Infectious Disorders

Bacterial Infections

Bacterial Food Poisoning and Gastroenteritis

- Most diarrhea is a food-borne illness
- Toxigenic bacteria vs Invasive bacterial infection

Toxin Mediated Diarrhea

- ABRUPT onset
- Classic causes and associated buzzwords
    - Staphylococcus aureus – eggs/mayo
    - Bacillus cereus – fried rice
    - Enterotoxigenic E. coli – classic traveler's diarrhea
    - Clostridium perfringens – meat/poultry
    - Scombroid – dark-meat fish (histamine reaction)
    - Ciguatera – carnivorous fish (neuro)

Invasive Bacterial Diarrhea

- GRADUAL onset, systemic symptoms
- Classic causes
    - Salmonella – undercooked eggs/chicken
    - Shigella – fever, dysentery
    - Campylobacter – most common; chicken
    - Yersinia – farm animals/chickens
    - Treat all with antibiotics!

Indications for Antibiotics/Treatment

- First assess for dehydration and give fluids (prefer oral if can tolerate)
- No-brainer, give antibiotics: fever, systemic symptoms, recent travel
    - Ciprofloxacin and loperamide
- No-brainer, no antibiotics: no fever, systemic symptoms, travel, or sick contacts
    - Loperamide only (assuming several days of symptoms)
- Gray area: PO Abx shorten course of moderate-severe diarrhea by 1-2 days
- **No Abx or antimotility agents** in kids or elderly pts with grossly bloody diarrhea/E. coli 0157:87→ may increase risk of HUS
- Always weigh pt's need for Abx vs. risks of resistance and C. difficile
- Anti-motility or anti-secretory agents effective and recommended

Table of Important Organisms

Organism	Unique Sources	Incubation Duration	Special Features

Salmonella	Eggs, poultry, unpasteurized milk	I: 8-24 hrs D: 2-5 days	Cafeteria-type outbreak
Vibrio parahaemolyticus	Undercooked seafood	I: 8-24 hrs D:1-2 days	Summer months
Yersinia	Animals and person-to-person	I: 12-48 hrs D 1-2 days	**Appy mimic**, terminal ileitis, post-infx arthritis
Shigella	Institutionalized, poor hygiene	I: 1-2 days D: 4-7 days	Watery diarrhea that gets worse
Campylobacter	Chickens, natural water sources	I: 2-5 days D: 5-14 days	+/- bloody diarrhea, **Appy mimic**
E. Coli 0157:H7	Raw ground beef, raw milk	I: 3-8 days D: 5-10 days	Bloody diarrhea, HUS or TTP

Cholera

- *Vibrio cholerae*
- Potentially fatal cause of diarrhea
- Produce a toxin that activates adenylyl cyclase in epithelium of small intestine, causing hypersecretion of H2O/Cl and **massive diarrhea (rice-water stools**), leading to shock/hypotension/death
- Epidemics due to contaminated water in wartime, overcrowding, famine, poor sanitation
- Treatment
    - Replace fluid, electrolytes: oral rehydration (H2O, salt, sugar) if mild-moderate, IV if severe
    - Abx shorten duration and reduce severity, but less important than fluids
        - tetracycline, ampicillin, trimethoprim/sulfamethoxazole, quinolones
- Prevention: clean water/food; Vaccine exists, but booster every 6 months.

Botulism

- *Clostridium botulinum*: anaerobic, spore forming bacillus found in soil
- Powerful neurotoxin which **inhibits acetylcholine release at neuromuscular junction**, causing paralysis
- Clinical
    - Three main presentations: foodborne (canned foods, honey), infant (most common), wound
    - **D's of botulism**: diplopia, droopy eyes (ptosis) dilated pupils, dry mouth, dysphonia, dysarthria
    - No mental status change or sensory symptoms
    - Can get respiratory paralysis possible
- Diagnosis: toxin identification
- Treatment

