

# 12 – Photo Opportunity II: Photos and Questions to Test Your Board Preparation

Speaker: Rajesh Gandhi, MD

2020

INFECTIOUS DISEASE BOARD REVIEW


Photo Opportunity I

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\*Acknowledgments: Delaney Taylor for assistance with slides

Disclosures of Financial Relationships with Relevant Commercial Interests

Scientific advisory board: Merck and Company, Inc.



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A Joint Project of the Massachusetts General Hospital Infectious Diseases Division and Microbiology Lab

Cases are from an educational web-site:  
[www.idimages.org](http://www.idimages.org)


I acknowledge the contributors to the site for their case submissions and images.

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Images of Covid-19

Pernio/chilblains-like

Erythematous to violaceous macules, papules, and papulonodules, some with pseudovesiculation at the tips of digits and at times including soles of feet.

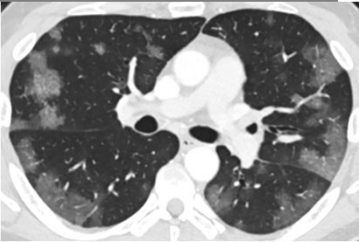


Slide courtesy of Dr. Daniela Kroshinsky (MGH Dermatology)

Mazzotta F, Troccoli T. Acute acro-ischemia in the child at the time of COVID-19 (Mondays case). <https://www.egid.com/en/mondayscase>.

Covid-19: Radiographic Features

- Peripheral, bilateral ground glass opacities with or without consolidation
- Ground glass opacities may have rounded morphology



Host

Severity

Interpretation

Courtesy of Dr. Brent Little (MGH Radiology)

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## Case 1

A woman in her forties presented with 6 days of fatigue, decreased appetite, fevers and chills. She also had severe headache and myalgias.

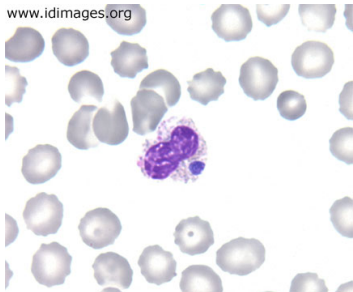
**PMH:** None.

**SH:** Patient was single and not sexually active. She denied cigarette, alcohol or illicit drug use. The patient had recently hiked in upper New Hampshire. She denied a history of tick bites. She had a dog but no other animal exposures.

Contributed by Anne Kasmar, M.D.

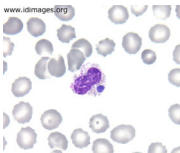
**PE:** She appeared well. T 103.5, BP 104/50, HR 122, RR 18, O<sub>2</sub> sat 97% on RA. She had no rash or adenopathy. Remainder of exam was normal.

**Studies:** WBC 2.3 (51% P, 29% bands, 14% L, 4% atypical lymphocytes); Hct 39%; Platelets 24. Serum chemistries values, including LFTs, were normal. Blood cultures were negative. CXR: normal



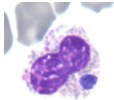
## Differential Diagnosis

- A. Meningococcemia
- B. Anaplasmosis
- C. Histoplasmosis
- D. Babesiosis
- E. "Spotless" Rocky Mountain Spotted Fever (RMSF)



## Diagnosis and Follow-up

- Peripheral blood smear showed morulae inside white blood cells, consistent with anaplasmosis.



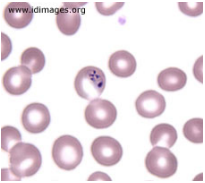
- Diagnosis confirmed with PCR testing.
- She was treated with doxycycline; symptoms completely resolved.

