Challenging Cases in Sarcoidosis: The Multidisciplinary Approach

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VCU Health System
Disclosures

- None
Objectives:

- Review epidemiology/etiology of Sarcoidosis
- Review approach to establishing a diagnosis of Sarcoidosis
- Review indications for treatment and monitoring disease activity
Case #1

35 year old AAF presents with 2 months of dyspnea, weight loss of 30 pounds, and diffuse body aches. Previously completed courses of doxycycline and sulfamethoxazole/trimethoprim. She endorses night sweats as well as significant fatigue. She has an ongoing cough that is non productive. Recent labs negative for HIV.
Case #1
More about this case later
Sarcoidosis: Epidemiology/Etiology
Sarcoidosis: Epidemiology

- Seen across the globe:
  - 16 / 100,000 in men and 19 / 100,000 in women

- In the U.S.:
  - African Americans: 35 per 100,000
  - Caucasians: 10 per 100,000

- Largest numbers seen in South East U.S.
Sarcoidosis: Epidemiology

- Rare before adulthood
- Usually presents between ages 25 and 45
- Small second peak after age 50 (mainly women)
- Female/male ratio of 1.12 to 1.75

Baughman, Am J Respir Crit Care Med. 2011 Mar 1;183(5):573-81
Sarcoidosis: Etiology?

ACCESS trial

- Positive associations noted between Sarcoidosis & Agricultural employment
- Exposures to insecticides at work
- Mold and mild-dew exposures
- Smoking was protective

- 53% of the subjects were white

A Case Control Etiologic Study of Sarcoidosis (ACCESS) Environmental and Occupational Risk Factor, AJRCCM 2004
ACCESS Trial

<table>
<thead>
<tr>
<th></th>
<th>White</th>
<th>Black</th>
<th>Other</th>
<th>Percent</th>
</tr>
</thead>
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<td>234</td>
<td>11</td>
<td>63.6</td>
</tr>
<tr>
<td>Male</td>
<td>170</td>
<td>91</td>
<td>7</td>
<td>36.4</td>
</tr>
<tr>
<td>Percent</td>
<td>53.4</td>
<td>44.2</td>
<td>2.4</td>
<td></td>
</tr>
</tbody>
</table>

Am J Respir Crit Care Med (2001) 164:1885-1889
# VCU DRoP Sarcoidosis database 2009-2013

<table>
<thead>
<tr>
<th>Biopsy-proven Sarcoidosis</th>
<th>Number</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Black</td>
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<td>74.4</td>
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<tr>
<td>White</td>
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<td>23.0</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>2.6</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Age (mean, range)</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>Black (mean, 95% CI)</td>
<td>47 (45.6; 47.7)</td>
</tr>
<tr>
<td>White (mean, 95% CI)</td>
<td>49 (47.2; 51.7)</td>
</tr>
<tr>
<td>Other (mean, 95% CI)</td>
<td>51 (43.9; 58.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>184</td>
<td>36.2</td>
</tr>
<tr>
<td>Female</td>
<td>324</td>
<td>63.8</td>
</tr>
</tbody>
</table>

Problem: Does the current data apply to our patient population?
Sarcoidosis: Presentation & Diagnosis
Sarcoidosis: Nebulous Presentation

- No symptoms/incidental discovery
- Fatigue
- Cough
- Shortness of breath
- Eye pain/vision changes
- Rash/Skin changes
- Stroke like symptoms
- Joint pains/swelling
- Palpitations/Heart block/syncope
- Lofgren syndrome:
  - Erythema nodosum (rash), Inflammatory Arthritis, Enlarged lymph nodes

Sarcoidosis: Organ Involvement

- Eye 25%
- Lungs 90%
- Liver 11-80%
- Skin 30%
- Neurosarcoid 25%
- Pulm HTN 6-23%
- Cardiac 20%

