50 – Syndromes that Masquerade as Infections

Speaker: Karen Bloch, MD

Syndromes that Masquerade as Infections

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Disclosures of Financial Relationships with Relevant Commercial Interests

- None

With Special Thanks to Dr. Bennett Lorber!

Mimics

- Many conditions masquerade as infections.
  - Often with fever
  - Sometimes focal abnormality
    - Cellulitis vs stasis dermatitis
    - Viral vs Organizing Pneumonia
    - Lymphadenitis vs Lymphoma

VS

ID Board Content

Medical Content Category	% of exam
Bacterial Diseases	27%
HIV Infection	15%
Antimicrobial therapy	9%
Viral Diseases	7%
Travel and Tropical Medicine	5%
Fungi	5%
Immunocompromised Host (non HIV)	5%
Vaccinations	4%
Infection Prevention and Control	5%
General Internal Medicine, Critical Care & Surgery	**18%**
Total	100%

Test taking tip

- Just as for infections, look for "buzz words" and "hooks"
- For infections:
  If I say "rabbit", you say…..

Test taking tip

- For infections:
  If I say "rabbit", you say…..

TULAREMIA

Test taking tip

I say ”Chitlins”

You say…..

Test taking tip

I say ”Chitlins”

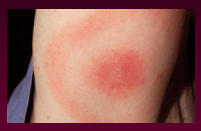
You say…..

YERSINIA

Test taking tip

I say ”Bull’s-eye rash”

You say…..



Test taking tip

I say ”Bull’s-eye rash”

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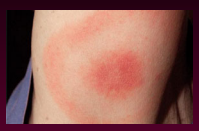
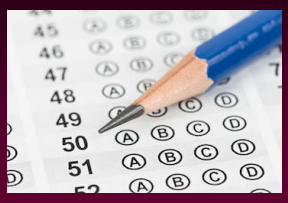


Lyme disease
(or Erythema migrans or STARI)

My Approach to Mimics

- Think like an Internist.
- The key is recognition, not treatment.
- This talk will emphasize illustrative case
- Goal is to cover lots of non-infectious diseases rather than in-depth discussion

Examples



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Question 1

A young man has oral and genital ulcers. You suspect Behçet's disease. Which of the following is most consistent with that diagnosis?

A. Evanescent, salmon-colored rash
B. High ferritin
C. Saddle nose deformity
D. Pustule at site of venipuncture
E. Posterior cervical adenopathy

Question 2

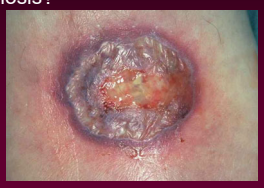
Sweet Syndrome is *most* likely to occur in a patient with which of the following illnesses?

A. Ulcerative colitis
B. Adult onset Still's Disease
C. Acute leukemia
D. Systemic lupus
E. Ankylosing spondylitis

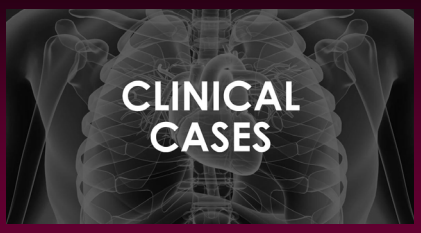
Question 3

A patient has a slowly enlarging ulcerated skin lesion on his shin after being hit by a soccer ball. Which of the following is the most likely diagnosis?

A. Pyoderma gangrenosum
B. Ecthyma gangrenosum
C. Erythema nodosum
D. Sweet Syndrome
E. Behçet's disease



But this being boards…..



Case 4

- 26yo man presents with a 1-month h/o fever, night sweats and fatigue. He was evaluated by his PCP with a positive monospot test. He was diagnosed with mononucleosis, but fevers have persisted.
- He lives in Indiana with his wife and 2 yo son, who are healthy. They have 2 cats.

