



# Not Another ACS Rule Out

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# History of Present Illness

- A 50 year old African-American woman presents with chest pain.
  - Acute onset
  - Occurs at rest
  - Sub-sternal, tightness, no radiation
  - Associated with shortness of breath
  - Several episodes in past few weeks



# Review of Systems

- 30-pound unintentional weight loss
- Progressive dysphagia
- Dysarthria
- Dry cough
- L-sided facial droop



## **Medical History:**

- Type II Diabetes, HTN, HLD, Bell's Palsy

## **Surgical History:**

- Tubal Ligation, Right Meniscus Repair

## **Social History:**

- Denies smoking, illicit drugs. 1 drink/month

## **NKDA**

## **Home Medications:**

- ASA, Ferrous Sulfate, Lisinopril/HCTZ, Metformin, Pravastatin, Naproxen



# Physical Exam

- **VITALS:** 99.2°F, 89, 147/80, 18, 100% RA
- **GEN:** NAD, AAO x 3
- **HEENT:** MMM, oropharynx clear
- **NECK:** No cervical LAD, no JVD
- **CV:** Regular rate, normal S1/2, no murmurs

# Physical Exam

- **PULM:** CTAB, good effort
- **ABD:** soft, ND,+BS, no TTP
- **NEURO:** L-sided facial droop, no furrowing of ipsilateral brow
- **EXT:** No edema, 2+ DPs, no clubbing