    - Botulinum antitoxin from CDC
    - Early intubation, supportive care

Infant botulism

- Classically due to eating honey
- Possible chief complaints: poor feeding, weak cry, poor head control (**floppy baby**), loss of facial expression (bulbar palsies)

Wound botulism

- From black tar heroin, skin popping or from dirty wound

Other

- Botox: injection of Botulinum toxin
- Medical uses: sweating, strabismus, cervical dystonia, spasms
- Potential bioweapon

Pearls

- Toxin-mediated diarrhea is rapid-onset and treated with antidiarrheals.
- Invasive causes of diarrhea are treated with antibiotics unless there is suspicion for E. coli O157:H7.
- Cholera causes massive, often-fatal diarrhea; the key to treatment is aggressive rehydration (preferably oral).
- Botulinum toxin is a powerful, paralytic neurotoxin.

Sexually Transmitted Diseases

Chlamydia

- ***Chlamydia trachomatis***
- Sx: urethritis and cervicitis; **watery discharge** in males and females is typically asymptomatic but can get cervicitis/PID
- Importance: **leading cause of infertility** because it can go undetected
- Dx: clinical dx, ELISA/DNA tests to confirm (urine/cervical swab)
- Tx: **azithromycin/doxycylcine**, erythromycin in pregnancy
    - Treat partners!

**Fun fact: Chlamydia trachomatis can also cause LGV (lymphogranuloma venereum) which presents as vesicular lesions or ulcers spreading to the lymph nodes known as inguinal buboes. This may also present with anorectal involvement.*

Gonococcus

- ***Neisseria Gonorrhoeae***
- Sx: occur 2-8 days after sexual exposure
    - Men: present with **milky/yellow discharge, dysuria**
    - Women: asymptomatic or dysuria/**PID**
- Complications
    - Conjunctivitis**:** if the patient has direct contact with the eyes after exposure, may

present with **conjunctivitis** and **copious purulent discharge** from the eyes
    - Disseminated gonococcus: bacteremia may occur and present with skin lesions
        - **gunmetal grey pustules** which are more common in women
        - septic arthritis, or tenosynovitis
- Importance: causes PID/infertility
- Dx: culture and Gram stain the discharge: gram-negative intracellular diplococci
- Tx: **IM ceftriaxone**
    - Tx partners, and tx for chlamydia too!
    - In disseminated cases administer IV antibiotics

Mycobacteria

Atypical Mycobacteria

Mycobacterium avium intracellulare (MAI)

- Affects mainly AIDs patients causing lung disease and bone marrow suppression, pancytopenia
- Tx: macrolide plus ethambutol plus rifampin
    - Severe disease: add an aminoglycoside
    - Surgical tx for local nodule

Mycobacterium marinum

- Skin infections presenting as a **fish tank granuloma**, affects fish handlers and those with hands in aquariums
- Tx: clarithromycin plus ethambutol, or clarithromycin plus rifampin
    - Some are drug resistant
    - Surgical tx if deeper tissue is involved

Mycobacterium kansasii

- Inhaled, similar to tuberculosis, lung disease
- Tx: rifampin plus isoniazid plus pyridoxine plus ethambutol

Mycobacterium ulcerans

- Causes skin ulcers
- Tx: wide excision of ulcers
    - Small lesions: rifampin, clarithromycin, and streptomycin injections

Typical Mycobacteria

- ***Mycobacteria Tuberculosis***
- Acquired through inhaling active droplets into our lungs
- Lives in macrophages as a facultative intracellular parasite (needs oxygen)
- If immunocompromised, reactivation occurs

TB Stages of Progression

- After transmission at the time of initial infection **primary TB** typically occurs in the **lower lobes** of the lung and looks like pneumonia → skin test conversion in 6-8 weeks (PPD+) → spontaneous healing in 6 months → progresses to **latent tuberculosis** OR **reactivation** tuberculosis (after time/become immunocompromised).
- **Reactivation** tuberculosis occurs in the **upper lungs** as an **apical lesion**

