Case Studies

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Case 1

A Migratory Problem

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Case Presentation

- 45yo male presents to ED with several weeks of right-side face numbness, double vision peripherally, and loss of balance. Symptoms have been stable over this time
- Otherwise healthy, no other signs or symptoms
- A Nicaraguan immigrant who has lived in the US long term and denies recent travel. Is a field worker
- Admits to periodic tick bites. No rashes noted
- Afebrile, normal BP, respiration rate

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Case Presentation

- Labs on admission
  - CBC w/diff, Chem 7 and LF panels, CRP: all normal except a hematocrit 5.7 (NL 4.2-5.6)

- Next Steps?
  - Admit patient
  - Brain scan
  - Spinal tap
  - Neurology and ID consults

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Differential Diagnosis (DDx)

- High Level DDx
  - Infection
  - Neoplasm
- What next?
  - MRI
    - Brain lesion identified: abscess vs encephalitis
- Refined DDx
  - Lyme disease
  - HSV/VZV, other viruses
  - Bacterial, fungal, TB or other mycobacterial infection
  - Tumor or post-infection inflammation less likely

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Diagnostics Results

- Spinal tap: neurologist called “benign”
- Chest CT scan clear (argues against TB brain lesion)
- Negative
  - Blood Lyme Ab panel, HIV Ab, TB IGRA
  - NP SARS CoV 2
  - CSF
    - Enterovirus, HSV, VZV, *Tropheryma whipplei*, TB, *B. burgdorferi* PCRs
    - VDRL
    - Cultures
  - Urine *Blastomyces, Histoplasma* antigens

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DDx Refined

- Arboviruses
  - EEE
  - Jamestown Canyon
  - LaCrosse
  - St. Louis
  - WNV
  - Powassan (tick-borne)
- Parasites
  - *Toxoplasma gondii*
  - Cysticercosis (*Taenia solium*)
  - *Toxocara*
- Tumor

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Further Tests

- Blood & CSF serology, CSF PCR
  - *T. gondii, T. solium* (cysticercosis)
  - Arboviruses
- O&P of no value (adult tapeworm OR tissue cysticerci in humans)
- And the results are in…
  - Positive *T. gondii* IgG
  - Equivocal *T. solium* IgG
  - All other tests negative, notably *T. gondii* IgM & PCR

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Outcome

- Working diagnosis:
  - neurocysticercosis (*T. solium)*
  - toxoplasmosis (*T. gondii*)
- Brain biopsy deferred; lesion too deep
- Rx: albendazole and steroids (effective against both organisms)
  - Albendazole: a broad spectrum antihelminthic agent
- Repeat MRI 1 month later: lesion shrinking
- Patient lost to follow up

