Pericardial Diseases: What Is New?

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* No Conflicts to Declare

Current Management Strategies in Pericarditis
Key Concepts

- Case presentations
- Acute Pericarditis
- Recurrent Pericarditis
- Constrictive Pericarditis
- Effusive Constriction

The Pericardium

Clinical Cardiology

Elevated JVP .....

Pericardial Disease Imaging

“Rip-Roaring” Acute Pericarditis

Case presentations

Effusive Constriction

Key Concepts

Key Concepts

Pericardial Disease Imaging

Professor of Medicine

“Look at the neck.”

Courtesy of Drs. Yinghong Chen and Phelan
Dermatologist of the Heart
Multimodality Pericardial Guidelines

GUIDELINES AND STANDARDS
American Society of Echocardiography Clinical Recommendations for Multimodality Cardiovascular Imaging of Patients with Pericardial Disease
Endorsed by the Society for Cardiovascular Magnetic Resonance and Society of Cardiovascular Computed Tomography


Multimodality Imaging

The Pericardium

Fibrous
Serous
Parietal
Visceral (Epicardium)

Guidelines on the Diagnosis and Management of Pericardial Diseases Executive Summary

The Task Force on the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology

Task Force members, Bertrand Niersch, Chairperson (Germany), Peter M. Seferovic (Serbia and Montenegro), Arsen D. Rusic (Serbia and Montenegro), Raimund Erbel (Germany), Reiner Binnermuller (Austria), Yehuda Adler (Israel), Wizidle Z. Tomkowski (Poland), Gaetano Thiene (Italy), Nagi H. Yacoub (UK)

Pericardial Disease Syndromes

- Pericarditis
- Acute
- Recurrent
- Pericardial effusion/tamponade
- Constrictive pericarditis
- Effusive-constrictive
- Pericardial masses, diverticulum, cyst
- Congenital anomalies

Yonghanchun et al. Eur Cardiol Review 2013
Medical Regimen of Pericarditis

- NSAID's (ASA, Ibuprofen, Indomethacin)
- Colchicine
- Prednisone
- Triple Therapy based on Imaging
- DMARD'S (Intractable cases)
- Biologicals

Clinical Question?

Between 2 patients with constrictive pericarditis, why does one have pericardial delayed hyper-enhancement (DHE) on cardiac MRI, while the other does not?

Interleukin Receptor Antagonist

Histology of Pericardial Inflammation

A New Renaissance in Pericardial Diseases

Edema/Inflammation

T2W STIR  LGE

Recurrent Pericarditis

MRI guided therapy
**Case Presentations**

- Acute Pericarditis
- Recurrent Pericarditis
- Constrictive Pericarditis
- Effusive Constriction

**Case Presentation**

- 35 year old man presents with constant retrosternal chest pain x 2 days.
- It is worse on lying down and improves when he sits up and leans forward
- O/E Afebrile and has a friction rub
- EKG shows widespread ST segment elevation and PR depression.

**How should this patient be treated?**

- A) MRI to assess pericardium
- B) Consultation for pericardectomy
- C) Start Steroids
- D) Reassurance and start NSAID'S
- E) Call Dr. Menon

**Acute Pericarditis**

- Fever >38°C
- Sub-acute onset
- Immunosuppression
- Trauma
- Oral anticoagulant therapy
- Myo-pericarditis
- Large pericardial effusion
- Cardiac tamponade
Acute Pericarditis
Diagnostic Criteria

- Clinical presentation (need at least 2)
  - Chest pain (pleuritic, improved by sitting up and forward)
  - Pericardial friction rub (heard best with diaphragm over LSB)
  - ECG changes (widespread ST elevation, PR depression)
  - New or worsening pericardial effusion
  - *Elevated CRP/USCRP/WSR is a confirmatory finding
  - *LGE on CMR may be new confirmatory finding

**Pericardial friction rub**

**ECG changes**

**New or worsening pericardial effusion**

**Elevated CRP/USCRP/WSR**

**LGE on CMR**

**Pericardial effusion**

**Constrictive physiology**

Pericarditis vs Myo-pericarditis

Algorithm for Acute Pericarditis

Current Management Strategies in Pericarditis

- **Acute Pericarditis**
- **Recurrent Pericarditis**
- **Constrictive Pericarditis**
- **Effusive Constriction**
If this patient has a recurrence 3 months later on Ibuprofen 800 mg po TID, what is the management strategy?