Case 4

- Exam:
  - Vitals:
    - T=38.4ºC, HR=118 bpm
  - No cervical lymphadenopathy
  - Palpable spleen tip
  - No rash
- Labs
  - CBC
    - WBC=2.7, plt=53
    - Normal H/H
  - Normal Cr
  - AST/ALT=38/200
  - Alk phos=494, bili=1.9
  - Ferritin=35,148 mg/ml

Question 4

- What is the most appropriate next study?
  - A. Flow cytometry of whole blood
  - B. ANA profile
  - C. CMV PCR
  - D. Soluble IL-2 receptor level
  - E. Toxoplasma titer

Hemophagocytic Lymphohistiocytosis

- Immune activation syndrome
  - Primary: Familial due to genetic mutation
  - Secondary:
    - Infections (EBV or other herpes group viruses, HIV, histoplasmosis, *Ehrlichia*, COVID-19 etc)
    - Malignancy (lymphoma, leukemia)

HLH: Diagnostic Criteria

- At least 5 of the following:
  - Fever
  - Splenomegaly
  - Cytopenias (any line)
  - Hypertriglyceridemia (>3mmol/L)
  - Ferritin >500 mcg/mL
  - Elevated soluble IL-2 receptor (aka CD25)
  - Low NK cell activity
  - Hemophagocytosis on pathology

HLH Clues

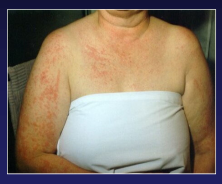
- EBV or other infection with progressive symptoms
- Massively elevated ferritin
- Cytopenia with negative ID evaluation

Case 5

- A 39-year-old woman is seen on day 4 of hospitalization for high fever and leukocytosis. The fever had been present for 3 ½ weeks and was accompanied by severe arthralgias of the knees, wrists and ankles as well as myalgias. A severe sore throat was present during the first week of the illness.

Physical Exam

- T=104.2º F.
- Tender cervical LAN appreciated.
- Spleen tip is palpable.
- The R wrist is swollen and painful.
- A rash present on the trunk and extremities, most prominently under the breasts and in the area of her underwear waistband.



- Labs:
  - Ferritin 3600 ng/ml (nl 40-200)
  - WBC 32,200 (89% neutrophils)
  - AST and ALT 3x normal
  - ESR and CRP 5x normal
  - ANA and RF negative
  - Throat and blood cultures negative
- On afternoon rounds with the attending, the fever resolved with Tylenol and the rash is no longer present.

Question 5

- The most likely diagnosis is?
  - A. Lymphoma
  - B. Adult Still's Disease
  - C. Acute Rheumatic Fever
  - D. Cryoglobulinemia
  - E. Kikuchi Disease

Adult Still's Disease (Adult Onset JRA)

Yamaguchi Criteria: (5 features with 2 major criteria)

Major:	Minor:
1. Fever >39ºC for ≥1week	1. Sore throat
2. Arthritis/arthralgia >2 wks	2. Lymphadenopathy
3. Typical rash (during febrile episodes)	3. Lg Liver or spleen
4. Leukocytosis ≥10K with >80% PMNs.	4. Abnl LFTs
	5. Negative ANA & RF

Adult Still's

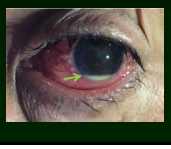
- Buzz words and associations:
  evanescent, **salmon-colored** rash

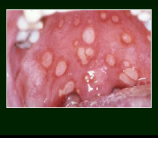
- Other clues:
  - Elevated ferritin
  - Pharyngitis
  - Koebner phenomenon = rash elicited by stroking skin or areas of pressure.

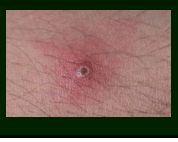
Case 6

- A 24-year-old man is referred from the ED for ulcers of the mouth and penis. He was born in Japan but came to the U.S. to attend graduate school.
- He has a history of recurrent painful oral ulcers for 3-4 years. Four days ago, he developed a painful ulcer on the penile shaft. He takes no medicines and denies sexual contact for the past 5 years.

- Left eye is inflamed and there is a hypopyon.
- Numerous ulcers on the oral mucosa.
- There is a 0.5cm ulcer on the penis.
- A 6mm papulo-pustular lesion is present in the right antecubital fossa where they drew blood yesterday in the ED.