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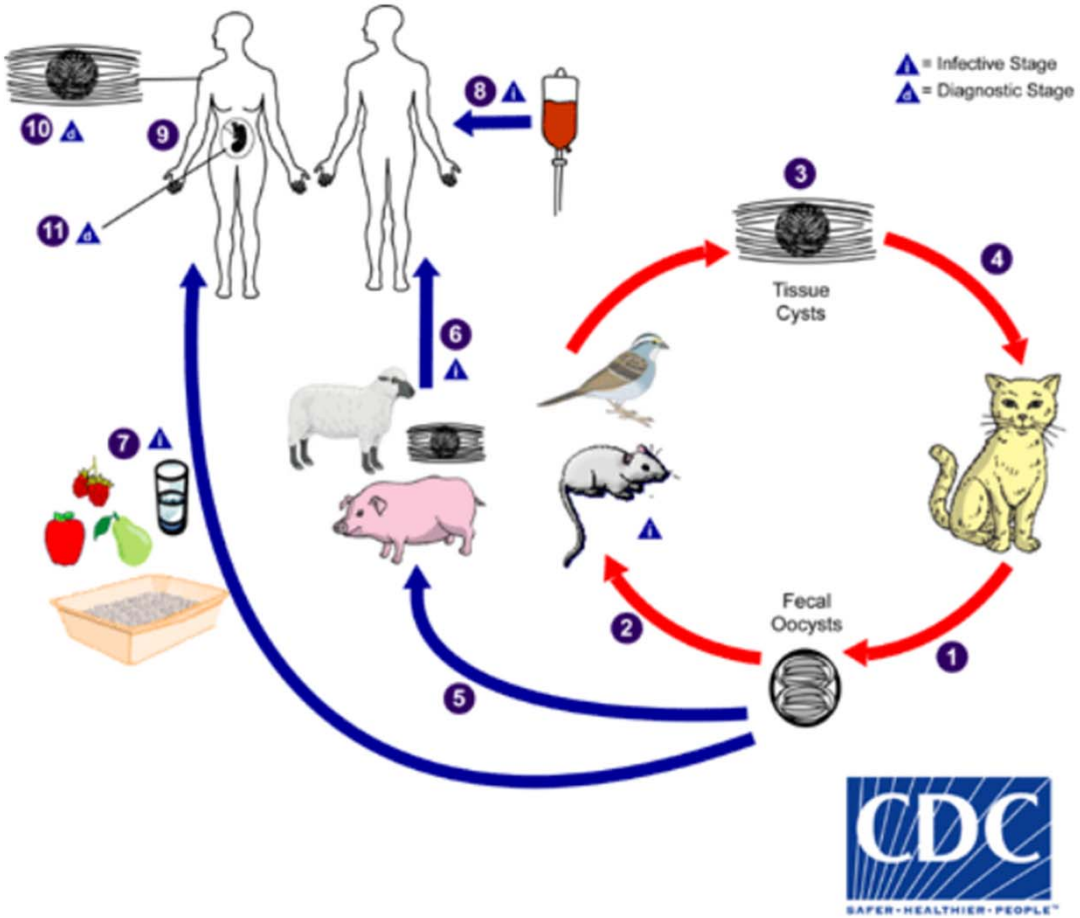
Toxoplasmosis

- *T. gondii*, a protozoan

- 1° infection
  - flu-like
  - Lymphadenopathy
  - Fetal malformations, death

- Then, latency
  - benign, longstanding
  - Immunosuppression causes reactivation



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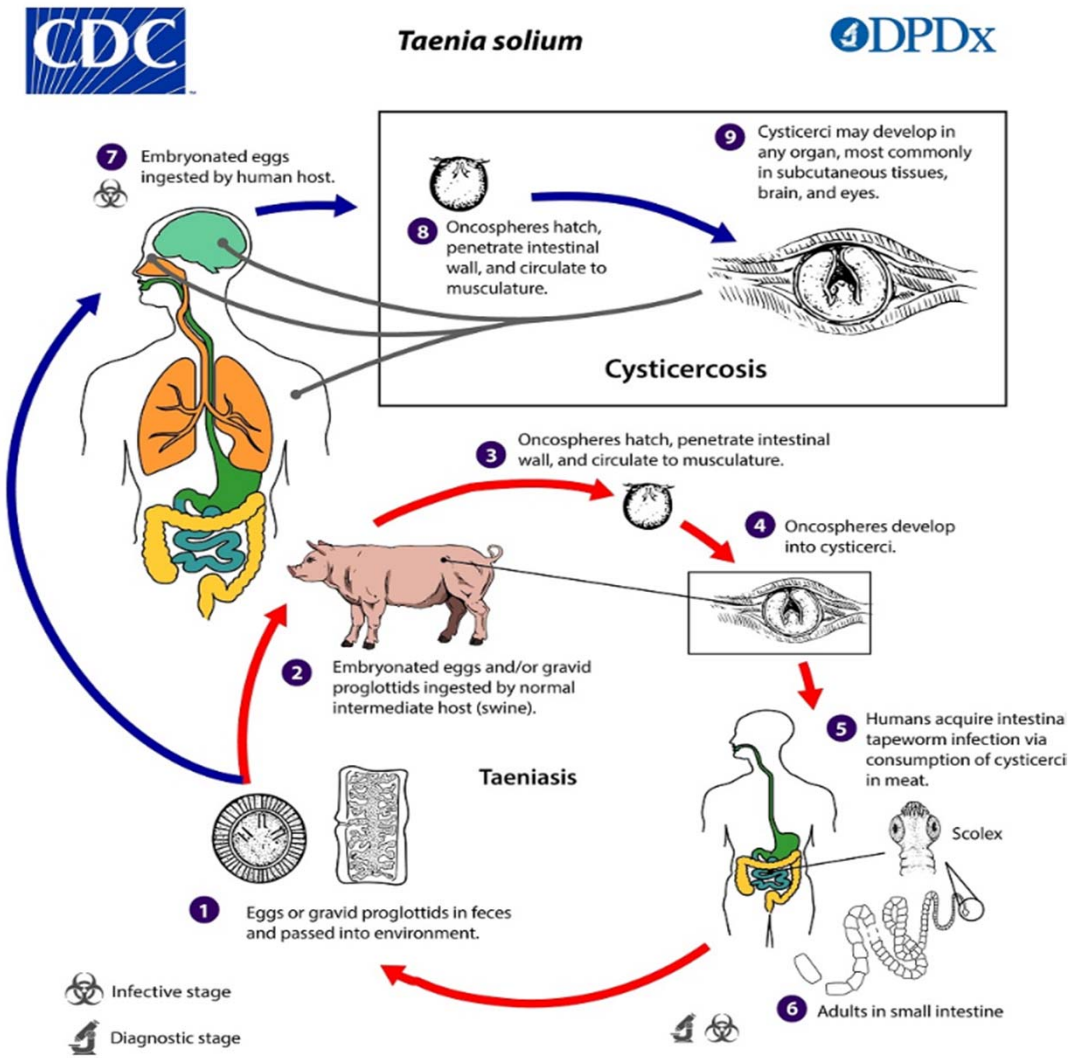
Taenia solium

