Joint Videomicroscopy (PPWG & Cytopathology WG)

When cytology is more useful than histology

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Acknowledgments to Dr Lorand Kis and Cristian Ortiz-Villalón
Clinical history: referral case

- 27 yrs old male.
- **12th Dec**: bilateral otitis media treated with fenoximetilpenicillin. Later developed dyspnea and cough.
- **7th Jan** (1st visit to GP): diagnosis of pneumonia, treated accordingly with penicillin with no improvement.
- CT thorax-abdomen: bilateral lung infiltrates. Needed O2 therapy (3L in rest)
- Switched to Amoxicillin- developed skin rush.
- **18th Jan**: bronchoscopy – BAL negative for fungi; influenza A,B, RS virus negative.
  
  - no blood eosinophilia; negative for ANA, ANCA, Ig, CCP, RF
- Treatment: Steroids (50 mg) -- improvement

- Core biopsy (25th Jan)
- Cryobiopsy right lower lobe segment 8-9 (6th Feb)
- **Wedge** (21st May)
1. Core biopsy

bronchiole
Diagnosis

Chronic inflammation with focal post-obstructive features. No granuloma or malignancy seen.
2. Cryobiopsy
Diagnosis

Interstitial inflammation with patchy areas of organising pneumonia and alveolar macrophages. No granuloma or malignancy seen.
3. Wedge resection
The molecular analysis for TCR-beta and TCR-gamma show evidence of polyclonal T cell population.
When cytology is more useful than histology?

Clinical history:
In the initial work-out a bronchoscopy was done: BAL negative for fungi; influenza A,B and RS virus. No differential cell count done.
Bronchoscopy procedure (briefly)

- Flexible bronchoscope is placed in the selected segment.
- Normal saline at room temp is instilled with a total volume 100 to 300 ml and divided into 3 to 5 aliquots.
- Minimal total volume retrieved >5% of the instilled volume (optimal >30%). Minimal volume for the analysis 5 ml (optimal 10 to 20ml).
- Gross appearance of the fluid:
  - If it is increasingly bloody: diffuse alveolar damage
  - Cloudy with floculent material that settles in the bottom after 15 to 20 min: PAP.
Clinical Evidence of Acute Diffuse Infiltrative Lung Disease
(dyspnea, diffuse infiltrates, hypoxemia, no known prior lung disease, illness ≤4 weeks duration)

High-Resolution CT Scan*

Diffuse Ground Glass Opacities
(±superimposed on chronic changes)

Bronchoalveolar Lavage

Eosinophils ≥25%

Lymphocytes ≥50%

Bloody lavage (persists and/or increases on sequential aliquots)

Other findings

Eosinophilic Pneumonia

Consider Drug Reaction, Acute HP

Diffuse Alveolar Hemorrhage

Specific Diagnosis

Non-diagnostic
### TABLE 1. SUMMARY OF BAL CELLULAR PATTERNS IN NORMAL/HEALTHY ADULT NONSMOKERS AND IN PATIENTS WITH COMORBID INTERSTITIAL LUNG DISEASES (CONSISTENT PATTERNS AND CLINICAL UTILITY)

<table>
<thead>
<tr>
<th>I. Normal Adults (Nonsmokers)</th>
<th>BAL Differential Cell Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alveolar macrophages</td>
<td>&gt;85%</td>
</tr>
<tr>
<td>Lymphocytes (CD4+/CD8+ = 0.9–2.5)</td>
<td>10–15%</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>≤3%</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>≤1%</td>
</tr>
<tr>
<td>Squamous epithelial*/ciliated columnar epithelial cells†</td>
<td>≤5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. Interstitial lung diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Disorders associated with increased percentage of specific BAL cell types</strong></td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td><strong>Lymphocytic cellular pattern</strong></td>
</tr>
<tr>
<td>&gt;15% lymphocytes</td>
</tr>
<tr>
<td>Sarcoidosis</td>
</tr>
<tr>
<td>Non-specific interstitial pneumonia (NSIP)</td>
</tr>
<tr>
<td>Hypersensitivity pneumonitis</td>
</tr>
<tr>
<td>Drug-induced pneumonitis</td>
</tr>
<tr>
<td>Collagen vascular diseases</td>
</tr>
<tr>
<td>Radiation pneumonitis</td>
</tr>
<tr>
<td>Cryptogenic organizing pneumonia (COP)</td>
</tr>
<tr>
<td>Lymphoproliferative disorders</td>
</tr>
</tbody>
</table>
Diagnosis

Features consistent with chronic eosinophilic pneumonia
Pulmonary eosinophilia

<table>
<thead>
<tr>
<th>Infection causes</th>
<th>Non-infections causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parasites</td>
<td>ABPA</td>
</tr>
<tr>
<td></td>
<td>Drug reaction: Nitrofurantoin and antibiotics</td>
</tr>
<tr>
<td></td>
<td>Chronic eosinophilic pneumonia</td>
</tr>
<tr>
<td></td>
<td>Acute eosinophilic pneumonia</td>
</tr>
<tr>
<td></td>
<td>EGPA</td>
</tr>
<tr>
<td></td>
<td>HES (Hypereosinophilic Synd)</td>
</tr>
</tbody>
</table>

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Chronic eosinophilic pneumonia:
Idiopathic condition.

Described in 9 patients with dyspnea, cough and pulmonary infiltrates in the radiology and eosinophils in the lung parenchyma.

Mild to moderate respiratory distress for more than two weeks.

Previous asthma or atopic conditions. Non-smokers.

Good response to steroids

Acute eosinophilic pneumonia is related to smoke exposure.
No atopic or asthma.
Severe respiratory distress
Eosinophilic count in the BAL over 25% is virtually diagnostic of acute and chronic eosinophilic pneumonia.