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Question 6

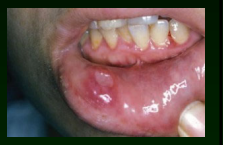
- The most likely diagnosis is?
  - A. Syphilis
  - B. Behçet's disease
  - C. Herpes simplex virus infection
  - D. Sarcoidosis
  - E. Cytomegalovirus infection

Behçet's disease

- Pleomorphic vasculitis diagnosised clinically
  Recurrent oral ulcers (≥3 per year) PLUS 2 of the following
  1) recurrent genital ulcers
  2) eye (uveitis, retinitis, hypopyon)
  3) skin lesions (EN, papules) including pathergy (red papule 24-48 hours after needlestick)
- "Silk road" ancestry (Asia->Mediterranean)
- Less common manifestations
  - GI disease (abdo. Pain, bloody diarrhea)
  - CNS disease (aseptic meningitis)
  - Arterial and venous thrombosis

Behçet's disease

- Buzz words and associations:
  Mucosal ulcers on mouth and/or genitals PLUS….
  GI symptoms (vs CMV)
  Aseptic meningitis (vs HSV)
  Ocular findings
  Pathergy (needle or IV site)
  Asian or Mediterranean ancestry



Case 7

PREVIEW QUESTION

- A 38-year-old woman with AML is admitted with fever. She underwent induction chemotherapy 2 weeks prior, complicated by neutropenic fever. Following marrow recovery, she was d/c to home. The day of admit she developed fever without localizing symptoms. CBC showed a white blood cell count of 12,250 with 20% bands.
- Exam: T 101.4; P 98, Otherwise unremarkable.
- Blood cultures were sent, and she was started on broad spectrum empiric antibiotics.

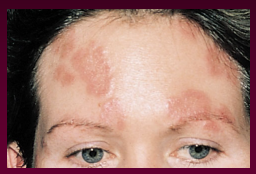
PREVIEW QUESTION

- HD 2: Fever persists, with interval development of raised, red-purple, tender, non-pruritic papules and nodules on her face, neck and the dorsum of her hands.

PREVIEW QUESTION

HD 3: Fever persists; some of the papules develop a plaque-like appearance

HD 4: skin biopsy: dense perivascular infiltrates of neutrophils without evidence of vasculitis; stains for organisms negative.



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Question 7

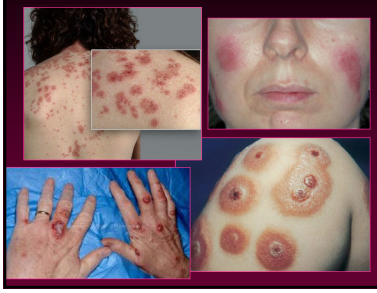
PREVIEW QUESTION

- Which is the most likely diagnosis?
  - A. Ecthyma gangrenosum
  - B. Pyoderma gangrenosum
  - C. DRESS
  - D. Leukemic infiltrates
  - E. Sweet syndrome

Sweet Syndrome

- AKA acute febrile neutrophilic dermatosis
- Three variants:
  - Idiopathic or "classical" >50% (IBD, post viral illness, preg, etc)
  - Malignancy associated~20% (may precede dx, AML most frequent)
  - Drug induced-G-CSF most common, antibiotics
- Fever and Rash universally present
- Rarely oral ulcers or extra-cutaneous disease characterized by neutrophilic infiltrate on path
- Labs notable for leukocytosis with left shift, inc ESR & CRP
- Path diagnostic—Neutrophilic infiltrate without vasculitis

Skin Lesions in Sweet Syndrome



- Lesions appear **abruptly** and usually **tender**.
- May be single or multiple, often involving **dorsum of hand**.
- Red, violaceous, or yellow center
- Nodular or **plaque-like**
- Central umbilification with **target appearance**

Sweet Syndrome

- Buzz words and associations:
  - Acute
  - Febrile
  - Neutrophilic (peripheral and on path)
  - Dermatosis

Be suspicious in patients with malignancy (esp AML, past or present), IBD, recent URI, vaccination, pregnancy, or colony stimulating factor use in preceding 2 weeks

Case 8

- A 33-year-old recent immigrant from Central America is seen for a chronic ulcer of the leg.
- The ulcer has progressively enlarged over 3 months after he bumped his leg on a table
- There has been no response to oral antibiotics.
- For the past year he has been troubled by an "upset stomach". On further probing, he describes intermittent abdominal cramps, frequent diarrhea; and, on 2 occasions, blood in the stool.