JAMA, January 26, 2011—Vol 305, No. 4 (Reprinted)
### VCU DRoP Organ Involvement

<table>
<thead>
<tr>
<th>Organ Involvement</th>
<th>Overall</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>459</td>
<td>90.4</td>
<td>343</td>
<td>90.7</td>
<td>103</td>
<td>88.0</td>
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<tr>
<td>Dermatologic</td>
<td>106</td>
<td>20.9</td>
<td>88</td>
<td>23.3</td>
<td>16</td>
<td>13.7</td>
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<tr>
<td>Cardiac</td>
<td>20</td>
<td>3.9</td>
<td>14</td>
<td>3.7</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Hepatic</td>
<td>48</td>
<td>9.5</td>
<td>43</td>
<td>11.4</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Splenic</td>
<td>14</td>
<td>2.8</td>
<td>11</td>
<td>2.9</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Neurologic</td>
<td>27</td>
<td>5.3</td>
<td>24</td>
<td>6.4</td>
<td>2</td>
<td>1.7</td>
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<tr>
<td>Renal</td>
<td>1</td>
<td>0.2</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>10</td>
<td>2.0</td>
<td>9</td>
<td>2.4</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Extrathoracic lymph node</td>
<td>26</td>
<td>5.1</td>
<td>20</td>
<td>5.3</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Parotid</td>
<td>5</td>
<td>0.1</td>
<td>3</td>
<td>0.8</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Ophthalmologic</td>
<td>42</td>
<td>8.3</td>
<td>35</td>
<td>9.3</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Other</td>
<td>44</td>
<td>8.7</td>
<td>33</td>
<td>9.3</td>
<td>9</td>
<td>2.6</td>
</tr>
</tbody>
</table>
Sarcoidosis: A diagnostic challenge?

- One half of cases not diagnosed until 3 months after first evaluation of symptoms

- 10% of patients > 2 years to diagnosis

- A specific test (or Gold Standard) does not exist
  - ACE level is neither diagnostic nor reflective of treatment success

- Diagnosis of exclusion: other causes must be “reasonably excluded”

Valeyre, Semin Respir Crit Care Med 2014;35:336–351
Sarcoidosis: Establishing the Diagnosis

Symptoms/Labs + Imaging

Biopsy

Exclude other causes

Sarcoidosis
Sarcoidosis: Establishing the Diagnosis

Symptoms/Labs + Imaging

<table>
<thead>
<tr>
<th>STAGE</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No abnormalities</td>
<td>5%–10%</td>
</tr>
<tr>
<td>1</td>
<td>Lymphadenopathy (fig. A)</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>Lymphadenopathy + pulmonary infiltration (fig. B)</td>
<td>25%–30%</td>
</tr>
<tr>
<td>3</td>
<td>Pulmonary infiltration (fig. C)</td>
<td>10%–12%</td>
</tr>
<tr>
<td>4</td>
<td>Fibrosis</td>
<td>5% (up to 25% during the course of the disease)</td>
</tr>
</tbody>
</table>

## Scadding Stages: Prognosis

<table>
<thead>
<tr>
<th>Radiographic stage</th>
<th>Frequency %</th>
<th>Resolution %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0</td>
<td>5–15</td>
<td></td>
</tr>
<tr>
<td>Stage I</td>
<td>25–65</td>
<td>60–90</td>
</tr>
<tr>
<td>Stage II</td>
<td>20–40</td>
<td>40–70</td>
</tr>
<tr>
<td>Stage III</td>
<td>10–15</td>
<td>10–20</td>
</tr>
<tr>
<td>Stage IV</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>
Sarcoidosis: Establishing the Diagnosis

Staging of Sarcoidosis on the Basis of Chest Radiographs

<table>
<thead>
<tr>
<th>STAGE 0</th>
<th>No abnormalities</th>
<th>5%–10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAGE 1</td>
<td>Lymphadenopathy (fig. A)</td>
<td>50%</td>
</tr>
<tr>
<td>STAGE 2</td>
<td>Lymphadenopathy + pulmonary infiltration (fig. B)</td>
<td>25%–30%</td>
</tr>
<tr>
<td>STAGE 3</td>
<td>Pulmonary infiltration (fig. C)</td>
<td>10%–12%</td>
</tr>
<tr>
<td>STAGE 4</td>
<td>Fibrosis</td>
<td>5% (up to 25% during the course of the disease)</td>
</tr>
</tbody>
</table>

Jenkins, Derick Nelson et al. Prevalance of Parenchymal Disease in an American Cohort with Stage 1 Sarcoidosis. CHEST 2015, Montreal CA
Case #1 – Diagnosed as Sarcoid by Lung Biopsy
Case #1 – Symptoms resolved