## Rule out coinfection with Lyme, Babesia (same vector)

Lyme



Babesia



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## Differential diagnosis

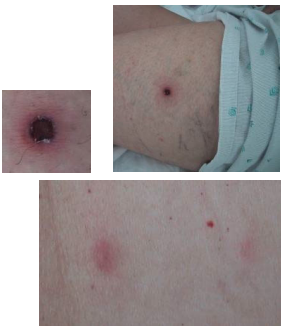
- **Meningococcemia:** patient did not have meningeal signs or rash to suggest acute meningococcemia; did not have arthritis/tenosynovitis/rash to suggest chronic meningococcemia
- **Histoplasmosis:** patient not immunosuppressed, which predisposes to disseminated histo; CXR not abnormal (infiltrates often present in histo)
- **Babesia:** ring-forms in red cells, not white cells
- **Rocky Mountain Spotted Fever:** would not explain morulae in WBC. RMSF (and human monocytotropic ehrlichiosis) more common in southeast, south central US

## Case 2

- 50 yo F was well until 7 days prior to admission when she noted “bite” on left thigh. Lesion enlarged over several days. Three days later, developed fatigue, arthralgias, myalgias, fever, headache. On day of admission (July), developed generalized rash on extremities, trunk, back.
- Lived in New England. She had seen a mouse in her basement. She had a dog. Denied sexual activity.
- **PE:** appeared well. 100.5 F. No adenopathy. Lesion present on left thigh. Papular erythematous rash on her extremities, back, chest.

Contributed by Karen Thomas, M.D. and Leena Gandhi, M.D.

- A. Varicella
- B. Monkeypox
- C. Cutaneous anthrax
- D. Rickettsialpox
- E. Lyme



## Rickettsialpox

- *Rickettsia akari* (spotted fever group of rickettsiae)
- Transmitted to humans by a mouse mite
- NYC outbreak in 1980s; high seroprevalence (16%) in people who inject drugs in Baltimore
- After bite of infected mite, *R. akari* proliferates locally → papule, ulcerates to form eschar
- 3-7 days later, high fever, chills and headache, followed by papulovesicular rash (not involving palms, soles)
- Diagnosis: serologic testing
- Treatment: doxycycline

## Rickettsialpox vs. Chickenpox

	Rickettsialpox	Chickenpox
Eschar	Yes	No
Lesions in crops	No	Yes
Number of lesions	Relatively sparse (20-40)	Many
Mature lesion	Papulovesicle	Vesicle

Rickettsialpox



Chickenpox



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## Differential Diagnosis

- **Varicella.** No eschar, vesicles, lesions at different stages
- **Monkeypox.** No exposure, adenopathy
- **Cutaneous anthrax.** Shallow necrotic ulcer with extensive surrounding edema
- **Lyme disease.** Annular rash

## Case 3

50 yo F developed ulcerated lesion on her left thumb which enlarged over several months despite several courses of antibiotics. She reported no sore throat, fever, chills, dyspnea or cough.

Three months before, she travelled to Ecuador, where she stayed in an ecotourism hotel near a river. No known fresh- or salt-water exposure.

Reported seeing several kinds of insects and receiving several bites. No known animal exposures or tick bites.

Contributed by Rojelio Mejia, MD

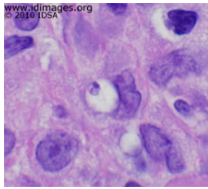
## Differential Diagnosis

Patient appeared well. T 98.1.  
Raised ulcerated lesion on thumb with a violaceous border

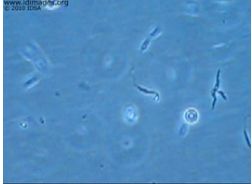
- A. Cutaneous leishmaniasis
- B. *Mycobacterium marinum*
- C. Sporotrichosis
- D. Pyoderma gangrenosum
- E. Tularemia



Skin biopsy showed amastigote, with kinetoplast in a vacuole. Culture of tissue from skin biopsy in Schneider's Media revealed promastigotes. PCR of tissue: *Leishmania guyanensis*.



