Pulmonary Manifestation of Myositis

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Types of Pulmonary Involvement

• Interstitial lung diseases (ILD) and/or interstitial pulmonary fibrosis (IPF)
  – Nmost common in patients with antisynthetetase autoantibodies (I.e., anti-Jo-1)

• Diaphragmatic weakness
Diagnosis

- History and Physical Exam
- Chest X-Ray
- High Resolution Computerized Tomography (HRCT)
- Pulmonary Function Tests
- Pulse oximeter and Arterial Blood Gas (ABG)
- Bronchoscopy
- Bronchoalveolar lavage (BAL)
- Surgical Lung Biopsy
Pulmonary Function Tests (PFTs)

- Diffusing capacity (DLCO)
- Spirometry
  - Obstruction
  - Restriction
Subsets of ILD

- Usual interstitial lung disease (UID)
- Acute interstitial pneumonitis (AIP)
- Cryptogenic organizing pneumonia or bronchiolitis obliterans organizing pneumonia (BOOP)
- Desquamative interstitial pneumonia (DIP)
- Lymphocytic interstitial pneumonia (LIP)
- Nonspecific interstitial pneumonitis (NSIP)
- Respiratory bronchiolitis interstitial lung disease (RBILD)
- Diffuse alveolar damage (DAD)
Current Definition of IPF

A distinct type of chronic fibrosing interstitial pneumonia of unknown cause, limited to the lungs, and associated with a surgical lung biopsy showing a histologic pattern of UIP.

Prevalence of Idiopathic Pulmonary Fibrosis (IPF)

• 128,000 to 200,000 people in the US

• Associations
  – None
  – Polymyositis and Dermatomyositis
  – Rheumatoid arthritis
  – Systemic lupus erythematosus
  – Scleroderma
  – Sjogren’s syndrome
  – Mixed Connective tissue disease
Symptoms

- Shortness of breath
- Chronic dry, hacking cough
- Fatigue and weakness
- Discomfort in the chest
- Loss of appetite
- Rapid weight loss
Pathology of UIP/IPF

Leading Edge of "Fibroblastic Foci"
Pathology of UIP/IPF

Patchy Interstitial Chronic Inflammation
HRCT FINDINGS IN IPF
<table>
<thead>
<tr>
<th>Clinical Features</th>
<th>AIP</th>
<th>UIP/IPF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Acute</td>
<td>Insidious</td>
</tr>
<tr>
<td>Course</td>
<td>Fulminant (4-6 wks)</td>
<td>Slowly progressive (3-5 yrs)</td>
</tr>
<tr>
<td>5 yr Mortality</td>
<td>60 - 90%</td>
<td>&gt; 60%</td>
</tr>
<tr>
<td>Complete recovery possible</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pathologic Features</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporal appearance</td>
<td>Uniform</td>
</tr>
<tr>
<td>Fibroblasts</td>
<td>Diffuse</td>
</tr>
<tr>
<td>Hyaline membranes</td>
<td>Focal</td>
</tr>
<tr>
<td>Thrombi</td>
<td>Focal</td>
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Hamman and Rich, Bull Johns Hopkins Hosp 74:177, 1944
Cryptogenic Organizing Pneumonia
## CLINICAL AND PATHOLOGIC FEATURES OF UIP/IPF AND BOOP/COP

<table>
<thead>
<tr>
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<th>BOOP/COP</th>
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<tr>
<td>Onset</td>
<td>Insidious</td>
<td>Acute</td>
</tr>
<tr>
<td>Systemic symptoms</td>
<td>Infrequent</td>
<td>Common</td>
</tr>
<tr>
<td>Chest radiograph</td>
<td>Bilateral interstitial</td>
<td>Usually patchy airspace</td>
</tr>
<tr>
<td>Treatment</td>
<td>Steroids, cytoxan, or azathioprine</td>
<td>None or steroids</td>
</tr>
<tr>
<td>Prognosis</td>
<td>Poor</td>
<td>Excellent</td>
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<tr>
<td>Temporal distribution</td>
<td>Heterogeneous</td>
<td>Uniform</td>
</tr>
<tr>
<td>Septal fibroblast foci</td>
<td>Extensive</td>
<td>Mild</td>
</tr>
<tr>
<td>Intraluminal fibrosis</td>
<td>Mild/moderate</td>
<td>Extensive</td>
</tr>
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Nonspecific Interstitial Pneumonia/Fibrosis

- F>M (1.5:1); mean 5th decade (range 9-78)
- Dyspnea, cough, fever: mean duration 8 months (range 1 week to 5 years)
- Associated/underlying conditions
  - Collagen vascular disease (10/64)
  - Organic antigen exposure (10/64)
- Prognosis generally good
  - >90% 5 year survival

Katzenstein, AL, Am J Surg Pathol. 18:1994
Cellular NSIP
HRCT in Cellular vs. Fibrotic NSIP
Histopathologic Variability in UIP and NSIP

• 168 surgical lung biopsies for IIP (Michigan)
• 109 had multiple lobes sampled
  – 3 blinded pathologists: each lobe diagnosed
  – 28 % were discordant
  – No lobar predilection for either diagnosis
  – Survival reflected the worst diagnosis

Figure 1. (A) Lobar histologic diagnosis in 109 patients with UIP or NSIP. (B) Lobar histologic diagnosis in 28 patients with a UIP pattern in at least one lobe but an NSIP pattern in at least one lobe (discordant UIP).
Figure 2. Kaplan–Meier survival curves for patients with concordant UIP (n = 51), discordant UIP (n = 28), and NSIP (n = 30), grouped by histologic classification (p < 0.0003). (dotted line: NSIP; solid line: discordant UIP; dashed line: concordant UIP; +: last follow up visit; o: death).
Diffuse Alveolar Damage

- Infection (viral, bacterial, fungal)
- Toxic inhalations
- Drugs
- Radiation reaction (acute)
- Alveolar hemorrhage syndromes
- Vasculitis
- Connective tissue disease
- Idiopathic (AIP)
### Clinical and Pathologic Features of UIP/IPF and DIP

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<tr>
<td>Mean age</td>
<td>55 yr</td>
<td>42 yr</td>
</tr>
<tr>
<td>Spontaneous improvement</td>
<td>No</td>
<td>Occasionally</td>
</tr>
<tr>
<td>Response to steroids</td>
<td>&lt;10%</td>
<td>&gt;60%</td>
</tr>
<tr>
<td>Mortality (mean survival)</td>
<td>&gt;60% (4-5 yr)</td>
<td>27% (12 yr)</td>
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PM/DM-Associated ILD
(Douglas. AJRCCM 2001;164:182)

- NSIP-cellular 32%
- NSIP-cellular and fibrotic 41%
- NSIP-fibrotic 10%
- UIP 4%
- DAD 9%
- BOOP 4%
PM/DM-Associated ILD
(Douglas. AJRCCM 2001;164:182)

• Lung disease was presenting feature in 30%
• Steroid response may delay correct diagnosis of PM/DMM
• Muscles respond faster than lungs to treatment
• Incomplete resolution of pulmonary infiltrates is common
Management

- Corticosteroids: (Prednisone)
- Cyclophosphamide (Cytoxan)
- Azathioprine (Imuran)
- N-acetylcysteine (NAC)
- Tacrolimus
- Mycophenolate (Cellcept)
- Cyclosporine
- Supplemental Oxygen Therapy
- Pulmonary
- Lung Transplantation