TB X-Ray Findings

- Lower lobe consolidation: primary TB (although in rare cases primary TB can affect the upper lobes)
- Ghon complex: calcified healed primary TB focus
- Ranke complex: Ghon complex + calcified hilar lymph node
- Apical Lesions: reactivation TB

Patient Population Affected

- Homeless, immunocompromised, immigrants, living in crowded areas, incarcerated

Symptoms

- **Cough**, fever, **night sweats**, weight loss, **hemoptysis**

Diagnosis

- Mycobacterial culture/PCR of sputum
- AFBs will be sent initially and if positive it is suggestive but not diagnostic *(remember that most mycobacterium will stain positive on an acid fast smear)*

Treatment

- Isoniazid (INH) plus rifampin plus pyrazinamide plus ethambutol tx for **9 months**
- Respiratory isolation
- Complications of tx
    - **Isoniazid: I**njures **N**erves and **H**epatocytes (neuropathy and increases LFTs)
    - **Rifampin:** causes orange body fluid (tears, secretions)
    - **Ethambutol:** causes an optic neuritis, cannot differentiate red from green

**Fun fact: 1/3 of the world population is infected with TB. TB is the most common cause of hemoptysis worldwide! In the U.S. the most common cause of hemoptysis is bronchitis.*

Necrotizing Skin Infections

- Toxin-producing bacteria that cause two major types of necrotizing infections: Myonecrosis and Necrotizing Fasciitis
- Fournier's gangrene: scrotum, vulva, and perianal skin

Myonecrosis: Gas Gangrene

- Rapidly progressive muscle-necrosing infection
- Cause: *Clostridial myonecrosis*
    - Produces a toxin that kills muscle and rapidly sets up anaerobic growth
- Hx: patient with recent trauma/surgical wound
- Sx: **pain** is the earliest symptom
    - Not much skin inflammation but there is **gas formation** – may see bullae or gas on xrays
    - **Rapidly progressive**, onset can be after 6-24 hours
- Sx: **tachycardia out of proportion to fever**, temp not reliable, mental status variable, progressive skin changes, +/- gas on plain X-ray, **la belle indifferenc**e
- Dx: incision reveals dead muscle and foul odor; dishwater fluid
- Tx: **wide debridement**, anaerobic abx (amp + gent + clinda OR high dose PCN G)

Necrotizing Fasciitis

- Necrotizing Infection of the Fascial Planes

Pearls

- **Chlamydia** is often **asymptomatic,** produces a watery discharge and is treated with **azithromycin** or **doxycycline**
- **Gonoccous** presents with a **yellow discharge** and can lead to several **complications** including **conjunctivitis** and **bacteremia**, treatment is **ceftriaxone**
- Tuberculosis can present in a variety of stages, **primary TB** can look like a typical pneumonia and affects the **lower lobes** of the lungs, while **reactivation TB** affects the **upper lobes**
- **Treatment** of **tuberculosis** includes INH plus rifampin plus pyrazinamide plus ethambutol, which each have a range of complications
- **Necrotizing skin infections** include **myonecrosis** and **necrotizing fasciitis**, each with separate presentations and etiology

SIRS/Sepsis

Definitions

- **SIRS (systemic inflammatory response syndrome)** = 2 of the following: tachycardia (HR >90), tachypnea (RR >20, PaCO2 <32), hyper/hypothermia (T >38 or <36), WBC (>12 or <4 or >10% bands)
    - DOES NOT MEAN YOU HAVE AN INFECTION! *Many* things can cause SIRS…exercise, trauma, burns, pancreatitis, etc
- **Sepsis** = SIRS + infection
- **Severe Sepsis** = Sepsis + end organ dysfunction
- **Septic Shock** = Severe Sepsis + hypotension (SBP <90) refractory to 2L IVFs

