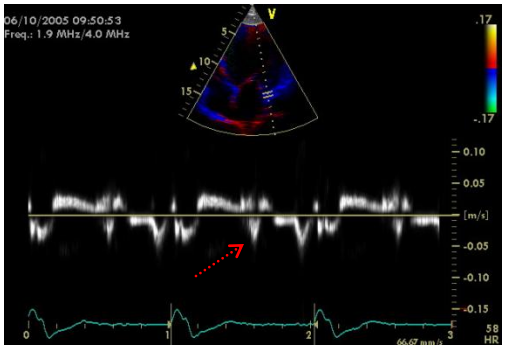


# COSTRIZIONE VS RESTRIZIONE



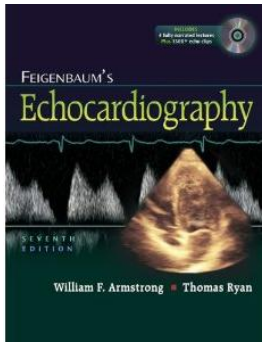




Differentiation of constrictive pericarditis from restrictive CMP (*Garcia et al JACC 1996)*

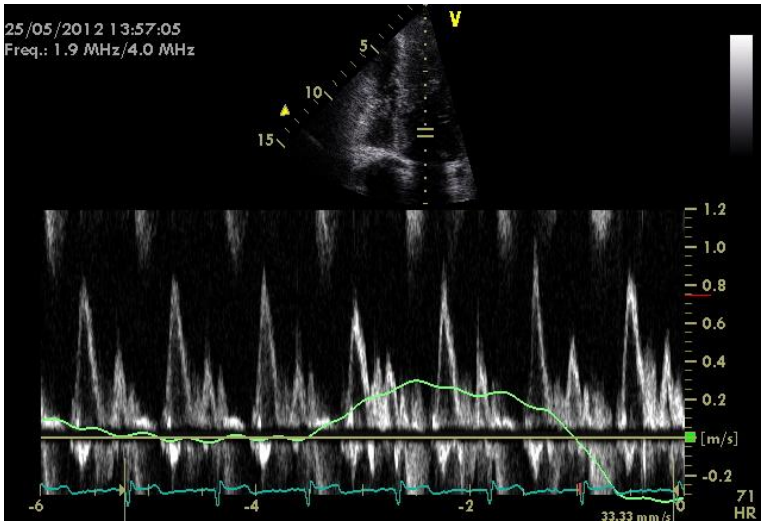
# COSTRIZIONE VS RESTRIZIONE

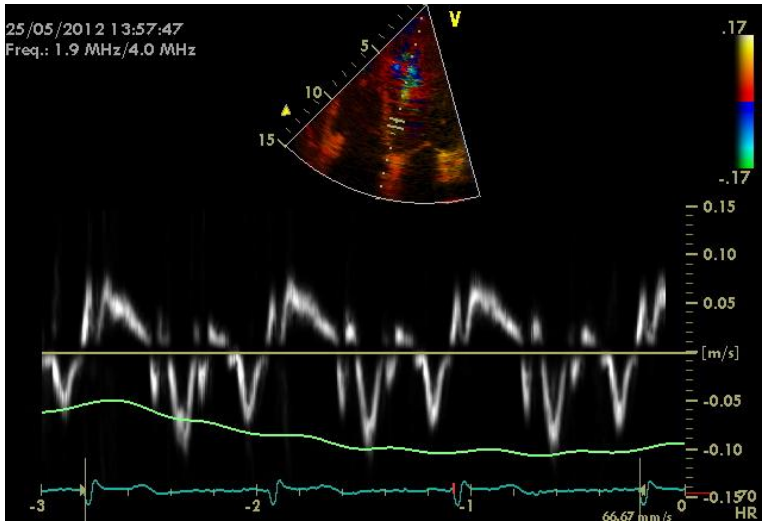
**Table 10.4** Separation of Constrictive Pericarditis from Restrictive Cardiomyopathy[a]