Skin biopsy, H and E stain



Culture of skin biopsy tissue in Schneider's medium

## Treated with liposomal amphotericin



One week after treatment



Follow-up at 3 months



## Differential Diagnosis

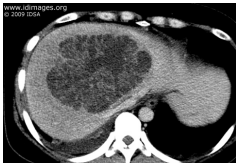
- ***Mycobacterium marinum*:** patient did not have known fresh- or salt-water exposure; she did not have nodular lymphangitis
- **Sporotrichosis:** no known exposures to soil or thorn; she did not have nodular lymphangitis
- **Pyoderma gangrenosum:** patient did not have known inflammatory bowel disease or other underlying pre-disposing condition; ulcerative PG usually occurs on lower extremities, trunk
- **Tularemia:** no animal or tick exposure; no systemic symptoms; no adenopathy

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Case 4

- A woman from China in her 40s developed fever, epigastric pain, and nausea. One week later, she was brought to ED with confusion and fever.
- T 101°F. Right upper quadrant abdominal tenderness.
- Abdomen CT: 10 cm hypoattenuated liver lesion



Contributed by Diana I. Mercado MD, Dong H. Lee MD, Todd I. Braun, MD

Is this abscess most likely due to:

- A. *Entamoeba histolytica*
- B. *E. coli*
- C. *Streptococcus milleri*
- D. *Actinomyces*
- E. *Klebsiella pneumoniae*

Culture from liver aspirate



Klebsiella liver abscess

- Hypermucoid strain of *Klebsiella pneumoniae* associated with distinctive clinical syndrome in Southeast Asia that includes primary liver abscess, bacteremia, and metastatic infection
- Risk factors: diabetes and Asian ancestry
- Colonies exhibit extreme “stickiness” on agar plates (“hypermucoviscosity phenotype”)
  - Positive String test: “string” of > 5 millimeters formed when one touches the colony

Case 5

- 60 yo M presented to ED with a few hours of severe pain in right upper extremity. There was no history of trauma. Exam was normal with no obvious skin changes. He was discharged home.
- Over the next few hours, he developed progressive swelling of right upper extremity.
- Exam: right upper extremity was diffusely swollen with a deep-red discoloration; several bullae.
- Studies: WBC 8,900 (47% polys, 38% bands). X-ray: air in soft tissues.

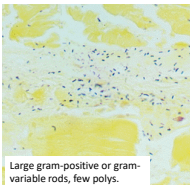
Contributed by Steve Calderwood, M.D.

Does this patient most likely have:

- A. *Vibrio vulnificus*
- B. Group A streptococcal necrotizing fasciitis
- C. Mixed aerobic/anaerobic necrotizing fasciitis
- D. Clostridial gas gangrene
- E. Bullous pemphigoid



Diagnosis



Surgical cultures grew *Clostridium septicum*.

In retrospect, patient reported several month history of bright red blood per rectum. Subsequent evaluation revealed an invasive colonic carcinoma.

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## Gas Gangrene

- Traumatic gas gangrene generally due to *C. perfringens*, sometimes other Clostridial species
- Spontaneous (non-traumatic) gas gangrene most commonly due to *C. septicum*
- *C. septicum* infection associated with malignancy
  - In one series, 81% had malignancy; in 37% the cancer was occult<sup>1</sup>
  - Most common cancers: colorectal, hematologic.

<sup>1</sup>Kornbluth et al. Medicine (1989) 68:30

## Differential Diagnosis

- **Vibrio vulnificus:** patient with liver disease, iron overload, or immunocompromising condition.
- **Group A streptococcal necrotizing fasciitis:** Would not result in air in soft tissues
- **Mixed aerobic/anaerobic necrotizing fasciitis:** after trauma or surgery
- **Bullous pemphigoid:** Would not present in such a fulminant manner nor would gas be present in tissues.

## Case 6

30 yo woman with HIV (CD4 cell count 20, not on therapy) presented with gradual onset of word-finding difficulties, expressive aphasia and right upper extremity weakness over 4 weeks.

She lived in New England. No recent travel or known insect bites. Not sexually active.

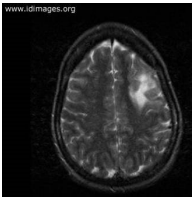
On exam, she was afebrile. She had oral thrush. She had difficulty naming objects and right-sided weakness.

Studies: WBC count of 2.2 (44% P, 45% L)

Contributed by Wendy Yeh, M.D.