- A) Prednisone 1-1.5 mg/kg po Qd
- B) Prednisone 0.5-1 mg/kg po Qd
- C) Colchicine 0.6 mg po BID
- D) Refer for pericardiectomy
- E) Plaquenil therapy

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Recurrent Pericarditis
Pericardial Effusion and Pleural Effusion

Recurrent Pericarditis
Clinical Trials with Colchicine

Efficacy and safety of colchicine for treatment of multiple recurrences of pericarditis (CORP): a multicentre, double-blind, placebo-controlled, randomised trial

Lancet 2014

Recurrent Pericarditis
Management Strategy

- Addition of colchicine to NSAIDs or ASA
- 1-2 mg on day 1 followed by 0.6-1.2 mg daily for three months with a gradual taper
- If refractory to therapy, corticosteroids are recommended

18 Year Old Univ of Penn College Student with Severe Chest Pain and ASD repair
Spring Break in LA
Antiphospholipid Syndrome and VTE
RA Thrombus

Which of the Following is the Correct Management?
- A. Triple anti-inflammatories and enoxaparin
- B. Dual anti-inflammatories and warfarin
- C. Triple anti-inflammatories and surgery
- D. Ask Dr. Nissen

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Take Home Points
- Role of multimodality imaging
- Stage severity of disease
- Interactions of anti-inflammatories and AC's
- Prolonged duration of therapy
- Affects young patients... and families

Current Management Strategies in Pericarditis
Case Presentations
- Acute Pericarditis
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65 Year Old Man (PP) With Progressive Dyspnea and Peripheral Edema
- PMH: Atrial Fibrillation, pacer insertion for SSS
- Meds: Amiodarone, Digoxin and Furosemide
- PE: 110/70, HR 80 BPM, JVP elevated to angle of jaw, Normal S1 and S2, extra heart sound, hepatomegaly ascitis, 3+ icterus
- Cath: Normal coronaries; RA mean pressure= 28 mmHg, RV= 60/28 mmHg, PCWP= 28 mmHg “dip and plateau” physiology

Dyspnea and Peripheral Edema
- Effusive Constriction

Klein 11/99 set 2 (afib)
What is the Diagnosis?

- A) Restriction
- B) Constriction
- C) Mixed
- D) Effusive constriction
- E) Send him to Mayo Clinic

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CT Scan

Constrictive Pericarditis

- Bilateral Thoracotomy
- Pericardial Stripping
- ‘Rock hard’ calcium into epicardium and myocardium

Key Diagnostic Findings

- Abnormal septal bounce
- Pericardial thickening
- IVC plethora
- Respiratory Doppler variation
- Short DT
- Increased TDI annular velocities
- Increased CMM Flow Propagation

Current Management Strategies in Pericarditis

Case Presentations

- Acute Pericarditis
- Recurrent Pericarditis
- Constrictive Pericarditis
- Effusive Constriction
58 Year Old Man With Progressive Dyspnea, Cough and Peripheral Edema

- PMH: Pericarditis and large pericardial effusion treated with pericardiocentesis
- Meds: Indomethacin, Omeprazole
- PE: BP 130/72, HR 76 BPM, JVP elevated to angle of jaw, Normal S1 and S2, 2+ edema
- Labs: CRP 30, ESR 24
- Cath: Normal coronaries, RA mean pressures 16 mmHg, RVs 36/28 mmHg, PCWP 15 mmHg
- LVEDP 22 mmHg, Cardiac Index 1.70 L/min, LV/RV discordance with respiration
**Tissue Doppler**
Medial Annulus

**IVC Plethora**
“Cocaine” Sniff Test

**Cardiac MR**

**Cardiac MR**
Late Gadolinium Enhancement

**Key Diagnostic Findings**
*Echo and CMR*
- Abnormal septal bounce
- Pericardial thickening
- IVC plethora
- Respiratory Doppler variation
- Preserved TDI annular velocities
- Organized pericardial effusion
- Late gadolinium enhancement of pericardium