Early Goal-Directed Therapy

- **EGDT "goals" = ways to tissue oxygenation/perfusion =**
    - **EARLY IVFs (2L crystalloid), EARLY ABX**
    - CVP 8-12, MAP >65
    - **pressors** if refractory hypotension (NE or dopamine)
    - SvO2 >70%
    - PRBCs if Hct <30%
    - inotropes (dobutamine) if CO low
- EGDT currently being questioned to see if anything other than IVFs + abx matters

Toxic Shock Syndrome

- Toxin-mediated SIRS
- Menstruation still most common setting (only about 200 cases/year)
    - 50% cases r/t tampons
- Case Definition: **high fever** (102F) + **rash** (diffuse macular erythroderma) +

desquamation (1-2 weeks after onset, esp palms and soles) + **hypotension** + **3 organs involved** (GI, muscular, mucous membrane, renal, hepatic, hematologic, CNS)
- Etiology: **Staphylococcal or Streptococcal**
    - Staph = MCC = RASH, d/t cavity packing, does not require positive blood cx, low mortality
    - Strep = NO RASH, d/t cuts/burns/varicella, requires positive blood cx to dx, high mortality

Syphilis

- Etiology: *Treponema pallidum* (spirochete)
    - Sexual contact or congenital transmission
- Early and late stages

Primary Syphilis

- Symptoms*: painless* genital chancre; regional LAD may be seen
    - Heals in 4-8 weeks
    - VDRL/RPR are nonspecific and are often negative in primary syphilis

Secondary Syphilis

- 2-10 weeks later, may involve almost anything
    - rash (palm/soles), infection of kidney, liver, CNS

Tertiary Syphilis

- Years later
- Gummatous lesions in skin, bone, viscera, CV, neurosyphilis
- **Neurosyphilis: tabes dorsalis**, chronic meningitis, dementia
    - Tabes dorsalis: demyelination dorsal columns → impaired proprioception, loss of vibratory sense (ataxia)
- Argyll-Robertson pupils: (aka *prostitute pupils*) small pupils that constrict to near object (*accommodate*) but do not react to bright light

Diagnosis

- VDRL or RPR (often neg in primary)
- Confirm with FTA-ABS

Treatment

- **PCN G** 2.4 million units IV x1
    - if late disease → three weekly doses
- Neurosyphilis requires PCN q 4 hours x 2 weeks
- Jarisch-Herxheimer reaction: PCN spirochete destruction → fever, toxicity

Tetanus

- Puncture wound most susceptible
- C. tetani spores in soil germinate in wound → produce tetanospasmin (neurotoxin) → blocks release of GABA/glycine → unopposed excitatory discharge (affects sympathetic and parasympathetic neurons)

- Clinical Presentation
    - Pain and tingling at site of inoculation followed by spasticity of nearby muscles that spreads to jaw/neck stiffness (lockjaw, trismus) and irritability → painful tonic convulsions
    - Muscle stiffness (opisthotonos, risus sardonicus)
    - NO CNS EFFECT (you're totally w/ it)
    - Clinical diagnosis
- Neonatal Tetanus = dirt w/ spores rubbed onto end of umbilical cord after delivery
- Treatment
    - PREVENTION is key!
        - Tdap immunization starting in childhood and then booster every 5-10 years
    - If disease present: give Tetanus immunoglobulin IM, supportive care (benzos, intubation) and abx

Pearls

- Gas gangrene may have skin signs and gas on XR, look for PERSISTENT TACHYCARDIA, *fever not reliable*; diagnose w/ incision
- EGDT = EARLY IVFs/ABX, then pressors/PRBCs/inotropy if indicated
- Staph TSS = fever, RASH, hypoTN, organ dysfxn; low mortality; 2/2 packing
- Strep TSS = fever, NO RASH, hypoTN, organ dysfxn; high mortality; 2/2 cuts/burns
- Syphilis: primary - chancre; secondary - rash; tertiary - neurosyphilis/gummas; Tx PCN (know J-H rxn)
- Tetanus: high mortality so PREVENTION is key!