- Pork tapeworm

- In humans
  - Adult tapeworm in gut
  - Cysticerci in tissues and organs aka *visceral larvae migrans*

- Note: *T. sagninata*, the beef tapeworm, does not cause cysticercosis



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Case 2

One from the Mold Case Files

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Case Presentation

- 71 yo male presents to his PCP with complaint of several weeks of scapular pain & occasional left arm tingling

- Co-morbidities
  - Diabetes
  - Hyperlipidemia
  - Obesity
  - Hypertension

- Dx: upper back pain

- Tx: Warm packs, stretching exercises, OT

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Case Presentation

One month later…

- Pt presents to PCP again: cervical-spine pain has intensified (10/10) despite PT.
  - Dx: “torticollis” (stiff neck)

- Discharged home
  - Tx: PT, eval for trigger point injections
  - Rx: muscle relaxer and opiate

- Imaging?
  - Not at this time

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Case Presentation

One month later (ie pt. was symptomatic for ≈ 2 months)…

- Pt. seeks treatment at local ED
  - Now unable to lift his head
  - No chills, headache or fever
  - No signs/symptoms of brain involvement
  - No trigger point injections to date (eval. Pending)

- Significant lab values
  - Leukocytosis with elevated neutrophils
  - CRP 5.6 (NL ≤1)

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Case Presentation

- Spine CT ordered
  - Erosion of the entire cervical spine (C1-C7) vertebrae and disk spaces
  - No cranial, thoracic/lumbar spine lesions
- DDx
  - Torticollis, trapezius muscle strain, cervical radiculopathy (pinched nerve), infection, cord compression, fracture
- Discharged home
  - Rx change to lorazepam (muscle relaxant and analgesic)
  - Referred to orthopedic surgery

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Urgent Follow up Evaluation

Next day

- Full Radiology report issued with serious concern for spinal infection
- Pt. called back to the ED for urgent MRI. Notably pt. is afebrile
- MRI findings
  - Significant inflammation of the tissues associated with C2-C7 c/w osteomyelitis and discitis, and adjacent epidural abscess
- Pt. transported to MMC Marshfield, admitted to hospitalist service, with neurosurgical consultation requested

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Next Steps

- Significant lab findings
  - CRP 5.7 (NL ≤1)
  - Procalcitonin = WNL. (Note: PCT is elevated in severe bacterial infections, not fungal or viral.)
  - Negative blood cultures (but still incubating)
- DDx
  - Infection
  - Infection
  - Infection…
- Surgery next day: C spine vertebral fusion, epidural abscess drained