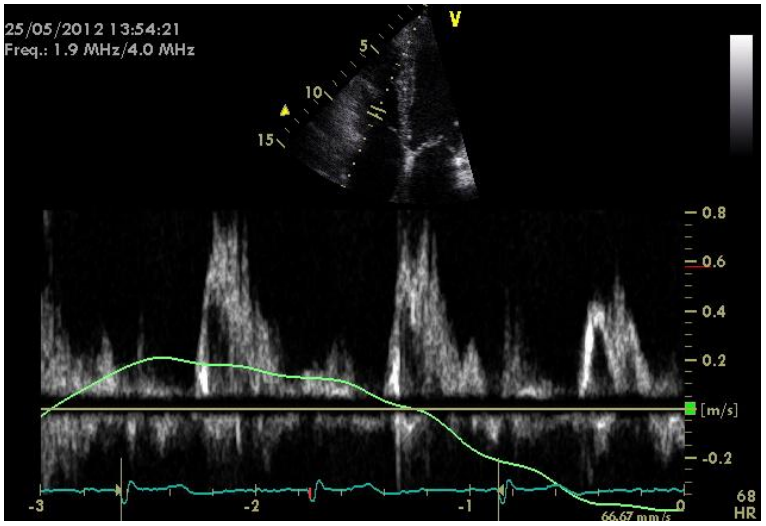
| | Constriction | Restriction |
|---|---|---|
| Atrial size | Normal | Dilated |
| Pericardial appearance | Thick/bright | Normal |
| Septal motion | Abnormal | Normal |
| Septal position | Varies with respiration | Normal |
| Mitral E/A | Increased (≥2.0) | Increased (≥2.0) |
| Deceleration time | Short (≤160 ms) | Short (≤160 ms) |
| Annular e′ | Normal | Reduced (≤10 cm/sec) |
| Pulmonary hypertension | Rare | Frequent |
| Left ventricular size/function | Normal | Normal |
| Mitral/tricuspid regurgitation | Infrequent | Frequent (TR > MR) |
| Isovolumic relaxation time | Varies with respiration | Stable with respiration |
| Respiratory variation of mitral E velocity | Exaggerated (≥25%) | Normal |
| Color M-mode mitral valve $V_p$ | Increased (>55 cm/sec) | Reduced |



# COSTRIZIONE VS RESTRIZIONE

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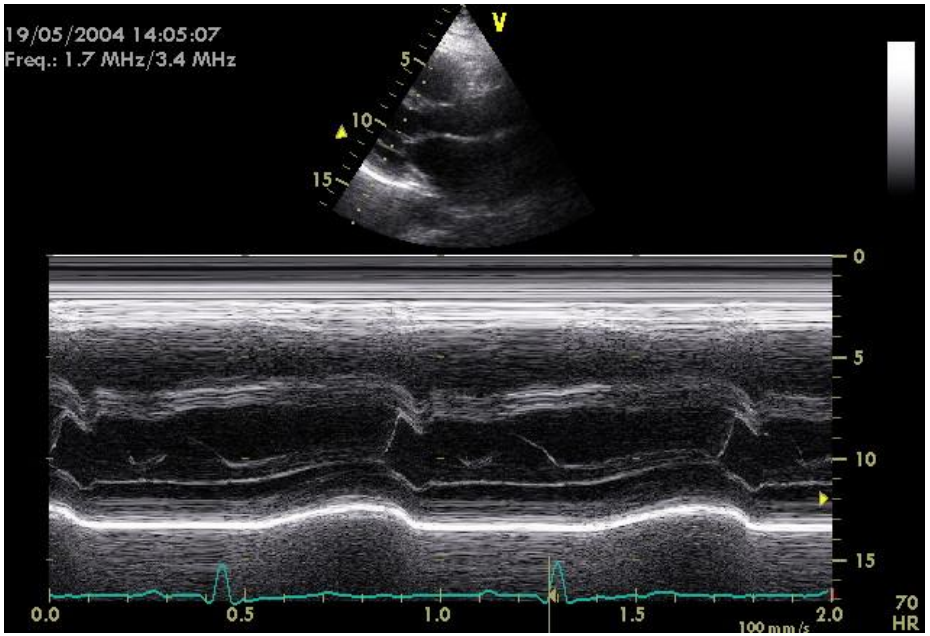