Fungal Infections

Candida albicans

- Risk factors: immunocompromise (diabetes, HIV, steroids, chemo, antibiotics)
- May be cutaneous, mucosal/genital, fungemia, endocarditis, hepatosplenic

Cutaneous Disease

- Diaper dermatitis
- Red, well-demarcated, **satellite lesions**
- Kids/adults (with DM) may develop in moist areas (pannus, under breasts)
- Tx: topical antifungals

Mucosal Disease

- Can affect mouth, esophagus
- Oral thrush: white plaques that scrape off
- Odynophagia/dysphagia suggest esophagitis; can feel like GERD
- Thrush Tx: swish and spit liquid antifungals
- Esophagitis Tx: oral fluconazole; amphotericin B if resistant

Vulvovaginal Candidiasis

- "Yeast infection"

- Very common, but **can be a presenting symptom of HIV**
- Other risk factors: extremes of age, diabetes, antibiotics, pregnancy, steroids
- Clinical: itching, burning, thick white “cottage cheese” discharge
- Equivalent in men is balanoposthitis
- Tx: topical antifungals or oral fluconazole

Fungemia

- Life-threatening, often secondary to indwelling catheter
- Tx is amphotericin B
    - If disseminated, can add flucytosine or fluconazole

Hepatosplenic Disease

- Patients with leukemia or lymphopenia
- RUQ pain, increased LFTs
- Diagnosis: multiple low-density defects on CT, yeast on biopsy

Cryptococcus

- *Cryptococcus neoformans*: encapsulated yeast found in soil with dried pigeon poop
- Transmitted through inhalation → causes pulmonary and CNS disease
- Most often causes **meningitis** (esp in the immunocompromised—classically AIDS)
    - Altered mental status, cranial nerve and visual abnormalities
    - Dx by cryptococcal antigen in CSF or serum; old India ink stain is actually faster
    - Tx: oral fluconazole x 10 wks; if severe, amphotericin B

Histoplasmosis

- A dimorphic fungus in soil with bird or bat poop → inhalation causes disease
    - Can occur in epidemics when soil is upturned
- Distribution: **Ohio** and Mississippi river valleys
- Usually no symptoms unless immunocompromised
- **Disseminated disease**: can be fatal in weeks; fever, cough, mouth ulcers, weight loss, retinal deposits
    - less common than chronic progressive pulmonary form
- **Chronic Progressive Pulmonary disease**: older pts with COPD, calcified nodes on chest X-ray
- In HIV pts, risk is highest with CD4 <100
- CXR may mimic miliary TB (miliary infiltrates)
- Tx: long-term itraconazole, amphotericin B

Protozoa & Parasitic Infections

Toxoplasmosis

- *Toxoplasma gondii* (a protozoa)
- Infects warm-blooded animals, mostly cats
- Mostly acquired from cat feces (inhaled while changing litter), though also from raw meat (pork)

- Most people have been exposed (primary infection usually mild), but with immunocompromise it reactivates to cause encephalitis, focal brain lesions, +/- retinitis
- **Ring-enhancing lesions** on CT
- Primary infection in pregnancy can cause prematurity, eye/CNS/skin problems, jaundice, splenomegaly (the earlier in pregnancy, the worse)
- Tx: pyrimethamine

Malaria

- Rare in USA
- Classic history is cyclical fever, shaking chills, history of travel to endemic area
- 4 species: *P. falciparum*, *P. ovale*, *P. vivax*, *P. malariae*
- Vector is **female *anopheles* mosquito**
- The important thing is that **malaria infects red blood cells**
- Present with cyclical fever, headache, chills, lethargy, abdominal pain, **anemia**
- *P. falciparum* is most dangerous (severe organ damage and death)
    - Potential for cerebral malaria/edema/encephalopathy, herniation, pulmonary edema, DIC; hypoglycemia in kids
- Workup: thick and thin blood smears to look for ring forms; +/- Giemsa or Wright stain
- Tx: chloroquine
    - Chloroquine resistance is common: can give quinine plus doxycycline
    - *Falciparum* requires **IV quinine, which can cause profound hypoglycemia**