# Initial Diagnostic Tests

CBC, CMP, PT, INR, aPTT: normal

Troponin: 0.08 > 0.10 > 0.11 > 0.10

Lipid Panel: A1c - 7.2%

Chol - 220 TSH - 1.46

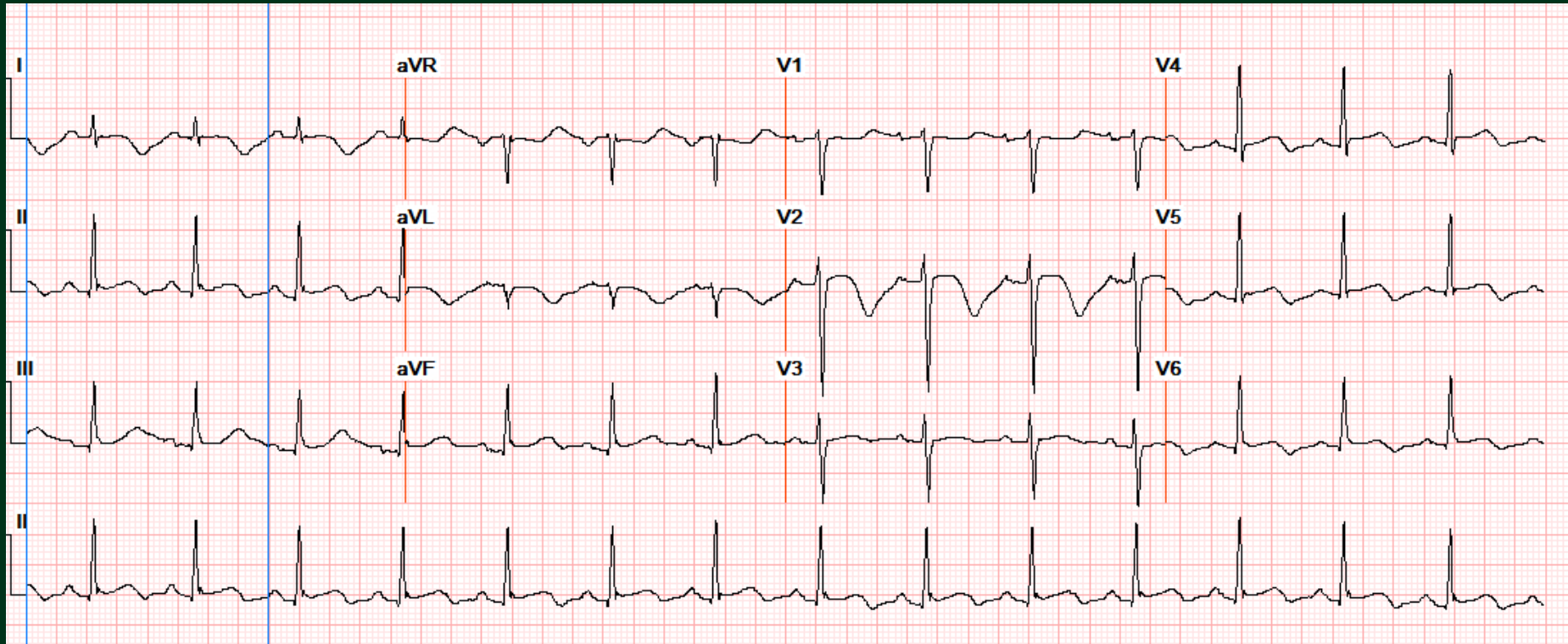