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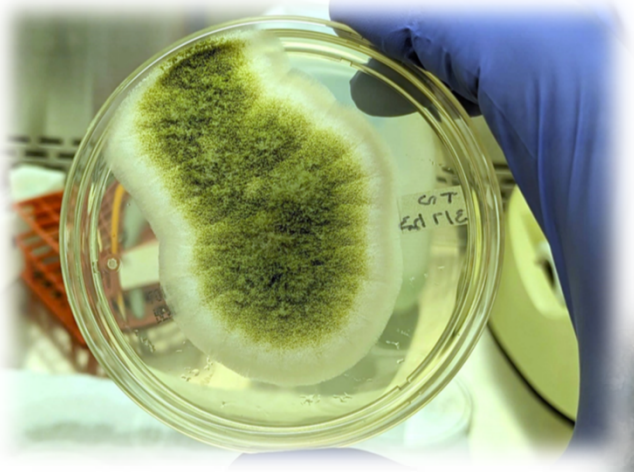
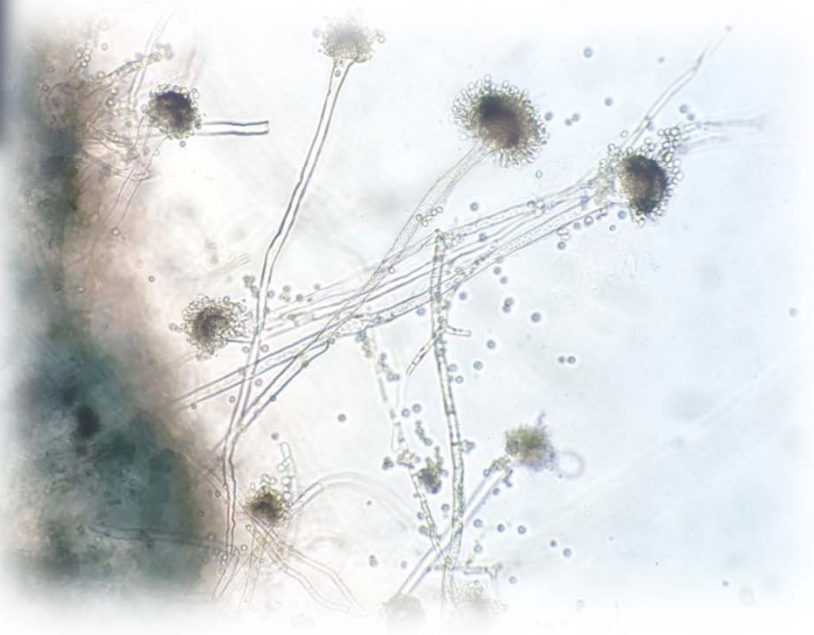
Lab Findings

- Blood cultures = Negative
- Surgical specimens
  - Bacterial cultures = Negative
  - Fungus cultures = Positive
- *Aspergillus flavus*





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Aspergillus sp.

- *Aspergillus* is a hyaline (non-pigmented filaments) septate fungus i.e. a mold
- The genus is comprised of over 870 species, most of which are minimally pathogenic to humans
- *A. fumigatus* is the most pathogenic, followed by *A. flavus, A. nidulans, A. terreus,* & *A. niger*.
  - But other species are increasingly seen as the number of people with immunosuppression rises

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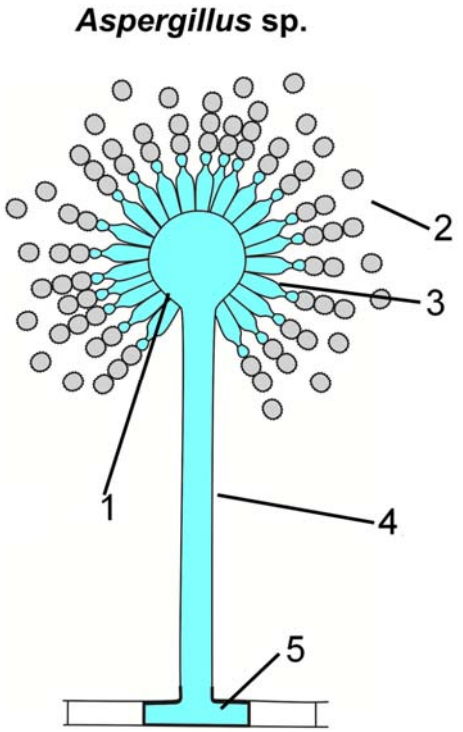
Aspergillus Microscopy