Prednisone x 3 months
Case #2

35 year old AAM presents with dyspnea climbing the stairs. He was told he possibly had sarcoidosis by his eye doctor over 10 years ago but can not recall every having a biopsy. He reports progressive cough over the last two months. He also notes palpitations. He denies fevers, chills, weight loss.
Case #2
VCU vs other (Scadding stage)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>32%</td>
</tr>
<tr>
<td>Stage II</td>
<td>16%</td>
</tr>
<tr>
<td>Stage III</td>
<td>36%</td>
</tr>
<tr>
<td>Stage IV</td>
<td>16%</td>
</tr>
</tbody>
</table>

**TABLE 1** Frequency of Scadding radiographic stages at presentation and probability of spontaneous resolution of sarcoidosis

<table>
<thead>
<tr>
<th>Radiographic stage</th>
<th>Frequency %</th>
<th>Resolution %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 0</td>
<td>5–15</td>
<td>60–90</td>
</tr>
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</tr>
<tr>
<td>Stage II</td>
<td>20–40</td>
<td>40–70</td>
</tr>
<tr>
<td>Stage III</td>
<td>10–15</td>
<td>10–20</td>
</tr>
<tr>
<td>Stage IV</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>
Sarcoidosis: Making the Diagnosis

- Biopsy
  - Tissue sampling of the most easily accessible site
    - Skin
    - Lymph nodes
    - Peripheral
    - Within the Chest: Mediastinal, Hilar

- Other Organs as guided by imaging studies
Sarcoidosis: Making the Diagnosis

- Biopsy
  - Bronchoscopy with endobronchial ultrasound
    - Rapid Onsite Evaluation (ROSE)
  - Bronchoscopy with transbronchial biopsy +/- cryo
  - Forceps biopsy of airway
Sarcoidosis: Making the Diagnosis

Symptoms/Labs + Imaging

Biopsy

- Non caseating granuloma
- Special stains (PAS, Acid Fast) to rule out infection
Sarcoidosis: Making the Diagnosis

Differential for non-caseating granuloma

- Hypersensitivity Pneumonitis
- Metals: beryllium, zirconium, silica, and talc.
- Hodgkin's disease
- Leucocyte oxidase defects -> Chronic granulomatous disease in adults
- Immune Dysregulation:
  - Crohns Disease, Primary biliary Cirrhosis, Langerhans' cell granulomatosis (PLCH), Blau Syndrome
- Vasculitis (GPA, Churg Strauss, SLE)
- Infections (Fungi, mycobacteria, Spirochetes, Protozoa)
Sarcoidosis: Making the Diagnosis

- Symptoms/Labs + Imaging
- Biopsy
- Exclude other causes

Sarcoidosis
Problem: Diagnosis established….now what?

- Are the Scadding Stages Useful?
- To Treat or Not to Treat?
- When to Absolutely Treat – Cardiac, CNS, Ocular disease, Hypercalcemia?
- How to Monitor Disease Activity?
Sarcoidosis: Basic evaluation

- CXR
- Cardiac history, EKG, Echocardiogram
- Yearly Screening Evaluation by Ophthalmology
- Comprehensive Metabolic Panel
- PFT’s
Case # 3

35 year old female with history of asthma presents to the ED with fatigue and dyspnea following an airplane trip. A Chest CTA reveals bilateral hilar lymphadenopathy. EKG reveals 3\textsuperscript{rd} degree heart block.
Cardiac Sarcoidosis

- Present in 5-25% of patients diagnosed with sarcoidosis
- Heart block
- Tachyarrhythmias
- CHF
- Sudden Cardiac Death
Cardiac Sarcoidosis:

### TABLE 4. RISK OF CARDIAC DEATH FOR UNITED STATES DECEDEMTS FROM 1988–2007 WITH SARCOIDOSIS AS UNDERLYING CAUSE OF DEATH RELATIVE TO BACKGROUND POPULATION