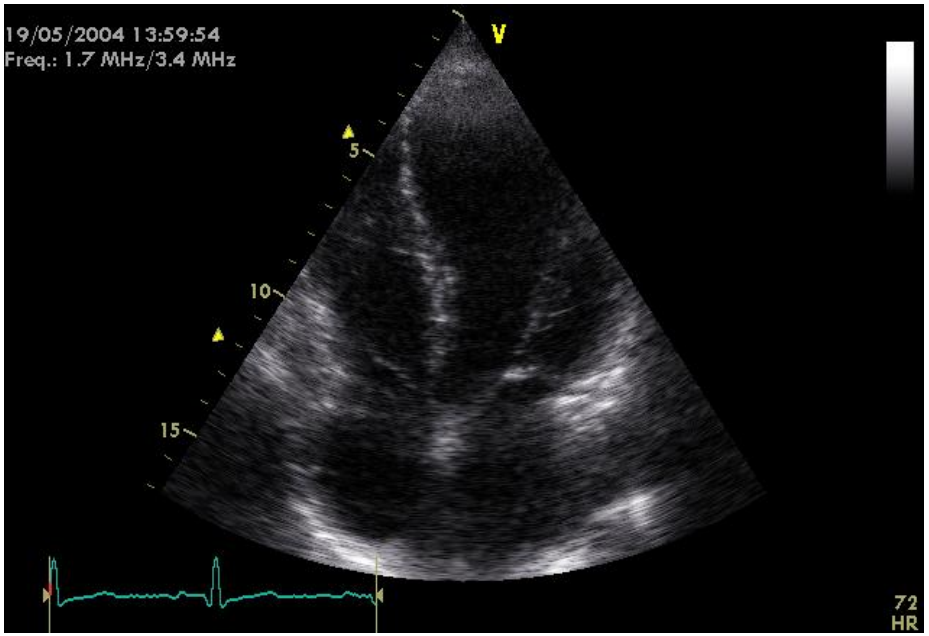

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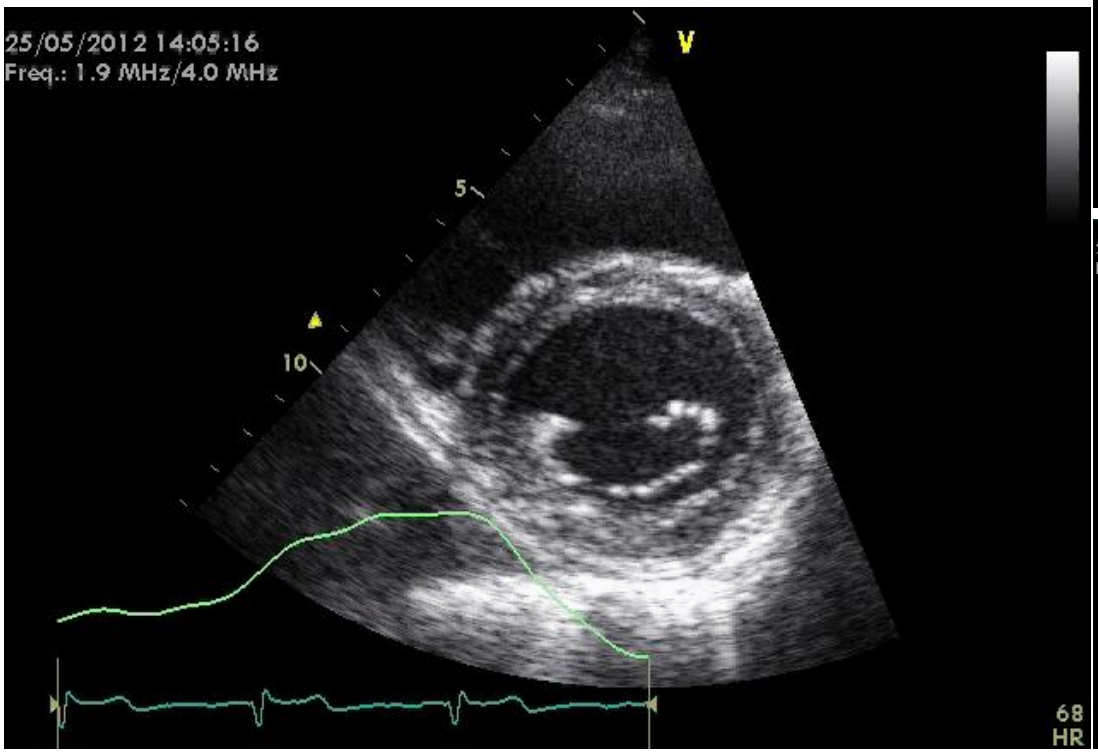
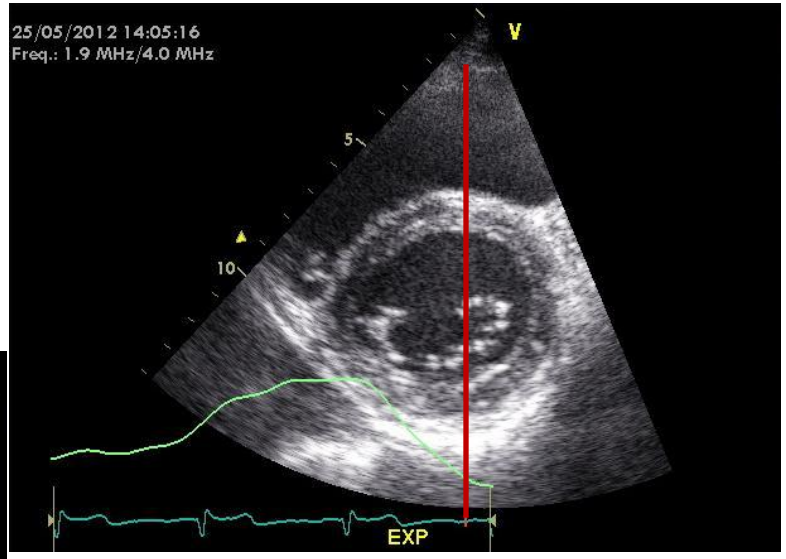
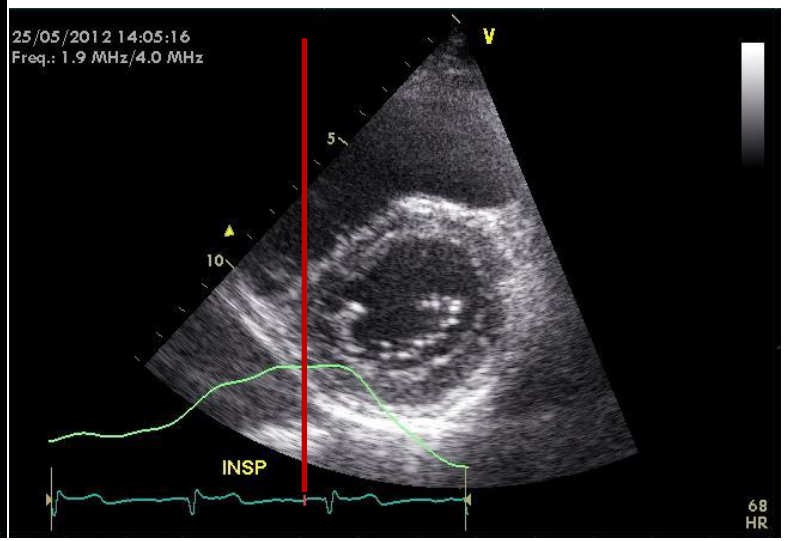
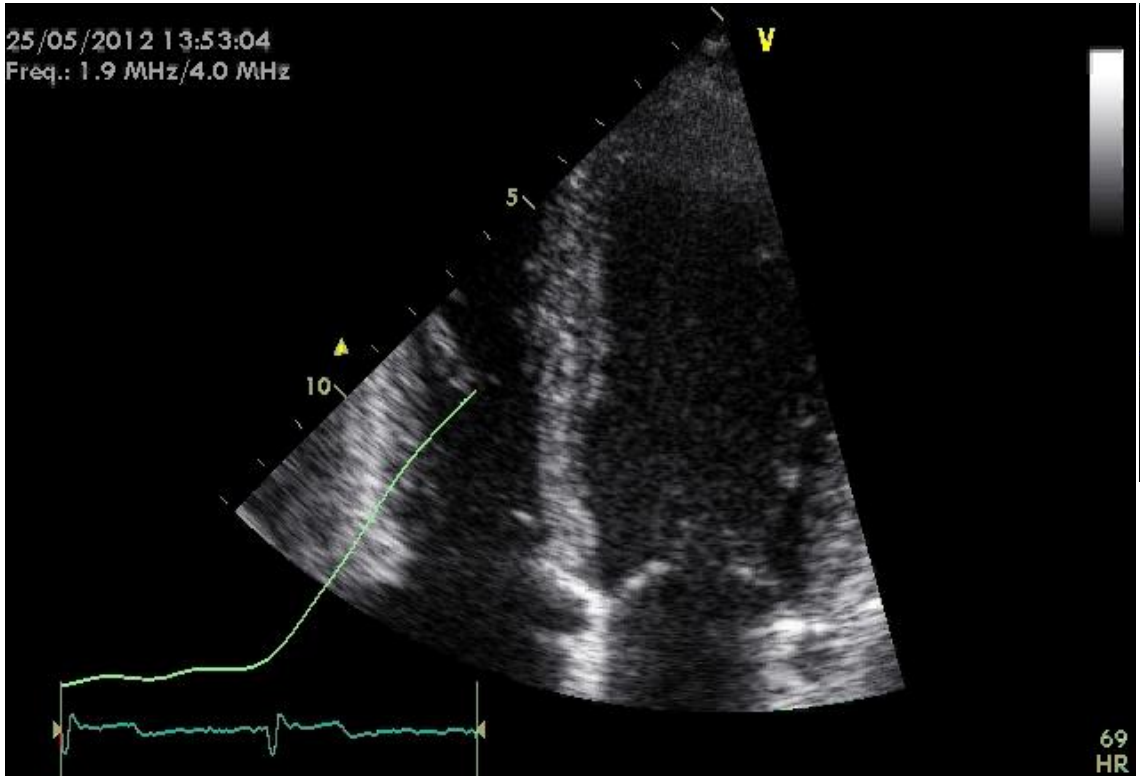