TG - 175

LDL - 138

HDL - 47



# EKG

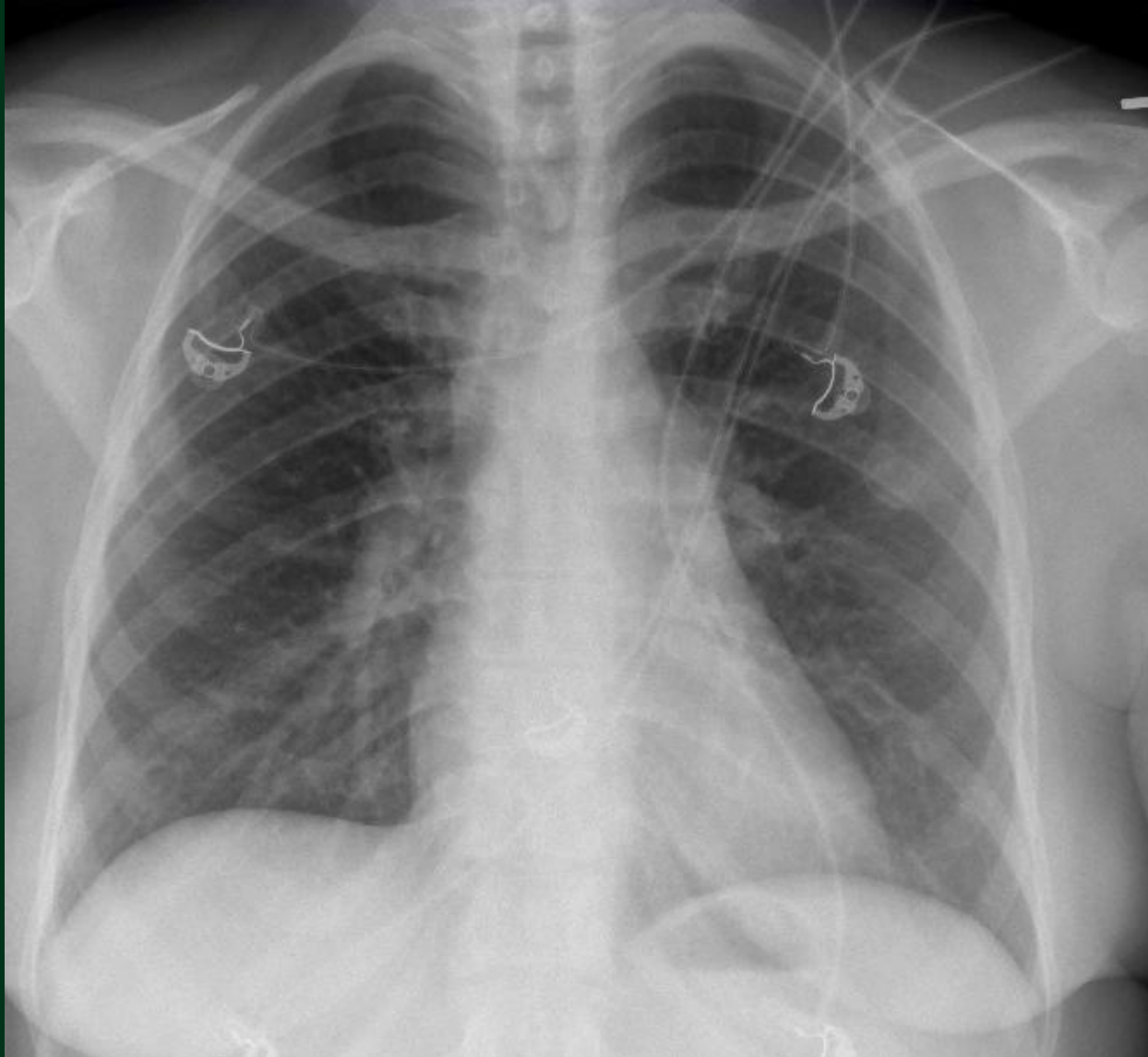


- NSR, normal axis, no ST-segment changes, T-wave inversions in leads I, aVL, V2, V5, V6