Tick Borne Diseases

Lyme Disease

- ***Borrelia burgdorferi***, transmitted by *Ixodes* tick
- Most common vector-borne disease in USA
    - Most common in Northeast
- Often tick bite history is absent
- 3 stages of disease
    - Stage 1: early, localized (1 wk after bite)
        - Bull's eye rash (erythema migrans)
    - Stage 2: early, disseminated (days to weeks later)l
        - Skin, CNS (bilateral Bell's palsy), musculoskeletal, cardiac (heart block)
    - Stage 3: late, persistent (months to yrs)
        - Nonspecific symptoms: joint pain, synovitis, subacute encephalopathy
- Diagnose by ELISA, may be false negative if tested early
- Tx: doxycycline; prevention

Rocky Mountain Spotted Fever

- *Rickettsia rickettsii:* transmitted by wood tick
- Most common in Eastern US, not Rocky Mountains
- Clinical course
    - Viral syndrome 2-14 days after tick bite → rash
    - **Rash starts on wrists and ankles, then spreads inward to extremities and trunk.** Includes palms/soles.

    - Late (if untreated): hepatosplenomegaly, myocarditis, acute respiratory distress syndrome, DIC
- Labs: increased white blood cell count, low platelets, +/- hyponatremia, hematuria
- Tx: doxycycline; prevention
- Complications: seizures, neuro deficits

Ehrlichiosis

- 2 forms: Human monocytic ehrlichiosis (HME) and human granulocytic anaplasmosis (HGA)
- High risk populations similar to Lyme Disease (e.g., exposure to wildlife)
- Clinical: abrupt onset of fever, headache, myalgias, rigors after tick exposure
    - No classic rash
    - Associated with optic neuritis, ARDS, meningitis, pancarditis, renal failure, DIC
- Workup: special testing (PCR, antibody)
- Tx: doxycycline or tetracycline

Pearls

- Candidal infection can range from thrush to disseminated disease, but always think about immunocompromise.
- Malaria is an infection of red blood cells transmitted by the female *Anopheles* mosquito; the sickest patients tend to have *P. falciparum*.
- When in doubt, treat tick-borne diseases with doxycycline

Viral Infections

Epstein-Barr Virus

- Infectious mononucleosis (“kissing disease”); transmitted via saliva
- **Triad: exudative pharyngitis, lymphadenopathy (Posterior Chain), fever**
- Also involved in Burkitt’s lymphoma, nasopharyngeal carcinoma
- Incubates for several weeks
- Presentation (in addition to Triad): +/- soft palate petechiae, **splenomegaly in 50%,** maculopapular/petechial rash in 15% (amoxicillin will increase to 90%)
- Complications: secondary bacterial pharyngitis, splenic rupture, pericarditis, encephalitis
- Diagnosis is clinical
- Laboratory findings: atypical lymphocytes, heterophile antibodies, hemolytic anemia/thrombocytopenia, elevated LFTs, false positive RPR or VDRL in 10%
- Treatment: symptomatic, no aspirin, avoid contact sports

Influenza

- Orthomyxovirus
- 3 strains: A, B, C (based on hemagglutinin and neuraminidase surface antigens)
    - Type A most common and most pathogenic
- **Genetic drift and shift (the word drift has a “gentle” or “minor” connotation)**
    - Antigenic shift causes major mutations
    - Antigenic drift causes minor mutations

- Presentation: sudden onset, fever, sore throat, headache, **myalgias**, nonproductive cough
- **Most common cause of death = secondary pneumonia**
- Lasts a few days to a week
- **Mortality highest in very young or very old**
- Treatment: Neuraminidase inhibitors (zanamivir or oseltamivir) only within 48 hours of symptom onset or if being hospitalized
    - No more amantadine/rimantadine d/t resistance
    - Prevention: vaccinate yearly

