MYSTERIOUS OBJECTS

Presented by:
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Patient is first seen in Pulmonary clinic on 6/15/2015

Primary diagnosis is:
Necrotic lymphadenopathy
Weight loss
Cystic lesions in the lung

The patient has a very complex medical history and does not have a very good insight of her medical issues.
Communication with patient is difficult.

Patient only speaks KAREN language and no KAREN interpreter is available. Patient cannot use phone as she is also very hard of hearing.

Most of the history was obtained through the patient’s friend, her daughter-in-law who also accompanied in the presence of an interpreter over the phone.
Patient was sent to clinic by physician from another facility outside of ACL

Retrieving those records, including CT scan, noted:

- Necrotic lymph nodes in the neck.
- Cystic lesions and scarring in the upper part of lung.

Patient questioning through an interpreter reveals:

- Dark colored sputum for the last 2 months
- Weight loss of 10 pounds
- Hemoptysis once 2 months prior
- No fever, chills, nausea, vomiting, headache, blurred vision.
- Decreased energy
• Pulmonary tuberculosis was suspected.

• Lymph node biopsy was performed under negative pressure precautions.

**MTC** was isolated from a culture of the lymph node.

All records outside of ACL could not be retrieved
Following lymph node biopsy, patient was admitted via ambulance with right neck cellulitis and **possible pulmonary tuberculosis** on 7/24/2015

- CT scan shows prominent right upper lobe pulmonary nodule.
- Patient eventually needs biopsy of lung lesion once cleared from airborne precautions.
- Patient will be treated for tuberculosis via health department.
LAB RESULTS 7/25/2015

Automated differential:

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
<th>Absolute Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEUT</td>
<td>47%</td>
<td>3.3 K/mcl</td>
</tr>
<tr>
<td>LYMPH</td>
<td>37%</td>
<td>2.6 K/mcl</td>
</tr>
<tr>
<td>MONO</td>
<td>7%</td>
<td>0.5 K/mcl</td>
</tr>
<tr>
<td>EOS</td>
<td>9%</td>
<td>H 0.6 K/mcl</td>
</tr>
<tr>
<td>BASO</td>
<td>0%</td>
<td>0.0 K/mcl</td>
</tr>
</tbody>
</table>
 LAB RESULTS 7/26/2015

Automated differential:

<table>
<thead>
<tr>
<th>Cell Type</th>
<th>Percentage</th>
<th>Absolute Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEUT</td>
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<td>2.0 K/mcl</td>
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<tr>
<td>LYMPH</td>
<td>48%</td>
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<tr>
<td>MONO</td>
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<tr>
<td>EOS</td>
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<td>0.9 K/mcl</td>
</tr>
<tr>
<td>BASO</td>
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<td>0.0 K/mcl</td>
</tr>
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</table>

*Note: The term 'H' in the 'ABSOLUTE EOS' row indicates a high eosinophil count.*
Lab results 7/31/2015

Automated differential:

<table>
<thead>
<tr>
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<th>Percentage</th>
<th>Absolute Count</th>
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</thead>
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<td>3.3 K/mcl</td>
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<tr>
<td>LYMPH</td>
<td>44%</td>
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<td>MONO</td>
<td>5%</td>
<td>0.4 K/mcl</td>
</tr>
<tr>
<td>EOS</td>
<td>10%</td>
<td>0.8 K/mcl</td>
</tr>
<tr>
<td>BASO</td>
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<td>0.0 K/mcl</td>
</tr>
</tbody>
</table>

ABSOLUTE NEUT 3.3 K/mcl
ABSOLUTE LYMPH 3.5 K/mcl
ABSOLUTE MONO 0.4 K/mcl
ABSOLUTE EOS 0.8 K/mcl
ABSOLUTE BASO 0.0 K/mcl
INFECTIONOUS DISEASE ASSESSMENT