# AUMENTATA INTERDIPENDENZA VENTRICOLARE



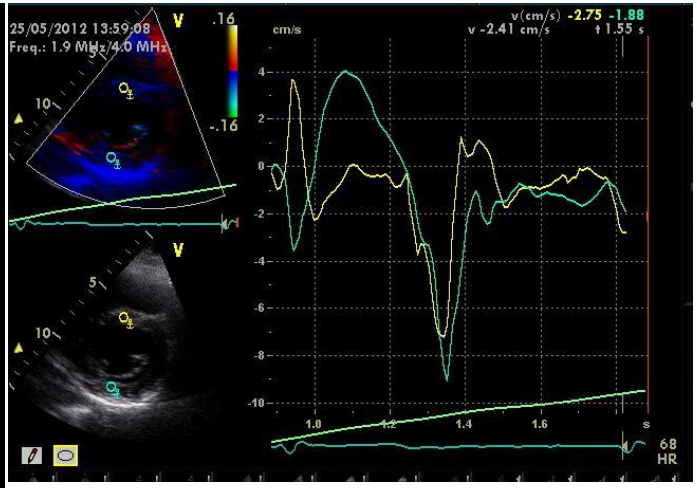




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**Table 2** Catheterization Criterion

| Criterion | Sensitivity (%) | Specificity (%) | Positive Predictive Accuracy (%) | Negative Predictive Accuracy (%) |
|---|---|---|---|---|
| LVEDP − RVEDP ≤5 mm Hg | 46 | 54 | 58 | 40 |
| PASP <55 mm Hg | 90 | 29 | 73 | 66 |
| RVEDP/RVSP >1/3 | 93 | 46 | 71 | 79 |
| LVRFW >7 mm Hg | 45 | 44 | 62 | 42 |
| Inspiratory decrease in RAP <5 mm Hg | 71 | 37 | 62 | 39 |
| Systolic area index >1.1 | 97 | 100 | 100 | 95 |