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Blacks</th>
<th></th>
<th>Whites</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>25–34</td>
<td>1.43 (1.22–2.00) *</td>
<td>2.14 (1.81–2.52) †</td>
<td>2.25 (1.32–3.82) ‡</td>
<td>2.31 (1.61–3.31) †</td>
</tr>
<tr>
<td>35–44</td>
<td>1.02 (0.93–1.13)</td>
<td>1.08 (0.97–1.20)</td>
<td>1.61 (1.25–2.08) ‡</td>
<td>1.26 (1.03–1.54)</td>
</tr>
<tr>
<td>45–54</td>
<td>0.87 (0.81–0.95) *</td>
<td>0.81 (0.73–0.90) †</td>
<td>1.19 (1.01–1.41) †</td>
<td>0.76 (0.64–0.91) *</td>
</tr>
<tr>
<td>55–64</td>
<td>0.72 (0.65–0.79) †</td>
<td>0.75 (0.66–0.86) †</td>
<td>0.72 (0.62–0.83) †</td>
<td>0.63 (0.53–0.74) †</td>
</tr>
<tr>
<td>65–74</td>
<td>0.63 (0.56–0.72) †</td>
<td>0.74 (0.61–0.90) *</td>
<td>0.71 (0.63–0.79) †</td>
<td>0.66 (0.57–0.77) †</td>
</tr>
<tr>
<td>75–84</td>
<td>0.78 (0.65–0.93) ‡</td>
<td>0.73 (0.52–1.03) ‡</td>
<td>0.68 (0.61–0.77) †</td>
<td>0.61 (0.51–0.73) †</td>
</tr>
</tbody>
</table>

Cardiac death includes codes for ischemia or myocardial infarction, sudden cardiac death or arrhythmia, congestive heart failure, or cardiomyopathy.

* P ≤ 0.001.
† P < 0.0001.
‡ P ≤ 0.005.
§ P < 0.05.
Cardiac Sarcoidosis: Clinical Manifestations

- Clinical expression from asymptomatic ECG changes to sudden death
- CHF symptoms common: systolic, diastolic, right heart failure due to pulmonary HTN
- Conduction abnormalities in 12-62%

Cardiac Sarcoidosis: Clinical Manifestations

- Can affect any part of the conduction system: LBBB, RBBB, AV block of any degree, and sinus node arrest

- Sudden death can be due to ventricular arrhythmias or complete heart block

- Sudden death may be the initial presentation in up to 17% of patients

Cardiac Sarcoidosis

Biopsy proven extra-cardiac sarcoidosis

Cardiac history, ECG, Echocardiogram,

1. Symptom(s) positive (significant palpitations*/pre-syncope/syncope)
2. Abnormal ECG**
3. Abnormal Echocardiogram***

One or more of 1-3

Advanced cardiac Imaging CMR and/or FDG-PET

None of 1-3

Negative – Low probability of cardiac sarcoidosis

* palpitations were defined as “prominent patient complaint lasting > 2 weeks”
** abnormal ECG defined as complete left or right bundle branch block and/or presence of unexplained pathological Q waves in 2 or more leads and/or sustained 2nd or 3rd degree AV block and/or sustained or non-sustained VT
*** abnormal echocardiogram defined as RWMA and/or wall aneurysm and/or basal septum thinning and/or LVEF < 40%
Sarcoidosis: Treatment?

- AKA How Can I Do No Harm?
# Sarcoidosis: Treatment

## Table 1. Approach to Treating Individual Organ Systems

<table>
<thead>
<tr>
<th>Clinically active disease</th>
<th>Not Generally</th>
<th>Sometimes</th>
<th>Generally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurological</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Ocular</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Cardiac</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Renal</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Hepatic</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Splenic</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Pulmonary</td>
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<td></td>
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<tr>
<td>Stage 0</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stage I</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stage II</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Stage III</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Stage IV</td>
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<td>Yes</td>
</tr>
<tr>
<td>Cutaneous</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Musculoskeletal</td>
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<td>Comorbid conditions</td>
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<td>Depression</td>
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<td>Fatigue</td>
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<td>No</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Treatments are dependent on site and severity of organ involvement. In pulmonary sarcoidosis, therapy is often initiated for significant symptoms and/or functional deterioration. For cardiac disease and neurosarcoidosis, therapy is essential. Treatment with doses higher than those used in patients with pulmonary sarcoidosis are generally required.