## Her clinical syndrome is most likely caused by:

- A. An arbovirus
- B. A polyomavirus
- C. A herpes virus
- D. A spirochete
- E. A dematiaceous fungus

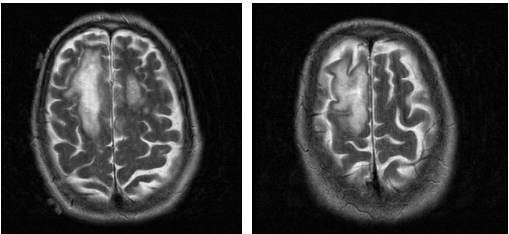


MRI: Abnormal T2 signal involving white matter, left fronto-parietal region. No enhancement, edema, mass effect

## Progressive multifocal leukoencephalopathy

- CSF JC virus positive
- Demyelinating disease of central nervous system caused by reactivation of JC virus, a polyoma virus
- Immunocompromised hosts (heme malignancy; HIV, natalizumab, rituximab)
- Rapidly progressive focal neurologic deficits, usually due to cerebral white matter disease.
- Rx: reversal of immunodeficiency. In HIV+ patients: antiretroviral therapy

## PML



Contributed by Vince Marconi, M.D.



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## Differential diagnosis

- **Arbovirus, such as West Nile Virus:** Unlikely because of no confusion, headache, meningeal signs, paralysis.
- **Herpes virus, such as HSV:** temporal lobe.
- **Spirochetal infection, such as syphilis:** central nervous system gumma or stroke-like syndrome (meningovascular disease).
- **Dematiaceous fungus:** no risk factors (e.g. adjacent paranasal sinus infection, penetrating trauma); lack of enhancement of brain lesion on head imaging.

## Case 7

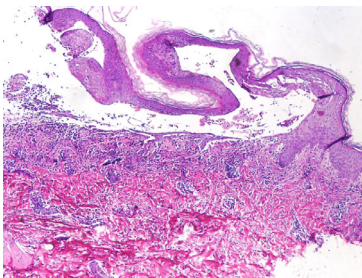
- 55 yo M was admitted with nephrolithiasis and *E. coli* urosepsis. Course was complicated by ARDS, requiring prolonged ventilatory support and tracheostomy. On hospital day 21, he developed methicillin resistant *Staph aureus* pneumonia. On hospital day 28, he developed fever and rash.
- PMH: hypertension, atrial fibrillation
- Medications: vancomycin, nifedipine, coumadin.
- Exam: T 103.2. Skin: erythematous areas in axillae, back, left thigh. On this erythematous base, there were tight bullae, which expressed yellow, serous, non-purulent fluid when opened. Exam otherwise normal.
- Studies: WBC 15.7 (84% P, 9% L, 3% M, 3% E), and hematocrit 28.6%. Cultures of the bullous fluid were negative.

Contributor: John Beigel, M.D.

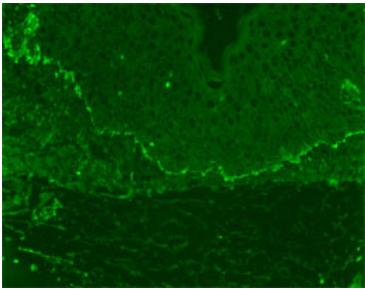


## Differential Diagnosis

- A. Dermatitis herpetiformis
- B. Bullous pemphigoid
- C. Linear IgA bullous disease from vancomycin
- D. Herpes zoster
- E. Staphylococcal scalded skin syndrome



H & E stain of skin bx showed neutrophilic infiltrate at the dermal-epidermal junction and a sub-epidermal bulla



Immunofluorescent stain showed IgA deposition on the basement membrane at the dermal-epidermal junction

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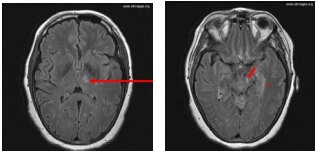
Treatment/ Follow up: Vancomycin was discontinued, and the bullae gradually resolved after one week.