Parainfluenza

- Associated with pediatric URIs
- CROUP (barking cough) and bronchiolitis
- **Steeple sign on anterior/posterior xray** = subglottic edema
- Treatment: Cool mist, steroids

Hantavirus

- Spread by **aerosolized rodent excretions** (sweeping a cabin, Yosemite)
- HPS = hantavirus pulmonary syndrome (sin nombre virus “without a name”)
    - Tachypnea, hemoconcentration, thrombocytopenia, leukocytosis
    - ARDS like picture
    - Treatment: supportive

Herpes Family

- HHV 1-2: Herpes simplex 1 and 2
- HHV 3: Varicella Zoster
- HHV 4: Epstein-Barr
- HHV 5: CMV
- HHV 6-7: Roseola
- HHV 8: Kaposi’s Sarcoma (AIDS)

Herpes Simplex

- Humans only, transmitted by close contact or direct inoculation
- HSV-1: 85% of US population HSV-2: 25% of US population
- Remain latent in dorsal root ganglion → reactivated with stress, immunocompromise, trauma
- Can cause encephalitis
- Diagnosis: **Tzanck smear**, culture
- **HSV-1**: mouth, stomatitis
    - Fever, decreased po intake, **corneal ulcers (no steroids)**
    - Whitlow = vesicles on digits
- **HSV-2**: anus, genitalia
    - Burning, stinging, malaise before lesions appear
    - Genital lesions are painful
    - Females tend to have more severe disease and may involve cervix
    - **Genital herpes at time of birth is dangerous for mother and baby C-Section**

- Treatment: antivirals, suppressive therapy

Varicella Zoster Virus

- Chickenpox
- Highly contagious (even the day before rash appears), incubation is 10-20 days
- Bad disease in adults and immunocompromised (disseminated, pneumonia), not a big deal in kids
- Zoster(shingles) is reactivation of dormant varicella zoster virus
- Clinical
  - **Lesions are in different stages** (some crusted, some fresh), **appear in crops, "dew drop on a rose petal"** (vesicle on red macule)**, mucous membranes can be involved**
    - Different from smallpox where lesions are all at same stage
  - Systemic symptoms: low grade fever, myalgias
- Clinical diagnosis
- Treatment: supportive; prevent bacterial superinfection
  - If immunocompromised give acyclovir
- Vaccine in wide use now

Zoster/Shingles

- Painful vesicular eruption, usually unilateral dermatomal pattern (thoracic and lumbar most common)
- **Herpes Ophthalmicus:** trigeminal nerve eruptions (CNV) can involve eye
- **Ramsay-Hunt-zoster oticus** (CNVIII): Bell's palsy + ear pain/zoster
- **Hutchinson's sign:** vesicles on tip of nose → may indicate eye involvement
- Postherpetic neuralgia: debilitating pain
  - Steroids may prevent
  - Most common in elderly
  - Treatment: TCA, capsaicin, narcotics, gabapentin

Pearls

- 50% of those with infectious mononucleosis will have splenomegaly, thus all should be told not to participate in contact sports
- Influenza may undergo genetic drifts (minor genetic changes) or genetic shifts (major genetic changes), and death most commonly occurs via secondary pneumonia in the very young or very old
- A steeple sign may be present on the xray of a child with croup, signifying subglottic edema
- Hantavirus is spread by aerosolized rodent excrement
- Active Genital herpes in a birthing female is an indication for c-section
- Chickenpox lesions occur in crops of different stages, active lesions are dew drop on a rose pedal appearing