- Exam:
  - T 100.2; skin lesion on leg (see image)
  - Slight, diffuse abdominal tenderness.
  - Otherwise, unremarkable.
- Labs:
  - Hb 12.4, WBC 11,150
  - ESR=79, CRP=110
  - Basic metabolic panel normal
  - Chest x-ray normal

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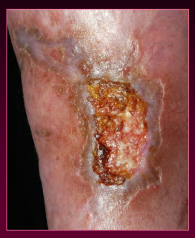
Leg lesion



Painful and irregularly shaped ulcer with undermined borders

Question 8

Which one of the following is the most likely diagnosis?

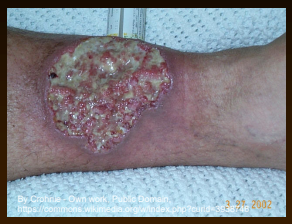
A. Ulcerative colitis
B. Cutaneous leishmaniasis
C. Amebic colitis
D. Necrotizing fasciitis
E. Squamous cell cancer

Pyoderma gangrenosum

- *Another* neutrophilic dermatosis
  - Indolent, fever rare (vs Sweet)
- Papule starts at site of often trivial trauma, progressing to a **painful** ulcer with violaceous border and necrotic base
- >50% of cases occur with systemic illness (but may precede dx, or occur independent of flares)
  - IBD (Ulcerative colitis>Crohn's)
  - Inflammatory arthritis
  - Solid organ or heme malignancy

Pyoderma Gangrenosum

- Buzzwords & Hooks
  - Minor trauma (Pathergy) frequent
  - Painful, progressive **undermined ulcer** with violaceous edges and **necrotic base**
  - Associated with IBD, arthritis, neoplasm



Case 9

- A 79-year-old woman is seen for 3 weeks of fever and fatigue.
- One week earlier she developed jaw discomfort when chewing food and had a brief episode of double vision.
- One month ago, she attended a luau and ate roast suckling pork prepared over an open fire.

- Exam:
  T 102.2, P 104, BP 124/84
  Slight tenderness over left scalp
  mitral regurgitant murmur
  rest of exam normal
- Labs:
  Hb 9.8; WBC 9800, normal diff
  UA normal
  basic metabolic panel normal
  sedimentation rate 147

Question 9

Which of the following is most likely to be diagnostic?

A. Anti-neutrophil cytoplasmic antibody (ANCA)
B. *Taenia solium* serology
C. Blood cultures
D. Arteriography
E. Temporal artery biopsy

Giant Cell Arteritis

- GCA (AKA temporal arteritis)= Arteritis of extracranial branches of the carotid.
- A disease of the older adult: Almost all >50 years old
- Clinical findings:
  - Fever (think of this with FUO in elderly)
  - HA, scalp or TA tenderness, jaw claudication
  - amaurosis fugax or sudden vision loss
- Marked inc ESR/CRP suggestive, TA biopsy diagnostic
- Immediate steroid therapy indicated if visual changes to prevent blindness (won't affect biopsy yield for up to two weeks).