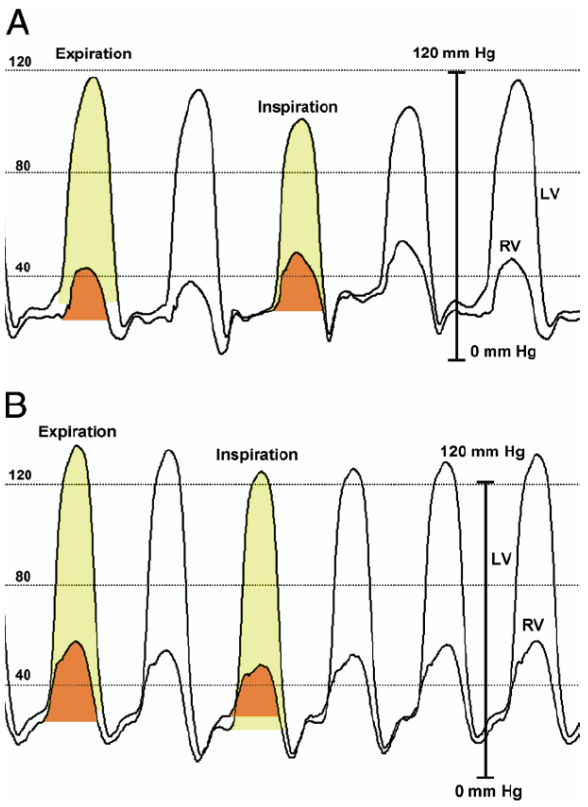


**Figure 1** LV and RV High-Fidelity Manometer Pressure Traces From 2 Patients During Expiration and Inspiration

Note that both patients have early rapid filling and elevation and end-equalization of the left ventricular (LV) and right ventricular (RV) pressures at end expiration. **(A)** A patient with surgically documented constrictive pericarditis. During inspiration there is an increase in the area of the RV pressure curve **(orange shaded area)** compared with expiration. The area of the LV pressure curve **(yellow shaded area)** decreases during inspiration as compared with expiration. **(B)** A patient with restrictive myocardial disease documented by endomyocardial biopsy. During inspiration there is a decrease in the area of the RV pressure curve **(orange shaded area)** as compared with expiration. The area of the LV pressure curve **(yellow shaded area)** is unchanged during inspiration as compared with expiration.

Pericardial Disease

## Constrictive Pericarditis in the Modern Era

Novel Criteria for Diagnosis in the Cardiac Catheterization Laboratory

Deepak R. Talreja, MD, FACC, Rick A. Nishimura, MD, FACC, Jae K. Oh, MD, FACC, David R. Holmes, MD, FACC

*Rochester, Minnesota*


J Am Coll Cardiol 2008;51:315–9

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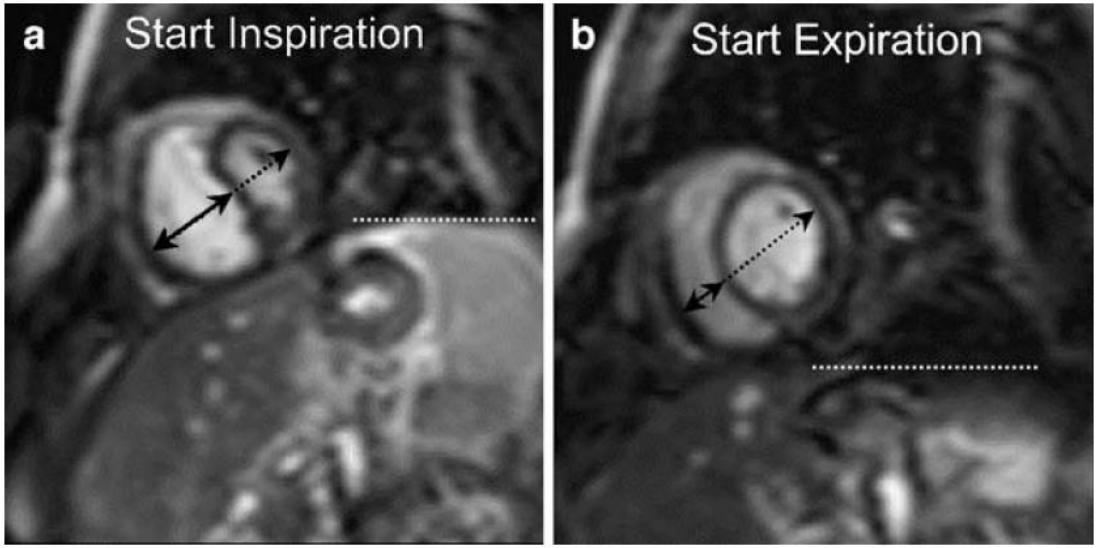