Linear IgA Bullous Disease

- Rare autoimmune subepidermal blistering disorder; usually idiopathic.
- Vesiculobullous eruption of the skin and MM
- Linear IgA deposition along the basement membrane zone
- Drug-induced LABD is most often due to iv vancomycin use.
- Generally resolves with discontinuation of vancomycin. May recur with rechallenge.

Case 8

- Woman in her 50s presented with fatigue, confusion, word-finding difficulties and fever for 3 days
- Lived in Midwestern US
- Avid outdoors person, frequently in wooded areas; husband recalls pulling a tick off her trunk recently
- T 101.3. Somnolent woman, oriented only to self
- CSF: WBC 146 (9% N, 56% L, 35% M); RBC 14; Glc 70; Pro 109

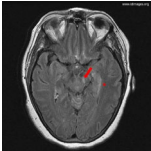


MRI: T2 hyperintensity left thalamus and substantia nigra; leptomeningeal enhancement

Contributed by Joy Chen, M.D. and Virk Abinash, M.D.

Differential Diagnosis

- A. Neisseria meningitides meningitis
- B. Herpes simplex virus encephalitis
- C. Lyme meningoencephalitis
- D. Powassan meningoencephalitis
- E. Lymphocytic choriomeningitis

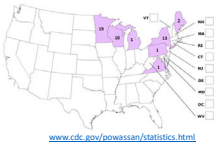


Diagnostic Procedures & Results

- CSF gram stain, fungal smear, bacterial and fungal cultures were negative
- CSF PCR tests for HSV, WNV, VZV, CMV negative
- CSF positive for immunoglobulin M against Powassan virus by ELISA. Confirmed at CDC

Powassan Encephalitis

- Transmitted by Ixodid ticks
- Northeast, upper Midwestern (Great Lakes) US
- Transmission period April-December
- Incubation period up to 4 weeks
- Fever, confusion, seizures, focal neurologic deficits
- CSF: lymphocytic pleocytosis
- Diagnosis:
  - MRI: T2 hyperintensity in thalamus, basal ganglia, brainstem
  - Positive IgM antibody; confirmed at CDC with PRNT



[www.cdc.gov/powassan/statistics.html](http://www.cdc.gov/powassan/statistics.html)



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## Case 9

19 yo M presented with 2 wks of painful swelling in his left groin. He reported fevers to 101 with night sweats, fatigue and malaise.

Denied urinary complaints, penile discharge or ulcers, change in bowel habits, abdominal pain or trauma to his legs.

Lived in Northeast US. No travel. Two female sexual partners, one of whom recently immigrated from Mexico. Lived with mother and grandmother, who had a cat and dog. Worked in food services. Denied seeing mice or rats.

## Differential Diagnosis

- T: 98.6 F. Tender lymph node inferior to inguinal ligament. WBC: 9.6; Urinalysis: negative
- A. Lymphogranuloma venereum (LGV)
  - B. Chancroid buboe
  - C. Bubonic plague
  - D. Cat-scratch disease (CSD)
  - E. Incarcerated hernia



Contributed by Stephen Walsh, M.D.

## Diagnosis

*Bartonella* titer > 1:256, consistent with cat scratch disease.

HIV, treponemal antibody, chlamydia and gonorrhea tests were negative.

## Inguinal adenopathy

- Ddx: HSV, syphilis, LGV, chancroid, CSD, lymphoma, tularemia, *S. aureus*, malignancy
- LGV often involves both femoral and inguinal nodes, producing characteristic “groove” sign



Ballard and Freinkel, Tropical Pathology, 1995.

## Cat Scratch Disease Lymphadenitis

- Generally due to infection by *Bartonella henselae*
- Primary papule develops at site of inoculation, may last 1-2 wks, followed by regional adenopathy which can last for 2-4 months.
- About 1/6 develop LN suppuration
- Spontaneous resolution generally occurs.
- Diagnosis: Serology; PCR, rarely by culture
- Most cases self-limited, but azithromycin may hasten resolution of adenopathy

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