# Chest X-Ray





# Initial Management

## NSTEMI:

- TIMI = 4
- ASCVD Risk = 18.3%
- Heparin gtt
- Aspirin 325 x 1 -> 81 daily, Plavix 300 x 1 -> 75 mg daily, Lisinopril 20 daily, Rosuvastatin 40 daily, Carvedilol 3.125 BID



# Initial Management

## Dysphagia:

- Modified Barium Swallow Study - **failed**

## Bell's Palsy:

- Prednisolone 60 mg daily
- Plan to taper after 5 days



# Additional Diagnostic Tests

ESR: **108**, CRP: 3.50, RF: <10

ANA: negative, **Anti-ds DNA**: negative

HIV 1 & 2 Ab: NR

c-ANCA, p-ANCA: <1:20 (negative)

Lyme IgG/IgM Ab: <0.91 (negative)

ACE Level: <14 (normal)

Total IgG: 1,026 (normal)



# Transthoracic Echo

- Mild LV systolic dysfunction; EF = 40 - 45%
- Severe antero-septal hypokinesis
- Akinesis of the LV apex

# Left Heart Catheterization



**LM:** No disease

**LAD:** 50% mid stenosis, 70% apical stenosis

**LCx:** 40% stenosis at level of OM2

**RI:** mid 65% stenosis

**RCA:** proximal 95% stenosis, mid 70% stenosis

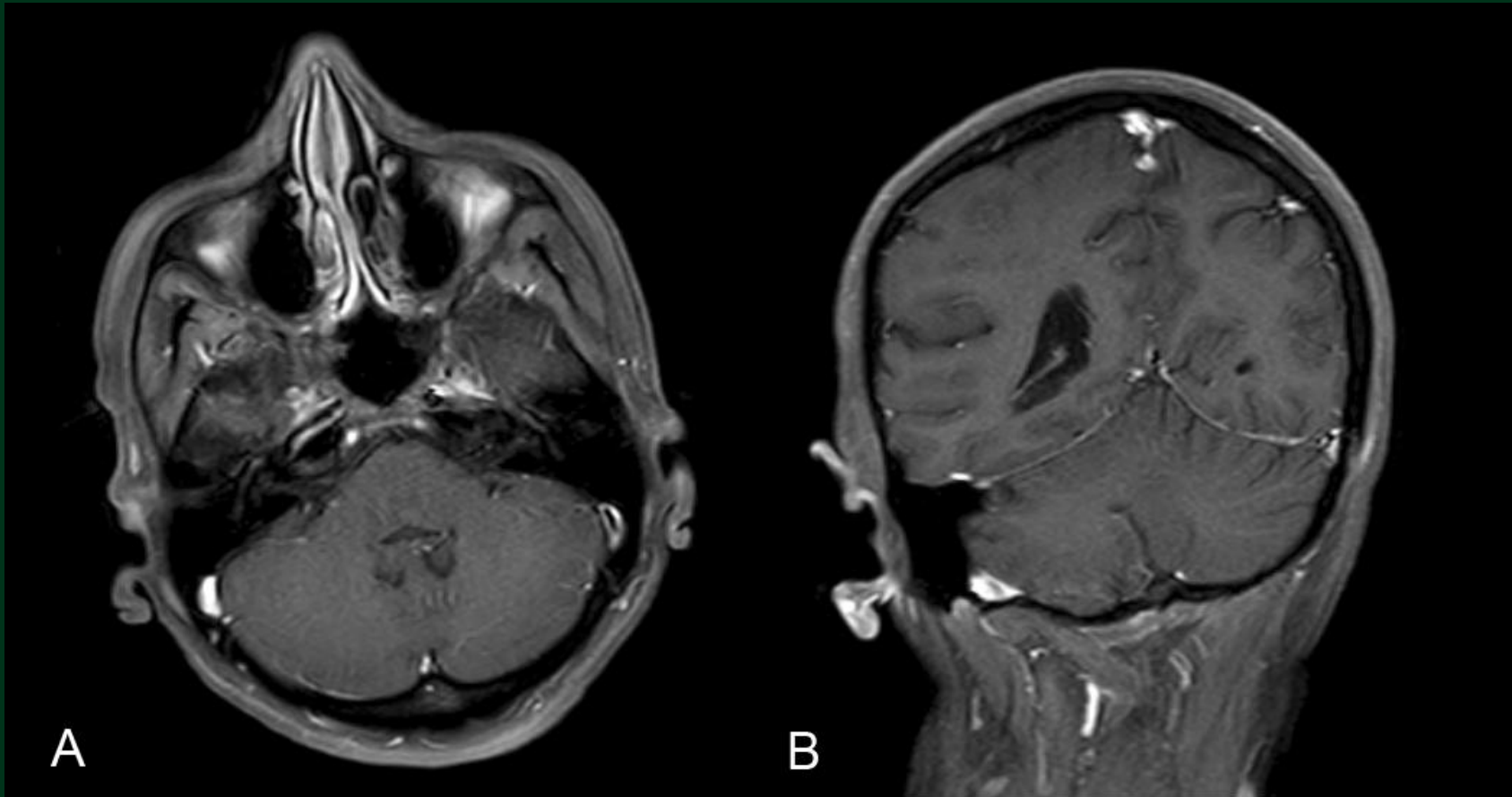


# Cardiac MRI



- Patchy mid-myocardial and sub-epicardial hyper-intensity in the inferior wall, lateral wall, and septum
- No acute infarct