**Fig. 1** Analysis of respiratory-related septal excursion. The relative position of the septum can be obtained by dividing the distance between RV free wall and septum (*full line*) by the biventricular distance (*dashed line*). If done during inspiration and expiration, at early ventricular filling, the respiratory-related septal excursion can be quantified. The *horizontal dashed white line* indicates the position of the left hemidiaphragm, which is used to determine the phase of the respiratory cycle. In this patient with CP, paradoxical septal inversion was visible at the onset of inspiration, with enhanced right-sided excursion during onset of expiration. The relative septal position at end-inspiration is 56.6% and 31.0% at end-expiration, giving a relative septal excursion of 25.6%

A cut-off value of 11.8% (mean normals +2 SD) enabled to differentiate CP patients from normals and RCM patients completely

Eur Radiol (2006) 16: 944–951
DOI 10.1007/s00330-005-0009-0

CARDIAC

Marco Francone
Steven Dymarkowski
Maria Kalantzi
Frank E. Rademakers
Jan Bogaert

**Assessment of ventricular coupling with real-time cine MRI and its value to differentiate constrictive pericarditis from restrictive cardiomyopathy**

# PERICARDITE COSTRITTIVA

- **Ispessimento del pericardio** (v.n < 3 mm)
  - Difficile da rilevare con gli ultrasuoni
  - Possibili shadowing se calcificazioni.
  - Meglio apprezzabile con TAC RNM
  - Possibile pericardite costrittiva senza significativo ispessimento del pericardio

- **Riempimento restrittivo**
- **Aumentata interdipendenza ventricolare**
- **La diagnosi richiede l'integrazione di dati clinici e strumentali ……però bisogna pensarci**

# PERICARDITE EFFUSIVO-COSTRITTIVA

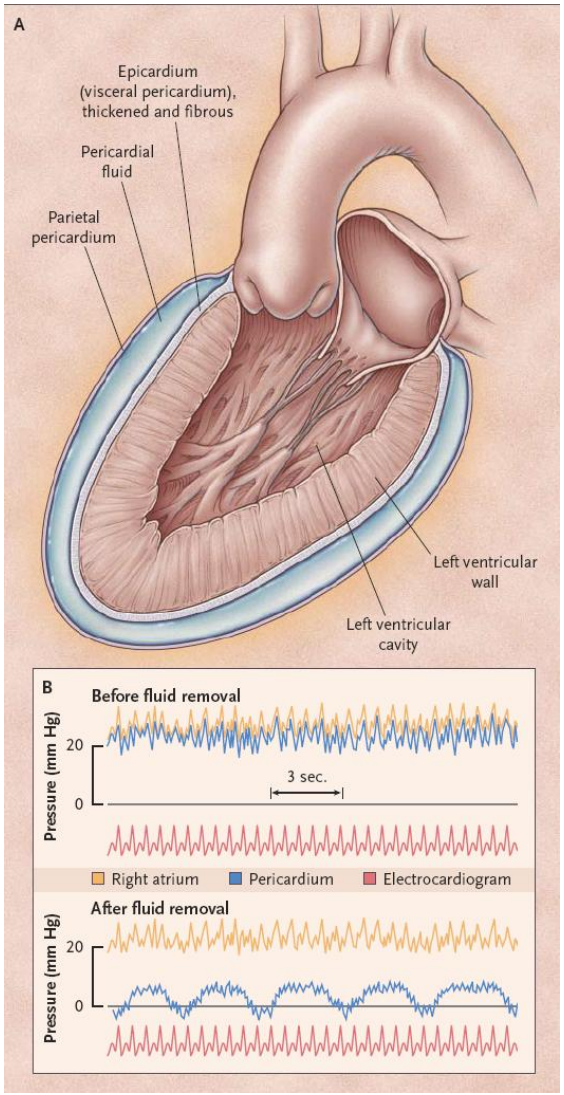


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**Figure. Effusive–Constrictive Pericarditis.**

As illustrated in Panel A, the presence of pericardial fluid causes tamponade, and a thickened visceral pericardium (epicardium) causes constriction. Pressure tracings (Panel B) show marked and equal elevations of the pericardial and right atrial pressures before the removal of fluid; after fluid removal, the pericardial pressure is normal (increasing and decreasing with respiration), but the right atrial pressure remains elevated, indicating that there is still constriction caused by the visceral pericardium.