Giant Cell Arteritis

Buzz words and associations:

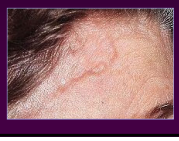
Age >50 years; fever (FUO) and:

scalp or TA tenderness

diplopia or transient visual loss

jaw or tongue fatigue or pain while chewing

high sedimentation rate



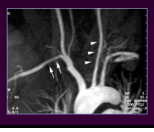
Polymyalgia Rheumatica (PMR)

Buzz words and associations:

- Half of all patients with GCA have concomitant PMR
- Up to 1/3 of patients with PMR have GCA
- Fever not prominent (may be low grade) in absence of GCA
- Aching and **morning stiffness** in proximal muscles of shoulder and hip girdle
- Gel phenomenon

Takayasu Arteritis

- Another large vessel vasculitis involving aorta, carotids and pulmonary arteries.
- Buzz words and associations:
  - Young woman (>80%), Asian ancestry
  - Subacute onset of fever, weight loss, arthralgias and myalgias
  - Carotidynia (pain with palpation), decreased pulses
  - Extremity claudication; visual changes; TIAs
- Dx: Arteriography



Case 10

- A 37-year-old female presents with fever and joint pain. She is a long-distance runner and in excellent health.
- Three weeks prior she noted R knee pain after a long run. She was treated with a steroid injection with transient improvement, but subsequently developed bilateral ankle pain and redness. She notes subjective chills and sweats.
- She does recall several tick bites over the last 2 months

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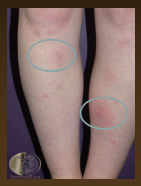
Exam:

T 101.2; Pulse 72; BP 110/70

Bilateral synovial thickening of ankles with warmth and tenderness to passive movement

Skin exam with painful pre-tibial nodules



Labs:

WBC 8.8 (76% segs)

CRP=167

Uric acid=4.4

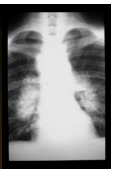
RF <15, CCP negative

Question 10

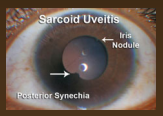
Which of the following is most likely to be diagnostic?

A. Chest x-ray
B. Serology for *Borrelia burgdorferi*
C. Urine *Histoplasma* antigen
D. Arthrocentesis
E. Skin biopsy

Sarcoidosis

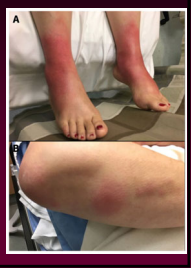


- A common mimicker
- Extra-pulmonary disease in ~1/3 of cases
- Lofgren Syndrome
  - Clinical diagnosis: Triad of hilar LAN, acute arthritis, EN
  - Women, ankles (>90%), fevers common
- BUZZ WORDS
  - Hilar LAN, EN, parotid enlargement, uveitis
  - Aseptic meningitis with basilar enhancement
  - Non-caseating granulomas



Erythema nodosum

- No cause >50% of cases
- Drugs: sulfonamides, penicillins
- Oral contraceptives
- Sarcoid (Lofgren's syndrome)
- Ulcerative colitis (or Crohn's)
- Microbes:
  - EBV, Hep B/C
  - *Streptocci*, *Bartonella,* TB
  - Endemic fungi



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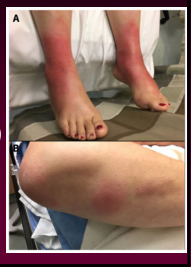


Case 11

- A 19-year-old immigrant from Iraq is hospitalized for 2-day history of fever and abdominal pain
- He has had similar episodes on at least 3 previous occasions over the past 7 years. At the first episode he underwent appendectomy; the appendix path was normal. Subsequent episodes resolved spontaneously after 2-3 days.

- Exam:
  T 102.2; pulse 114; no rash
  Abdominal guarding, rebound tenderness, hypoactive bowel sounds.
- Labs:
  WBC 16,650; UA normal
  Basic metabolic panel normal
  no occult blood in stool
  CT of abdomen and pelvis normal

Question 11

The most likely diagnosis is:

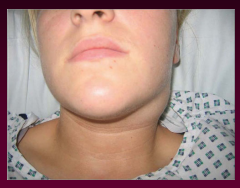
A. Hereditary angioneurotic edema
B. Familial Mediterranean fever
C. Systemic lupus erythematosus
D. Crohn's disease
E. Acute intermittent porphyria