1. Vesicle
2. Conidia (“spores”)
3. Phialides
4. Conidiophore
5. Hypha



https://commons.wikimedia.org/wiki/File:Aspergillus_illustr.png. M. Piepenbring/CC-BY-SA 4.0 Accessed 11/27/23

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Diseases of *Aspergillus*

- In increasing severity, the aspergilli are associated with:
  - Onychomycosis
  - Otitis externa
  - Aspergilloma
  - Allergic bronchopulmonary aspergillosis
  - Sinusitis
  - Keratitis
  - Aflatoxin food poisoning
  - Invasive aspergillosis, pulmonary and disseminated

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Spinal Epidural Abscess (SEA)

- An infection between the dura mater (outer covering of the spinal cord) and the vertebrae that surrounds it
- Hematogenous carriage or penetrating injury
- Predisposing factors common: DM (50%), immunosuppression, malignancy, or mild localized blunt trauma
- Usually bacterial and usually *S. aureus* (50-90%); molds are rare

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Diagnosis, Treatment

- Diagnosis:
  - CT and MRI
  - Culture and susceptibility
  - Histopathology to rule out malignancy

- Treatment:
  - Surgery to drain the abscess and reconstruct the degraded vertebrae
  - Prolonged, focused antimicrobial therapy

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Outcome

- One year later, patient has fully recovered with no residual neck symptoms.

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Case 3

A Safari that Bagged more than was Bargained For

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Case Presentation

- 54yo female presents to UC with complaint of newly found “insect bites” on back of right knee and upper left thigh. Lesions appear to have central puncture wounds. One is itchy, the other not
- Also has had night chills & sweats
- Patient does garden work. No Hx of attached ticks
- DDx
  - Lyme disease
  - Anaplasmosis
  - Cutaneous blastomycosis
  - Varicella
  - Insect stings

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More Information

- Patient is seen in dermatology the same day
- New information
  - Had recent trip to Africa
  - Had had acute flu-like symptoms upon return
  - Two primary, necrotic lesions
  - Secondary “mosquito bite” lesions without necrotic centers
  - Symptoms spontaneously resolved after several days, leaving only the lesions
- Add to the DDx:
  - African tick bite fever
  - Leishmaniasis
- Additional tests: punch biopsy of thigh lesion sent for pathology exam

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Lesions

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Pathology Findings

- Pathology Findings
  - Objects resembling tick mouthparts seen
  - Localized epidermal/dermal ulceration and necrosis with underlying vasculitis (secondary to embedded foreign object)
  - Stains for infectious agents: All Negative
- Serology tests? None. Why? Too soon
- Biopsy material taken at same visit, sent to CDC
  - Culture and PCR positive for *Rickettsia africae*

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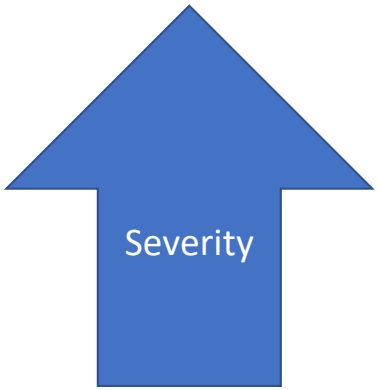
African Tick Bite Fever

- Agent: *R. africae,* part of the spotted fever group of rickettsias
  - Rickettsia are small obligate intracellular coccobacilli
- Other select spotted fever agents
  - *R. rickettsia* Rocky Mountain SF
  - *R. conorii* Mediterranean SF
  - *R. japonica* Japanese SF
  - *R. honei* Flinders Island SF
  - *R. africae* African tick bite fever



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Diagnosis

- Gram negative but are not seen on Gram stain
- Culture and PCR: CDC
- Serology for SF group rickettsias: retrospective only
- Practically speaking, requires a clinical & epidemiological diagnosis

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Outcome

- Patient's case was resolving naturally at time of her initial presentation. (Not unusual for African tick-borne fever)
- She was treated with doxycycline as a precaution
- Interestingly, no other members of her African safari party fell ill

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Thank you

Questions?