The clinical diagnosis of this condition rests on the demonstration, in a patient with pericardial effusion and tamponade, that a clinical and hemodynamic picture consistent with pericardial constriction persists after the removal of enough pericardial fluid to lower the intrapericardial pressure to normal

# PERICARDITE EFFUSIVO-COSTRITTIVA

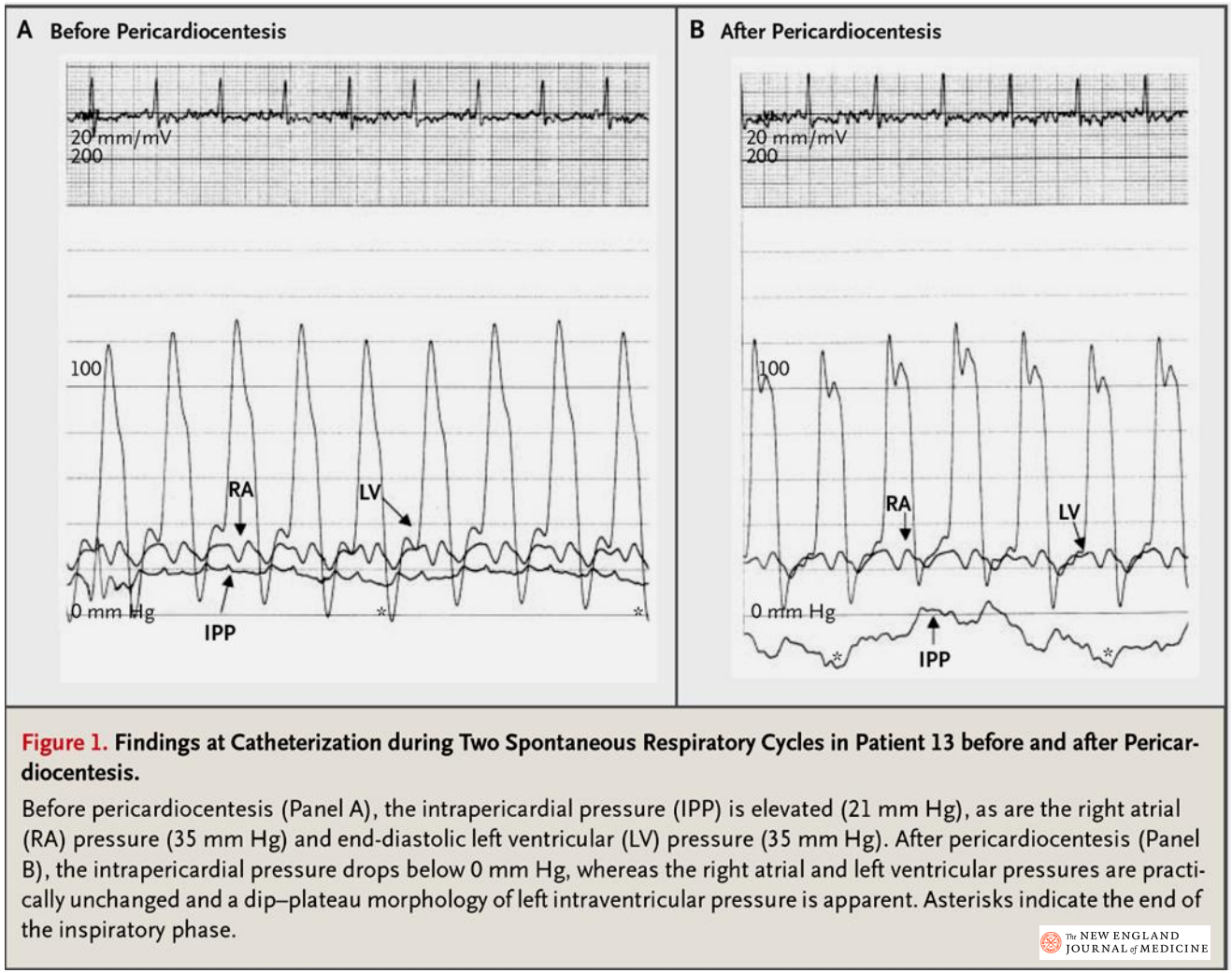


**Figure 1. Findings at Catheterization during Two Spontaneous Respiratory Cycles in Patient 13 before and after Pericardiocentesis.**

Before pericardiocentesis (Panel A), the intrapericardial pressure (IPP) is elevated (21 mm Hg), as are the right atrial (RA) pressure (35 mm Hg) and end-diastolic left ventricular (LV) pressure (35 mm Hg). After pericardiocentesis (Panel B), the intrapericardial pressure drops below 0 mm Hg, whereas the right atrial and left ventricular pressures are practically unchanged and a dip–plateau morphology of left intraventricular pressure is apparent. Asterisks indicate the end of the inspiratory phase.

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ORIGINAL ARTICLE

Effusive–Constrictive Pericarditis

Jaume Sagristà-Sauleda, M.D., Juan Angel, M.D., Antonio Sánchez, M.D., Gaietà Permanyer-Miralda, M.D., and Jordi Soler-Soler, M.D.