Familial Mediterranean Fever

- Auto-inflammatory dz, causing hereditary periodic fevers
  - Others: PFAPA, TRAPS, hyperimmunoglobulin D
- Sporadic, recurrent attacks of fever & serositis (peritonitis, pleuritis, arthritis) manifesting as pain.
- Variably erysipeloid rash LE
- Dx: Genetic testing
- Buzz words and associations:
  - Periodic episodes (fever PLUS…)
  - Serositis
  - Mediterranean ancestry

Case 12

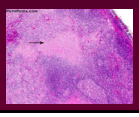
- A 26-year-old medical student presents with fever and cervical adenopathy.
- She was completely well until 9 days ago when she had the acute onset of fever and vague neck discomfort. She had no sore throat and no dental or scalp problems.



- Exam:
  T 101.4; unilateral anterior and posterior cervical enlarged lymph nodes, firm, and mildly tender. Otherwise, unremarkable.
- Labs:
  Hb 13.9; WBC 4,900 (9% atypical lymphocytes)
  Basic metabolic panel normal
  Chest x-ray normal
  ESR=72
  Monospot: Negative

- Serologic studies:
  EBV IgG positive, IgM negative
  CMV, *Toxoplasma*, *Bartonella* titers negative
  RF, ANA, ds-DNA negative
- Lymph node pathology:
  Necrotizing lymphadenitis with histiocytic infiltrate and phagocytosed debris.

  Stains for AFB and fungi negative.



Question 12

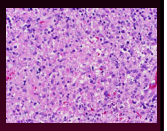
Which one of the following is the most likely diagnosis?

A. Cat Scratch Disease
B. Adult Still's Disease
C. Sarcoidosis
D. Kikuchi Disease
E. Non-Hodgkin Lymphoma

Kikuchi Disease

- AKA acute necrotizing histiocytic lymphadenitis
- Self-limited condition of unknown cause
- Typically, young women
- No racial or ethnic proclivity (more common in Asia)
- fever & cervical LAN (esp posterior, usually unilateral).
- May also see morbiliform exantham, rarely extra cervical LAN, aseptic meningitis, uveitis.
- Variably leukopenic and atypical lymphocytes (25% of cases).

Kikuchi Disease

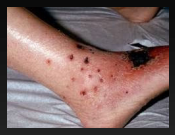


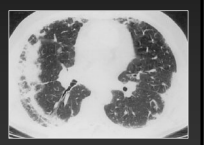
- Diagnosis by pathology:
  - necrotizing histiocytic infiltrate (not neutrophils) and fragments of nuclear debris.
- Buzz words and associations:
  - Acute onset fever and cervical adenopathy in young woman
  - Atypical lymphocytes (mono-like syndrome)
  - Path: necrotizing adenitis with histiocytosis

Case 13

- A 41-year-old woman is seen for fever, worsening respiratory symptoms, and a rash.
- She has long-standing asthma with frequent exacerbations
- She uses an inhaler several times a day and was recently placed on a leukotriene receptor antagonist. She is being tapered off steroids which she has taken for several months.

- Exam: Temp 101.5; RR 24
- Diffuse wheezing; palpable purpura with nodules on elbows and legs.
- Labs: WBC 15,230 (22% eosinophils).
- CT scan: bilateral peripheral infiltrates.
- Skin nodule biopsy: granulomas





Question 13

Which one of the following is the most likely diagnosis?

A. Strongyloidiasis
B. Disseminated histoplasmosis
C. Sarcoidosis
D. Allergic bronchopulmonary aspergillosis
E. Churg-Strauss syndrome

Churg-Strauss Syndrome

- AKA eosinophilic granulomatosis with polyangiitis (EGPA)
- Multisystem, small vessel vasculitis with allergic rhinitis, asthma, peripheral and lung eosinophilia.
- Most often involves lung and skin, but can involve heart, GI tract, and nervous system.
- Presence of blood eosinophilia and peripheral pulmonary infiltrate in setting of difficult to control asthma
- Tapering of steroids often "unmasks" EGPA
- May be p-ANCA positive.