• Tuberculous cervical lymph adenitis
• Cough
• Hemoptysis??
• R/O pulmonary process
• Lung Mass??
• Follow CBC
• Follow cultures
• Follow cxr
• Follow clinically
<table>
<thead>
<tr>
<th>Date</th>
<th>Smear Result</th>
<th>Culture Results</th>
<th>Final Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/26/2015</td>
<td>SMEAR NEGATIVE</td>
<td>CULTURE NEGATIVE</td>
<td>Final 9/11/2015</td>
</tr>
<tr>
<td>7/28/2015</td>
<td>SMEAR NEGATIVE</td>
<td>CULTURE: * M. AVIUM COMPLEX</td>
<td>Final 8/26/2015</td>
</tr>
<tr>
<td>7/29/2015</td>
<td>SMEAR NEGATIVE</td>
<td>CULTURE: M. AVIUM COMPLEX</td>
<td>Final 8/27/2015</td>
</tr>
<tr>
<td>7/31/2015</td>
<td>SMEAR NEGATIVE</td>
<td>CULTURE NEGATIVE</td>
<td>Final 9/11/2015</td>
</tr>
<tr>
<td>8/1/2015</td>
<td>SMEAR NEGATIVE</td>
<td>CULTURE NEGATIVE</td>
<td>Final 9/23/2015</td>
</tr>
<tr>
<td>8/2/2015</td>
<td>SMEAR NEGATIVE</td>
<td>CULTURE: M. AVIUM COMPLEX</td>
<td>Final 9/11/2015</td>
</tr>
</tbody>
</table>
• All MAVC positive cultures were isolated from MGIT broth only (3 of 6).

• Positive MGIT broth was tested by ACCUPROBE method for the presence of MTC and MAVC.

• Positive MGIT broth was subcultured to 7H10 solid media to verify the presence of MAVC by morphology and to check for purity of isolation. (Look for MTC or other mycobacteria).

• All primary solid media of LJ and selective 7H11 were examined for the presence of characteristic colonies of MAVC and/or MTC.

• No MAVC or MTC colonies were isolated from primary solid media.

• A single colony of M. fortuitum was isolated and identified from the 7H11 media of a single culture. (1 of 6)
8/28/2015

Primary diagnosis pulmonary tuberculosis

At this time, not all culture reports were final
• Primary diagnosis remains “Pulmonary TB”.

• All samples tested were sputum.

• Should more (better) samples such as bronchial lavage be tested for presence of MTC?

• Is patient free of pulmonary TB?

• Questions remain.
8/14/2015 TB LAB
REVIEWSING CULTURES
Looking for MTC

Example of M. avium complex growing on solid media using 6 drops as inoculum.

4 week incubation
Test patient in question

Possible mixed infection??

2 week incubation
Culture too young for visible colonies

Look for microcolonies
MICROCOLONIES (example)

M. avium complex

10X

MTB

M. gordonae
Investigate primary Auramine rhodamine smear
Positive Auramine rhodamine (example) 40X
Test patient investigation
Original smear low power field **10X**

Auramine rhodamine
2\textsuperscript{nd} slide \textit{low power} view (original slide)
WHAT IS THIS??

High power 40X
Perform wet prep of processed sample
Wet prep of test patient, low power (10X) view from **digested, decontaminated** sputum.
High power view (40X)
80 microns
85 µm x 53 µm. Range, 68-118 µm x 39-67 µm. **Ovoidal or elongate** with thick shell. **Operculum is slightly flattened and fits into shoulder area** of shell. Posterior end is thickened. Egg often **asymmetrical** with one side slightly flattened. **Yellow brown to dark brown. Unembryonated**. Filled with yolk material in which a germinal cell is imbedded. Cells are irregular in size.
Diagnosis From Eggs Detected by Auramine-Rhodamine Stain?

Thick Shell

end slightly flattened and thick

operculum
Paragonimus (lung fluke)

1. Unembryonated eggs
2. Embryonated eggs
3. Miracidia hatch and penetrate snail
4a. Sporocysts
4b. Rediae
4c. Cercariae
5. Cercariae invade the crustacean and encyst into metacercariae.
6. Humans ingest inadequately cooked or pickled crustaceans containing metacercariae.
7. Excyst in duodenum
8. Adults in cystic cavities in lungs lay eggs which are excreted in sputum. Alternately eggs are swallowed and passed with stool.

=CDC

Aurora Health Care®
According to CDC

It was thought that Paragonimus ova would be destroyed in the decontamination procedure of specimens used for TB cultures.

This case proves otherwise
Morphologic Diagnosis of Paragonimus:
The usual diagnosis is based on microscopic demonstration of *eggs in stool or sputum*, but these are not present until 2 to 3 months after infection. (Eggs are also occasionally encountered in effusion fluid or biopsy material.) Concentration techniques may be necessary in patients with light infections.

Biopsy may allow diagnostic confirmation and species identification when an adult or developing fluke is recovered.