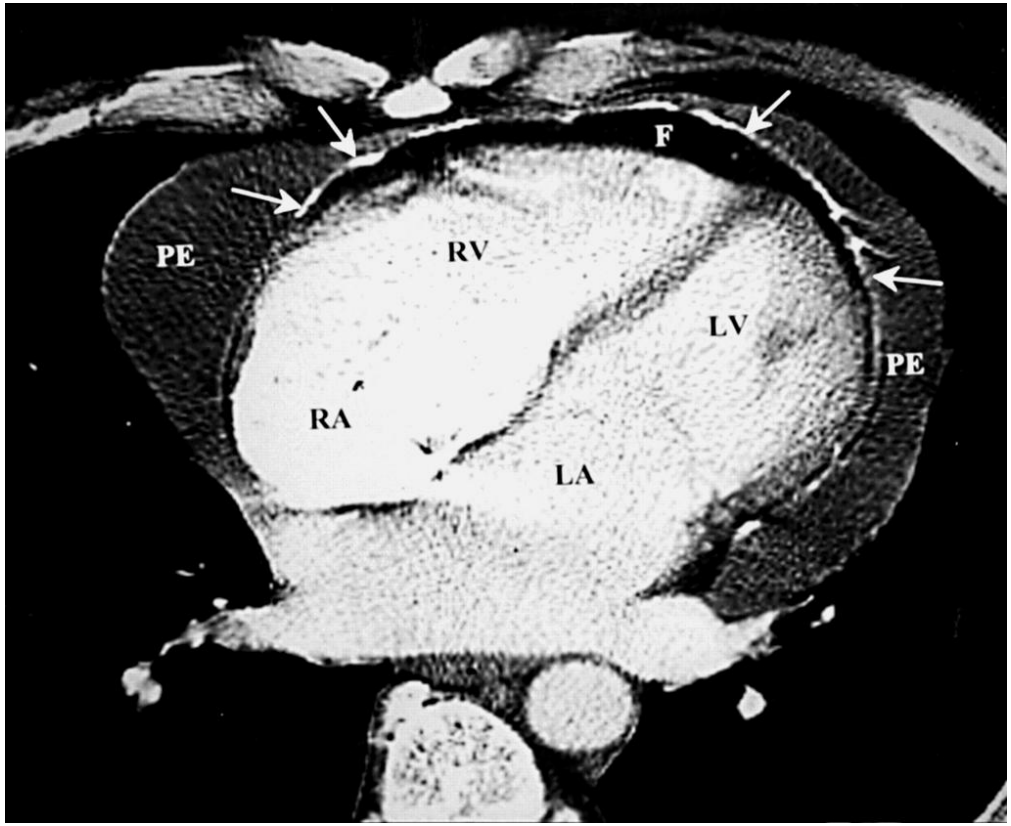
N Engl J Med 2004;350:469-75.

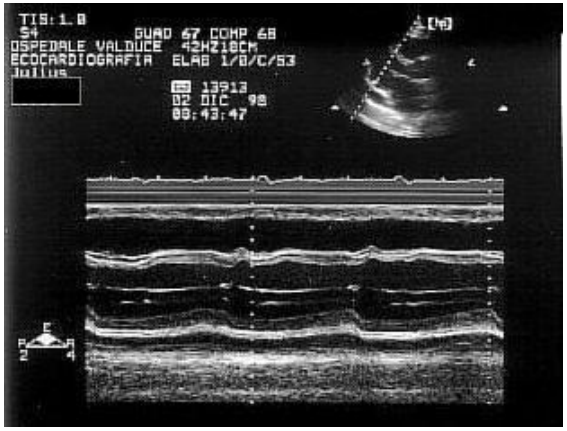
Effusive–constrictive pericarditis is an uncommon pericardial syndrome that may be missed in some patients presenting with tamponade.

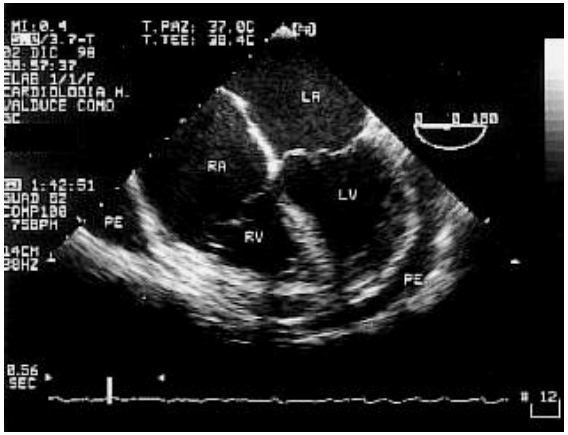
The causes are diverse, and its course may be reversible.

In patients requiring surgery, particular attention should be paid to the extent of the involvement of visceral pericardium should extensive epicardiectomy be necessary.

# PERICARDITE EFFUSIVO-COSTRITTIVA





M Santarone, G Corrado, G Belloni *Heart* 2000;**83:**556

# TERAPIA CHIRURGICA

LIBERA IL CUORE

Grazie per l’attenzione