Breast Mass on Mammography

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Clinical Presentation

• 68 year old woman was noted to have 2 adjacent masses in the right breast on screening mammography
  • Well-circumscribed, lobulated, and measured 1.8 x 1.7 x 1.0 in aggregate
• The masses increased in size over a 6-month follow-up interval, prompting surgical removal
Diagnosis?
Sparganosis

- Infection caused by species of cestodes (tapeworms) in the *Spirometra* genus
  - *S. mansoni*, *S. ranarum*, *S. mansonoides*, *S. erinacei*, *S. proliferum*
- First described by Patrick Manson from China in 1882
- *Spirometra* is in the order Pseudophyllidea
  - Order includes *Diphyllobothrium latum*
Pseudophyllidea

- *Diphyllobothrium latum* (and other *Diphyllobothrium* spp.)
- *Spirometra* species

Cyclophyllidea

- *Taenia solium*
- *Taenia saginata*
- *Dipylidium caninum*
- *Hymenolepis nana*
- *Hymenolepis diminuta*
- *Echinococcus* species
Humans are an incidental parenthenic or second intermediate host.
Humans as an Intermediate Host

- We are host to the larval stage of the cestode
- Other larval cestodes found in humans:
  - *Taenia solium* (cysticercosis)
  - *Taenia multiceps* and *T. serialis* (coenurosis)
  - *Echinococcus* species (echinococcosis)
Anatomy

Sparganum removed from the chest wall of a patient. The worm measured about 70 mm long. Images from a specimen courtesy of the Oklahoma State Department of Health.

Sparganum removed from the ocular conjunctiva of a patient from Taiwan. The worm measured 40 mm long. Image courtesy of Dr. John H. Cross and the Uniformed Services University of the Health Sciences, Bethesda, MD.
Epidemiology and Clinical Presentation

• Typically seen in patients from East Asia
• May involve multiple organ systems: subcutaneous tissue, breast, orbit, GU tract, lungs, pleural cavity, abdominal viscera and CNS
• Symptoms vary by location
• *S. proliferum* can cause proliferative lesions in infected tissue, with multiple larvae present

• Retrospective review of 1061 cases:
  • Patients were <1 year to 80 years old (mean 29 years)
  • Transmission:
    • 54.6% - application of frog meat as a poultice
    • 33.8% - foodborne (frogs and snakes)
    • 11.5% - waterborne (drinking untreated water)
  • Organs involved:
    • Subcutaneous/muscle – 43.1%;
    • Ocular – 31.0%
    • CNS – 17.9%
Changing epidemiologic patterns in China

• 1959 – 1979: most cases (83.8%) were from poultices
  • 50% involved the eyes
  • Post 2000, only 8.3% involve the eyes
• From 2000 onward, 63.9% of cases are foodborne
  • 47.8% involve the CNS
  • (before 1979, there were no cases of CNS involvement reported)
Diagnosis

- Identification of a sparganum from tissue
- Species level identification is not required for treatment
Key morphologic features

• Features of a cestode:
  • Myxoid matrix surrounded by an acellular tegument
  • Calcareous corpuscles
Calcareous corpuscles – a histologic features of cestodes:

Mineral concretions containing calcium, polysaccharides, and lipids
Key Morphologic Features, continued

• Features supportive of sparganosis:
  • No fluid-filled “bladder” surrounding the tapeworm like cysticercosis
  • No suckers or hooklets of a protoscolex
  • Longitudinal smooth muscle fibers

![Image of tissue sample]
## Comparison of larval cestodes in tissue

<table>
<thead>
<tr>
<th></th>
<th>Sparganosis</th>
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<tbody>
<tr>
<td><strong>Causative organism</strong></td>
<td><em>Spirometra</em> spp.</td>
</tr>
<tr>
<td><strong>Common locations</strong></td>
<td>Subcutaneous tissue, breast, any organ</td>
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<tr>
<td><strong>20x – 40x total magnification (2x-4x objective)</strong></td>
<td>![Image of tissue sample]</td>
</tr>
<tr>
<td><strong>400x total magnification</strong></td>
<td>![Image of tissue sample]</td>
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Further History and Follow-up

- Patient was originally from the Philippines
- Moved to the U.S. 10 years prior to presentation
- She reported ingestion of frog meat in the Philippines
- Removal is curative
- Treatment with antihelminths (mebendazole, albendazole, praziquantel) is not generally effective, but may be used for cases of proliferative sparganosis in addition to surgical removal
- Patient was counseled on not eating raw frog or snake flesh in the future.
Bonus Question

• Which other human parasite is transmitted through ingestion of water containing infected copepods?

• *Dracunculus medinensis*