# MRI Brain with Contrast

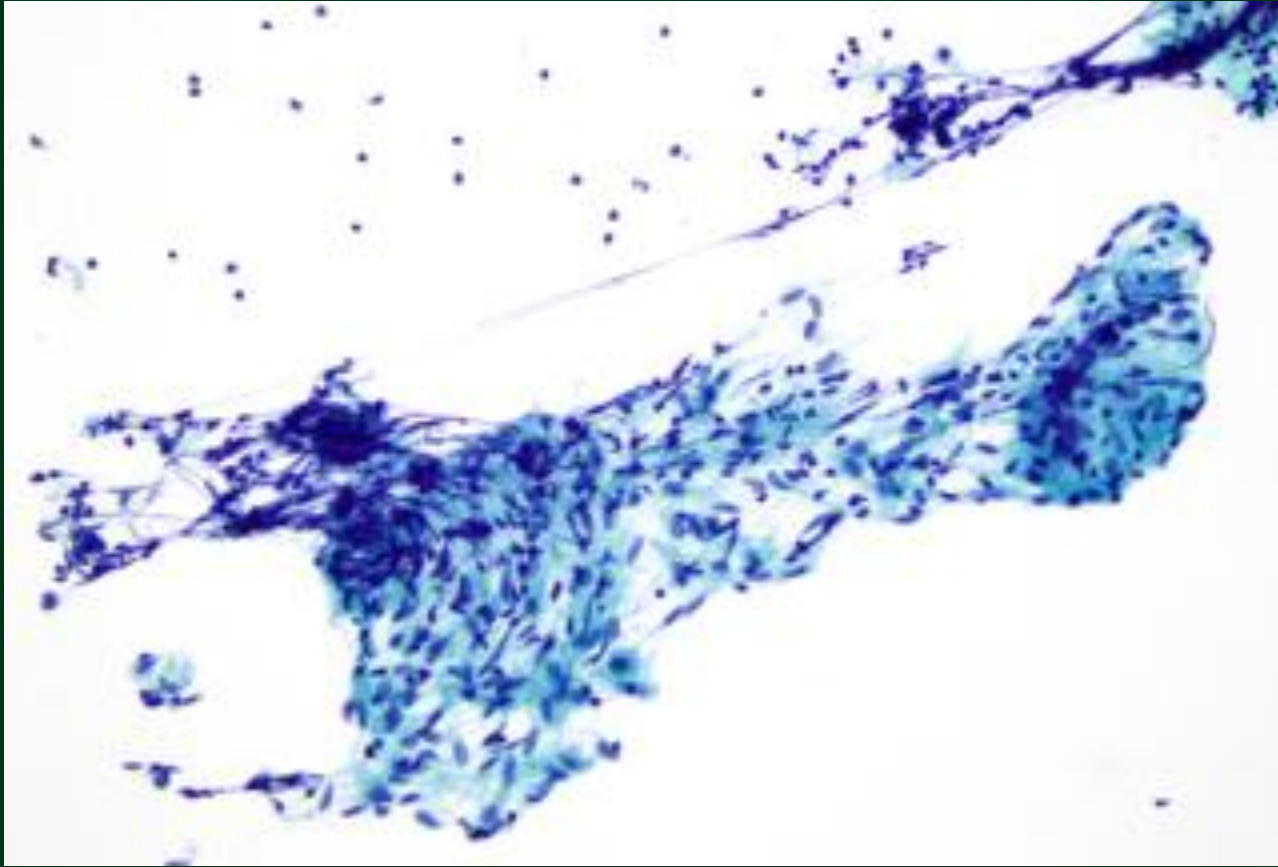


- Focal enhancement and thickening of the dura mater, consistent with pachymeningitis





# Bronchoalveolar Lavage



- **Sub-carinal LN FNA: Two small epithelioid granulomas**
- **Flow Cytometry; Anaerobic, Aerobic, and Fungal Cultures; and AFB Smear - negative**



# Final Diagnosis

## Multi-Organ Sarcoidosis, Initial Presentation

- Cardiac Sarcoidosis with NSTEMI
- Neurosarcoidosis with Cranial Nerve Palsy (VII)
- Pulmonary Sarcoidosis
- Gastrointestinal Sarcoidosis - Pharynx [Presumed]



# Inpatient Course

- Prednisolone 60 mg daily course extended to 4 weeks with taper
- L-sided CN VII Palsy resolved
- Dysphagia resolved, passed repeat MBSS
- Repeat TTE:
  - EF > 55%, improved apical contraction
- Discharge HD #14



# Outpatient Course

- Multi-disciplinary treatment team:
  - Rheumatology, Dermatology, Cardiology, Pulmonology, Neurology, and Primary Care
- Hydroxychloroquine 200 mg BID
- Methotrexate 10 mg weekly
- Prednisone tapered to 5 mg daily



# Outpatient Course

- **Holter Monitor:** 1% PVC's, otherwise NSR
- **EP Study:** no inducible ventricular arrhythmia  
- no indication for AICD
- **Staged PCI:** DES x 2 to the RCA - DAPT x 1 year
- Patient doing well, no recent hospitalizations



# Sarcoidosis

- Peak incidence, ages 20-39
- More common in women
- Incidence 3 x higher in African-Americans
- **Non-caseating granulomas:**
  - Epithelioid cells, macrophages, lymphocytes
  - Later - fibroblasts and collagen
- CD4+ T-cell response maintains granulomas:
  - IL-2, IFN- $\gamma$ , TNF- $\alpha$



# Sarcoidosis - Diagnosis

- Compatible clinical and radiographic findings
- Biopsy of most accessible involved organ
- Stain for AFB, Fungal and Bacterial Cultures
- **ACE - poor sensitivity and specificity**
- Diagnosis of exclusion

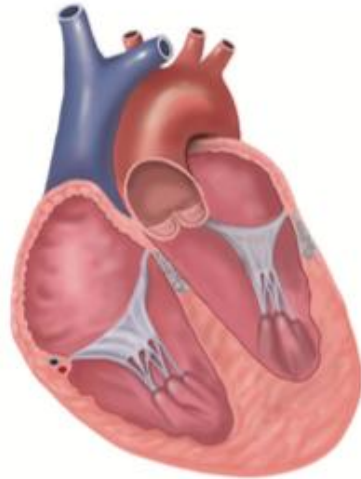


# Cardiac Sarcoidosis

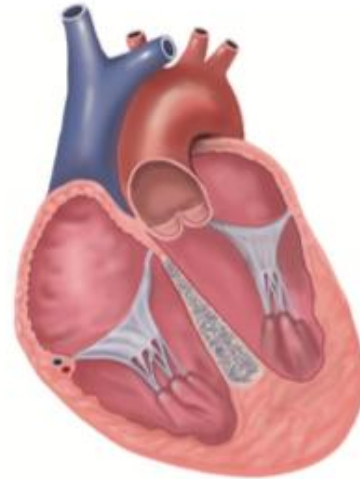
- 5% of patients symptomatic
- 25% of Sarcoidosis autopsies
- Restrictive cardiomyopathy
- Tachy- and brady-arrhythmias
- ACS very rare as initial presentation