*Symptoms suggest our patient is in chronic phase*

During the chronic phase, pulmonary manifestations include cough, expectoration of discolored sputum, hemoptysis, and chest radiographic abnormalities, (masses, infiltrates, cavitation, fibrosis, effusion or pleural thickening).

Extrapulmonary locations of the adult worms result in more severe manifestations, especially when the brain is involved.
Human *paragonimiasis* is common in Southeast Asia like Thailand and Vietnam and India, where diets often include:

- raw, cured, pickled, or salted crustaceans.
  (freshwater crabs or crayfish containing metacercariae)

In contrast, consumption of uncooked crustaceans is uncommon in North America.
OTHER CASES
INDIA CASE STUDY

August 2015

Patient was started on anti-tubercular therapy with no relief even after 8 months. BAL fluid was negative for AFB. Patient advised to continue (ATT) (India has high incidence of TB) Microscopic exam of rusty colored sputum revealed operculated, oval, yellowish-colored eggs of *Paragonimus* species.

*Paragonimus is a disease which is frequently misdiagnosed as pulmonary tuberculosis.* In the areas where people eat crab/crayfish this disease should be considered in the differential diagnosis to avoid antituberculosis treatment for a non-tubercular condition.

Delayed diagnosis:
can lead to unnecessary medical treatments and procedures that can cause serious illness. Clinicians should consider the diagnosis of paragonimiasis in all patients with **cough, fever, and pleural effusion with peripheral eosinophilia**.
Pulmonary Paragonimiasis Mimicking Tuberculosis

KJ Prasad¹, Arup Basu², Shilpi Khana³, Chand Wattal⁴

Abstract

Paragonimiasis is a disease which is frequently misdiagnosed as pulmonary tuberculosis. In the areas where people eat crab/crayfish this disease should be considered in the differential diagnosis to avoid antituberculosis treatment for a non-tubercular condition. We are reporting a case of pulmonary paragonimiasis who had been treated for tuberculosis.

This positive sample was sent to RMRC, Dibrugarh for species identification. According to them morphologically and morphometrically the eggs appeared to be of *P. heterotremus*. The diagnosis was thus confirmed as pleuropulmonary paragonimiasis.

Patient was started on oral Praziquantel for 2 days. Until last follow up he had improved considerably.
Possible in USA?
CDC reports 16 cases in Missouri from 1968 – 2010

Signs and symptoms
- Fever
- Cough
- Chest pain
- Dyspnea
- Night sweats
- Malaise
- Abdominal pain
- Weight loss

Radiographic findings
- Pleural effusion
- Nodule
- Pericardial effusion

Patients consumed raw crayfish while on float (recreational river) trips, camping, or as a demonstration of wilderness survival skills.
A 19-year-old male from Louisiana with no known travel history outside the United States presented to his health care provider with a one-month history of headache, fatigue, shortness of breath and weight-loss. A chest radiograph showed significant:

*bilateral pleural effusions with an infiltrate in the left lung.*

This was a case of paragonimiasis caused by the lung fluke, *Paragonimus kellicotti,*

*Endemic in North America.*
The U.S. regional distribution of P. kellicotti-caused paragonimiasis cases is depicted...
CASE STUDY
IMPORTED CRABS

Patient with symptoms of TB in the U.S. No travel outside of U.S.
Clinical diagnosis TB
Treated and tested for TB

All TB testing is negative
Patient is not improving with ATT treatment
Lung biopsy diagnoses adult Paragonimus species

Further investigation into patient history reveals eating out in nearby restaurant with raw crabs several years ago.
CONCLUSION

• Paragonimus infections can mimic TB. Consider OVAP exam if no growth of TB or if patient does not respond to treatment.

• Increasing patient population from southeast Asia (where diets often include: raw, cured, pickled, or salted crustaceans.)

• Be aware of suspicious objects (oval eggs) seen on AFB smears from respiratory sources.

• Paragonimus cases occur in immigrants, and returning travelers and acquired cases following consumption of imported Asian crabs in the United States.

• Most cases of paragonimiasis in the United States caused by native P. kellicotti flukes are transmitted by the ingestion of raw or undercooked crayfish, the preferred crustacean intermediate hosts for P. kellicotti.

• Severe infections can involve the brain if left untreated.
THANK YOU

ACL Pathologist: Dr. John Pickeral MD for help with pictures

Michael Costello PhD: Technical Director Microbiology ACL for fluorescent pictures.