**Initial Management**
- Diagnosis: Effusive Constrictive Pericarditis with active inflammation
- Management: Lasix, Prednisone, Ibuprofen, Colchicine
- Follow-up in 3 months: ongoing SOB, cough, edema and +25 lb weight gain

Klein 11/99 set 2 (afib)
Surgical Management
Pericardiectomy

- "The pericardium is thickened and inflamed and we were able to get into it by the apex, removed it anterior to the phrenic nerve ..., and even with that his pulmonary artery pressure CVP dropped and it appeared that his cardiac index improved... The septal bounce had disappeared and the cardiac index had gone from 1.5 to over 3 and the patient was diuresing."
- Pathology: Marked fibrosis and organized hemorrhagic pericarditis

Survival Curves After Pericardiectomy by Etiology of Constriction

23 Year Old College Student
Shortness of Breath and Chest Pain
Which of the following is correct?

- A. Normal echo for a 23 year old
- B. Things will get better
- C. Major concern
Which of the following is correct?

- A. Normal echo for a 23-year-old
- B. Things will get better
- C. Major concern

Management

- A. Medical
- B. Surgical

Key Diagnostic Findings

- Localized effusive constriction
- Inflamed organizing effusion compress RV
- Elevated WSR and CRP
- Management Anti-inflammatory then Surgery

Post-op Imaging

Marked Improvement

A 48-year-old Male Presented with Dyspnea, Chest pain, Weight Gain and Edema

- Past history of hypertrophic obstructive cardiomyopathy
- Treated with septal myectomy and bilateral pulmonary vein isolation one month before presentation
**Physical examination**
- Vitals: 98.6 °F, 146/88, 82, 20, 95% on RA
- Mild respiratory distress
- CVS: elevated JVP, regular, no murmur
- Lungs: bibasilar diminished breath sounds
- Abdomen: soft, non-tender
- Extremity: 2+ bilateral LE pitting edema
- Skin: midline sternotomy wound, no erythema

**Lab**
- WBC 7.37
- HB 9.4
- HCT 30.7
- PLT 382
- Troponin normal
- BNP 680
- WSR 36 (0 - 15 mm/H)
- CRP 7.3 (0.0 - 1.0 mg/dL)

**Echocardiogram**

**What is Next Test?**

**CMR**

Clinical Management?
Surgical findings...“Mine Field”

- Pericardial window drained only 20 ml
- Operation converted to sternotomy
- Surgical field showed, intense inflammation of the epicardial/visceral layers.
- Pericardial stripping of the right side performed
- On attempting left side pericardiectomy, LAD was nicked
- Because of intense inflammatory reaction, further pericardiectomy of the left side was aborted.

Histopathology

- Histopathology showed
  - Marked fibrosis and granulation tissue with organizing hemorrhage.
  - Fibrotic thickened pericardium
- Started on prednisone, NSAID and colchicine.
- Discharged home

A month later on anti-inflammatory medications...

Presentation

- Shortness of breath
- Difficulty doing stairs
- Abdominal swelling
- Chest pain, sharp in nature, increased with exertion

Work up

- EKG: NSR with LBBB
- WSR 45 (0 - 15 mm/H)
- CRP 8.1 (0.0 - 1.0 mg/dL)
- Prednisone was increased to 60 mg daily

Echocardiogram

Apical Views

TDI

Significant respiratory variation of
Doppler flow (MVI 40%)
E/e’ = 9
Histopathology showed: Mild chronic inflammation.

Colchicine 0.6 mg BID

Patient remained chest pain-free

Prednisone was tapered off

Take home messages

5 months later

- Patient remained chest pain-free
- Remains on diuretics and mild heart failure symptoms
- Inflammatory markers normalized
- Prednisone was tapered off
- Remained on colchicine and NSAID and stopped a year later
**Take Home Points**

- Caution is needed when sending patient for pericardectomy in setting of inflammation.
- Multimodality imaging is useful tool in evaluating effusive constrictive pericardial disease.
- CMR is an important tool to assess the severity and distribution of pericardial inflammation.
- An adequate trial of anti-inflammatories is recommended in the setting of active inflammation and constrictive findings before proceeding to pericardectomy.

**73 Year Old Man with Shortness of Breath and Abdominal Swelling**

Failed VT ablation and Pericardial Effusion

**Multimodality Cardiovascular Imaging of Pericardial Diseases**

Exciting Times