HIV

General

- Human retrovirus that requires reverse transcriptase

- Primarily infects the CD4 helper T cells (T4 antigen)
- Macrophages serve as reservoir of virus
- Transmitted through bodily fluids
- Acute HIV infection frequently missed
    - Resembles typical viral syndrome: fever, fatigue, rash, headache
    - **Keep it on your radar and test liberally**.
- Time from infection to symptomatic disease averages 10 yrs (variable)
- **AIDS = CD4 count <200 or AIDS-defining illness**
    - Common ones to know: candidal esophagitis, invasive cervical cancer, certain herpes manifestations
- As CD4 count drops, incidence of opportunistic infections rises (mostly below 500)
    - Prophylaxis is started as CD4 count drops
    - <500: **TB**, zoster, HSV, Kaposi's sarcoma
    - <200: encephalopathy, candidiasis, **PCP**
    - <100: **toxoplasmosis**, histoplasmosis, **cryptococcus**
    - <50: progressive multifocal leukoencephalopathy, cytomegalovirus (**CMV**), CNS lymphoma
- 4 classes of HIV meds, each with typical side effects (Don't memorize drug names)
- Post-exposure prophylaxis: start within 72 hours
- Antiretrovirals (ARVs) decrease transmission in pregnancy

Pulmonary Presentations

- If CD4 >500: think of normal pneumonia (PNA) organisms plus TB & malignancy
- If CD4 <500: start thinking about PCP, fungal PNA, CMV, lymphoma, and Kaposi sarcoma

PCP

- Most common opportunistic infection in AIDS
- Clinical: non-productive cough, fever (often prolonged), and **marked dyspnea** on exertion
- Bat-wing pattern on CXR
- Treatment
    - Bactrim DS
    - Steroids If PaO_2 <70 or A-A gradient >35
    - Second-line is inhaled pentamidine (causes hypoglycemia, hypotension, risk of pneumothorax)
- Lactate dehydrogenase (LDH) is sensitive for PCP but not specific
- Dx: bronchoalveolar lavage

Rabies

- Transmitted through infected animal's saliva to CNS
    - Dogs, bats, skunks, foxes, raccoons, coyotes
    - **Not transmitted by rodents or lagomorphs (rabbits)** - heavily tested fact
- Incubation 3-7 wks
- Clinical: develop pain/paresthesia at bite site, restlessness, seizure, thick saliva
    - Drinking water causes painful spasm, so pts avoid it (hydrophobia)
- Suspect animals are caught and their brains tested for rabies
- No treatment (give rabies immunoglobulin)
- Aggressive prophylaxis; pet immunization

    - Those at high risk (vets, handlers) should also be vaccinated.
- Bite treatment: local wound care
    - Post-exposure vaccination with rabies immunoglobulin into wound and at a distant site and human diploid cell vaccine (HDCV; 5 injections on days 0, 3, 7, 14, 28)
    - Often too late once there's evidence of infection

Roseola

- Herpesvirus: HHV 6 and 7 (also called sixth disease, exanthem subitum)
- Age 6mo - 2yrs
- Typical progression: sudden high fever for 2 days → fever resolves → rash
    - **Rash begins on trunk, spreads to head/neck**; non-pruritic
    - Common cause of febrile seizures
- **No treatment with aspirin** due to risk of Reye's syndrome

Measles

- Also called rubeola
- Paramyxovirus
- Clinical presentation
    - Classically fever, **cough, coryza, conjunctivitis**
    - **Koplik spots** (not always seen)
    - **Rash starts on head, then spreads**
    - Rash "stains" (turns brown)
    - Can cause diarrhea, PNA, encephalitis, corneal complications

Rubella

- Also called German measles
- Somewhat milder than measles
- Rare in infants and those >40
- Clinical: get viral syndrome, **rash that starts on face, spreads to trunk and limbs, then fades after 3 days**
- In pregnant women, causes congenital rubella syndrome (microcephaly, patent ductus arteriosus, cataracts

Pearls

- Have a high index of suspicion for HIV, even in pts with nothing but a viral syndrome, and test liberally.
- If a rash in a kid spreads from trunk to neck/head, think roseola. If it spreads from face/head to trunk, think measles or rubella.