Churg-Strauss Syndrome

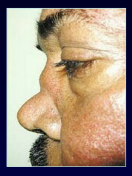
- Buzz words and associations:
  - Longstanding asthma
  - New infiltrates and eosinophilia (>10%) as steroids tapered.
  - Rash (tender nodules on extensor surfaces, purpura, ecchymosis, necrosis)
  - Fever UNCOMMON (until late)

Case 14

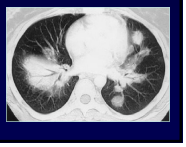
- A 38-year-old man is seen for a 6-week history of cough, intermittent fever and night sweats.
- He has had nasal stuffiness for 4-5 months with occasional epistaxis.
- He lives in Philadelphia, and 6 months ago traveled to Cincinnati, OH on business.
- He has no pets and takes only an OTC decongestant; he denies recreational drug use

Exam:
- T 100.2; RR 18;

Nasal deformity with perforation of septum
Lungs clear; rest of exam normal.



- Labs:
  WBC 6,900 with normal differential;
  UA 30-50 RBC; BMP normal
  Chest CT: bilateral nodules with cavitation.



Question 14

- The diagnosis will most likely be supported by which of the following?
  - A. c-ANCA
  - B. Anti-glomerular basement membrane Ab
  - C. *Histoplasma* urine antigen
  - D. Angiotensin converting enzyme (ACE)
  - E. Pulmonary angiogram

Granulomatosis with polyangiitis (GPA) (~~Wegener's~~)

- Systemic vasculitis of medium and small arteries.
- Primarily involves the upper and lower respiratory tracts and kidneys (Pulmonary-Renal Syndrome).
- Limited to upper respiratory tract or lungs in 25% (most often young women).
- Variably involves joints, eyes, skin, and nervous system.

Granulomatosis with polyangiitis

- Dx:
  Suggestive: Positive ANCA (~85% sensitivity)
  IFA: c-ANCA.
  ELISA: anti-proteinase 3 (PR3-ANCA)
  Diagnostic: Biopsy

Buzz words and associations:
Nasal symptoms (Saddle nose and perforation)
Lung nodules
Respiratory and renal findings (hematuria)

Case 15

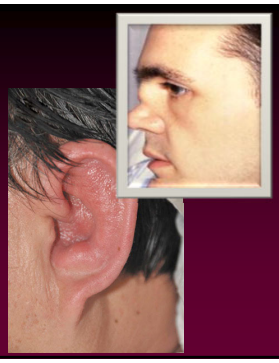
- A 42-year-old man is seen for his third episode of cellulitis of the external ear.
- Two previous episodes involving the same ear, 2 and 5 months ago, responded very slowly to antibiotics.
- He has a several year history of chronic nasal stuffiness and had an episode of knee arthritis in the past year but is otherwise well.

Case 15

Exam:
Afebrile
Left auricle is inflamed and tender, ear lobe is spared.

He has a saddle-nose deformity; the nasal mucosa is normal.

Labs: CBC normal



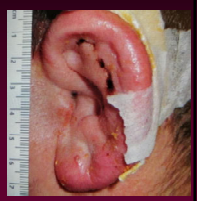
Question 15

The most likely diagnosis is?

A. Invasive external otitis
B. Leprosy
C. Granulomatosis with polyangiitis
D. Relapsing polychondritis
E. Congenital syphilis

Relapsing Polychondritis

--Immune-mediated condition.
--Inflammation of cartilaginous structures, particularly ears, but also nose, eyes, joints, and airways.
--Clinical diagnosis.

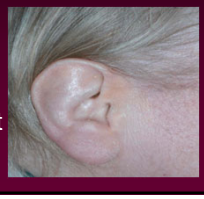


Saddle-nose Deformity

Relapsing polychondritis
Lepromatous leprosy
Congenital syphilis
Leishmaniasis
Granulomatosis with polyangiitis
Cocaine use

Relapsing Polychondritis

- Buzz words and associations:
  - Recurrent "cellulitis" (cartilage inflammation)
  - Saddle-nose
  - Cauliflower ear
  - Sparing of ear lobe
  - Parasternal joint involvement



That's all!

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