**CENTRAL ILLUSTRATION** Clinical Features of Cardiac Sarcoidosis



Small patches of basal involvement, usually clinically silent



Large area of septal involvement, often clinically manifest as heart block



Re-entrant circuit involving area of granuloma/fibrosis leading to VT



Extensive areas of LV and RV involvement, often clinically manifest as heart failure +/- heart block +/- VT

# HRS 2014 Criteria



**Table 4** Heart Rhythm Society (HRS) consensus statement for diagnosis of cardiac sarcoidosis

## Histological diagnosis of cardiac sarcoidosis

Endomyocardial biopsy specimens with non-caseating epithelioid granulomas and no alternative cause identified

## Clinical diagnosis of probable cardiac sarcoidosis

Histologic diagnosis of extracardiac sarcoidosis and one or more of the following is present while reasonable alternative cardiac causes other than CS have been excluded:

Corticosteroid or immunosuppressive therapy responsive cardiomyopathy or heart block

Unexplained reduced LVEF (<40%)

Mobitz type two second degree heart block or third degree heart block

Depressed left ventricular ejection fraction <50%

Patchy uptake on cardiac FDG-PET in a pattern consistent with CS

Late gadolinium enhancement (LGE) on cardiac magnetic resonance imaging in a pattern consistent with CS

Positive gallium uptake in a pattern consistent with CS



# Treatment

- Corticosteroids
  - **Prednisone**: 20 - 60 mg daily x 1-3 months then slow taper
- Immunomodulating Therapy:
  - **Methotrexate**: can decrease corticosteroid dose requirement
  - **Hydroxychloroquine**: for neurologic or cutaneous involvement



# References

- Y Matsui, T Tachibana, et. all. "Clinico-pathological study of fatal myocardial sarcoidosis." *Ann. N. Y. Acad. Sc.*, vol 278, pp. 455-469, 1976.
- C. S. P. Lam, K. a Tolep, M. P. Metke, J. Glockner, and L. T. Cooper, "Coronary sarcoidosis presenting as acute coronary syndrome.," *Clin. Cardiol.*, vol. 32, no. 6, pp. E68-71, 2009.
- K. Kakuta, K. Dohi, Y. Sato, T. Yamanaka, M. Kawamura, T. Ogura, S. Nakamori, N. Fujimoto, E. Fujii, N. Yamada, and M. Ito, "Chronic Inflammatory Disease Is an Independent Risk Factor for Coronary Flow Velocity Reserve Impairment Unrelated to the Processes of Coronary Artery Calcium Deposition," *J. Am. Soc. Echocardiogr.*, pp. 1-8, 2015.
- O Vignaux, R Dhote, D. Duboc, P. Blanche, D. Dusser, S. Weber, and P. Legmann. "Clinical significance of myocardial magnetic resonance abnormalities in patients with sarcoidosis," *Chest*, vol. 122, pp. 1895-1901, 2002.
- R. Schwendimann, M. Harris, D. Elliot, et. al. Neurosarcoidosis: clinical features, diagnosis, and management," *Am. J. Ther.*, vol. 20, pp. 292-299, 2013
- L. Newby, R. Jesse, et al. "ACCF 2012 expert consensus document on practical clinical considerations in the interpretation of troponin elevations," *J. Am. Coll. Cardiol.*, vol. 60, pp. 2427-63, 2012.
- M Ianniuzzi, B Rybicki, and A. Teirstein. Sarcoidosis. *N. Engl. J. Med.*, vol. 157, pp. 2153-65, 2007.
- D Birnie, P Nery, A Ha, and R Beanlands. Cardiac Sarcoidosis. *J. Am. Coll. Cardiol.*, vol. 68, pp. 411-421, 2016.



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Questions?