Iannuzi, JAMA, January 26, 2011—Vol 305, No. 4
Sarcoidosis: Initial Treatment

- Acute disease activity: Prednisone: 20-40 mg
- Steroid intolerance/side effects outweigh benefit of therapy
  - Second line therapy

Sarcoidosis: Treatment

Sarcoidosis: Second Line Therapy

- Methotrexate
- Azathioprine
- Leflunomide
- Mycophenolate mofetil
- Hydroxychloroquine

Sarcoidosis: Third Line Therapy - Biologics

- **Infliximab**
  - Chimeric monoclonal antibody to TNF
  - Infusion therapy at 0, 2, and 6 weeks, then every 4-8 weeks
  - Weight based dose

- **Adalimumab**
  - Fully human monoclonal antibody to TNF
  - Subcutaneous injection every 2 weeks
  - Set dose

Sarcoidosis: Treatment Dilemma

- Only two drugs are FDA approved
  - Steroids
  - Acthar

- Oral immunosuppressants are not well studied (no randomized, placebo controlled, clinical trials **except for methotrexate)**

- Infliximab has a few randomized, clinical trials that show benefit
Infliximab

- Handful of randomized, placebo controlled trials

- Overall show benefit of Infliximab for pulmonary and extra-pulmonary sarcoidosis

- Case series and retrospective analysis also show benefits

- Strongest evidence for use
Acthar

- Corticotropin subcutaneous injection
- FDA approved for sarcoidosis in the 1950s
  - Only FDA requirement at the time was safety
  - Efficacy “proven” based on a few case reports
Acthar

- Mechanism of action
  - Stimulation of corticosteroid secretion
  - Stimulation of melanocortin receptors
    - Possible direct anti-inflammatory effects
    - Works in acute MS exacerbations (FDA approved)

- No placebo controlled trials

- No evidence that long-term (or short-term) side effects are any different that corticosteroids
How to Monitor Disease Activity?

&

How Long to Treat?
Assessment of Disease Activity

- Pulmonary Function Testing
  - FVC: 5-10% change
  - DLCO:
    - Less likely to see improvement with therapy
    - Monitoring for decline

- 6 Minute Walk
  - Unclear role – multi-organ involvement a proposed limitation

Assessment of Disease Activity

- WASOG Sarcoidosis Organ Assessment Instrument
  - 16 organ systems
  - Categorized into highly probable, at least probable, possible, and no consensus
Assessment of Disease Activity

- ePOST (Extrapulmonary Physician Organ Severity Tool)
  - Scores range from 0-102
  - 17 organ systems (minus pulmonary)
  - Physician dependent

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not affected</td>
</tr>
<tr>
<td>1</td>
<td>Slight</td>
</tr>
<tr>
<td>2</td>
<td>Mild</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Moderate to severe</td>
</tr>
<tr>
<td>5</td>
<td>Severe</td>
</tr>
<tr>
<td>6</td>
<td>Very severe</td>
</tr>
</tbody>
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Assessment of Disease Activity

- **Symptoms**
- Imaging
  - PET/CT
    - Cardiac
    - Full body
  - MRI
    - Cardiac
    - Brain
  - CXR
Case # 4

21 year old Caucasian male athlete first noted his running pace had decreased from 6 min/mile to 8 min/mile. Several months later developed dizziness and near syncope. Initial diagnosis was vertigo.

Several weeks later he passed out.

Taken to ED:
Case # 4

Initial Work up:

EKG: intermittent 3 degree AV block
TTE: normal LV/RV, EF 65%
C-MRI: Focal enhancement 8mm x 9mm - basal lateral wall
Chest CT: Mild mediastinal adenopathy, few nodular densities in RUL
Bronchoscopy with biopsy: c/w non-caseating granulomas
Dual Chamber Pacer Placed – 100% paced !!
Case #4

Diagnosis

- Pacemaker insertion
- Azathioprine started
- Prednisone added to Azathioprine
- Pacemaker revision/ICD lead added (risk of sudden cardiac death)

6 months

- Decreased prednisone
- Native conduction recovery
- Exercise capacity improved – not back to baseline
Case #4

6 months

Decreased prednisone
Native conduction recovery
Exercise capacity improved
– not back to baseline

8 months

Cardiac PET
Case # 4

C-PET – 8 mo after diagnosis
Case #4

6 months
- Decreased prednisone
- Native conduction recovery
- Exercise capacity improved – not back to baseline

8 months
- Infliximab added
- Cardiac PET: Diffuse uptake in myocardium
- Ejection Fraction: 45!

10 months
- No Fatigue
- Exercise capacity normal
- Cardiac PET…
Case # 4

C-PET – 8 mo after dx

C-PET – 15 mo after dx
Sarcoidosis

The multidisciplinary team at VCU health

- Tom Iden – Pulmonary
- Aamer Syed – Pulmonary
- Jordana Kron – EP-Cardiology
- Trang Le – Endocrine
- Huzaefah Syed - Rheumatology
Questions ?