Infectious Diseases
ACP Puerto Rico Chapter Meeting

Daniel C. DeSimone, MD
Mayo Clinic Rochester, Minnesota
Desimone.Daniel@mayo.edu

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Infectious Diseases, ACP

Disclosures

• Relevant Financial Relationships
  • None

• Off-Label/Investigational Uses
  • None
Infectious Diseases

Objectives

1. Discuss common infectious disease syndromes
2. Discuss antibiotic therapy where appropriate
Infectious Diseases
Clinical Pearls

• Approach to every ID case:
  1. **Syndrome** ("itis"); endocarditis, pneumonitis, meningitis
  2. **Host** (steroids, DM, chemotherapy, radiation)
  3. **Bug** (most common organism given syndrome)
  4. **Drug** (based on bug and syndrome, route/duration)
Meningitis

- Patients are toxic in appearance, rapid duration of illness (less than 24 hour)
- Fever, nuchal rigidity, altered mental status
- Seizure, focal neurologic deficits, papilledema
- *N. meningitidis*—cause petechiae and palpable purpura
- Examination for nuchal rigidity—Kernig and Brudzinski signs

Meningitis

Kernig’s sign

Brudzinski sign

Image/Graphic: 56
Meningitis

• Diagnosis
  • Lumbar puncture—CSF examination
  • CT head prior to LP to exclude mass lesion or increased intracranial pressure
  • *Give antibiotics ASAP
  • Gram stain CSF and culture

Meningitis

• Treatment—Avoidance of delay in antibiotics

• *S. pneumoniae*: IV Vancomycin + Ceftriaxone, and adjunctive dexamethasone
  • Dexamethasone given early has helped lower the rate of hear loss, other neurologic complications, and mortality

• *N. meningitidis*: IV Vancomycin + Ceftriaxone

• *Listeria monocytogenes* (infants, elderly): IV Ampicillin + Vancomycin + Ceftriaxone

Question

33 y/o woman, born and raised in Minnesota, seen in the ED in January with a 3-day history of fever, headache, stiff neck, and photophobia. No recent travel; takes no meds. Temp 38.5C, BP 136/86, pulse 100, RR 18. Unremarkable physical exam. No papilledema on fundoscopic exam. CSF shows 324 TNC (40% N), glucose 58 mg/dL, protein 125. Gram stain negative but some atypical cells were seen, culture is pending. Which of the following is the most likely cause of this patient’s symptoms?

A. Enterovirus

B. Herpes simplex virus type 2

C. Mumps virus

D. West Nile Virus
Question

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A. Enterovirus—most common cause of viral meningitis between May & November in western hemisphere; seasonality—influenza, LCMV

B. Herpes simplex virus type 2—Can cause meningitis year round (no seasonality)

C. Mumps virus—reduced incidence since MMR vaccine, often associated with parotits or orchitis

D. West Nile Virus—focal motor weakness is a common finding such as flaccid paralysis. IgM AB availability. Mosquito-borne illness between June & October
## Meningitis

<table>
<thead>
<tr>
<th>Glucose (mg/dL)</th>
<th>Protein (mg/dL)</th>
<th>Total white blood cell count (cells/microL)</th>
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<tr>
<td>&lt;10&lt;sup&gt;†&lt;/sup&gt;</td>
<td>10 to 40&lt;sup&gt;‡&lt;/sup&gt;</td>
<td>100 to 500&lt;sup&gt;◊&lt;/sup&gt;</td>
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<td><strong>More common</strong></td>
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<td>Bacterial meningitis</td>
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<td><strong>Less common</strong></td>
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<td>TB meningitis</td>
<td>Neurosyphilis</td>
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<td>Fungal meningitis</td>
<td>Some viral infections (such as mumps and LCMV)</td>
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[Source](http://www.uptodate.com/contents/clinical-features-and-diagnosis-of-acute-bacterial-meninigitis-in-adults?source=search_result&search=meningitis&selectedTitle=1%7E150)
Pertussis (Whooping cough)

- *Bordetella pertussis*
- Highly contagious via aerosol droplet
- Classic paroxysmal cough—uncontrollable expirations followed by gasping inhalation
- Pertussis vaccine resulted in marked reduction
  - However, there has been waning immunity in adults and now there has been an increased in cases of pertussis

Goldman-Cecil Medicine, 313, 1990-1993.e2
Pertussis (Whooping cough)

- **Diagnosis**—PCR testing of nasopharyngeal swab specimen
- **Treatment**
  - Azithromycin or
  - Clarithromycin or
  - Bactrim
- **Prevention**
  - All adults should receive a one-time TDaP booster
Pneumonia
Fungal-Histoplasmosis

- *Histoplasma capsulatum*
- “Spelunker’s lung”
- Soil, bird droppings, bat guano
- Self-limited, influenza-like illness to disseminated infection
- AIDS, immunosuppression drugs (i.e. TNF-alpha inhibitors)
  - Predispose to dissemination
Pneumonia
Fungal-Histoplasmosis

In the environment, *Histoplasma capsulatum* exists as a mold (1) with aerial hyphae. The hyphae produce macroconidia and microconidia (2) spores that are aerosolized and dispersed. Microconidia are inhaled into the lungs by a susceptible host (3). The warmer temperature inside the host signals a transformation to an oval, budding yeast (4). The yeast are phagocytized by immune cells and transported to regional lymph nodes (5). From there they travel in the blood to other parts of the body (6).
Pneumonia
Fungal-Histoplasmosis

• *Histoplasma* antigen test in urine or serum help in extrapulmonary disease and response to therapy

• Serology is useful—complement-fixation titers of 1:32 or greater indicate active disease

• Treatment
  • Pulmonary, mild-moderate—itraconazole for 3 months; mod-severe—IV Amphotericin x 2 weeks, then oral itraconazole for 3 months
  • Disseminated: same as mod-severe

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 265, 2949-2962.e1
Pneumonia
Fungal-Blastomycosis

- *Blastomyces dermatitidis*
- “BBB”—Broad Based Budding yeast
- “dimorphic”—mold at 25-28°C, yeast at 37°C
Pneumonia
Fungal-Blastomycosis

• Outbreaks—destruction of beaver dams, lakes/rivers, occupational exposures; Pet dogs
• Lungs are portal of entry
• Extrapulmonary—skin, bone, prostate, CNS

Mandell, Douglas, and Bennett’s Principles and Practice of Infectious Diseases, Updated Edition, 266, 2963-2973.e2
Image/Graphic: 13, 14
Pneumonia
Fungal-Blastomycosis

• Diagnosis: direct visualization of organism on fungal stain or culture of specimens
  • Urine antigen testing available; but can cross react with other dimorphic fungal infections

• Treatment
  • Mild-moderate: Itraconazole
  • Severe/disseminated: IV Amphotericin, then Itraconazole
Pneumonia
Fungal-Coccidioidomycosis
Pneumonia
Fungal-Coccidioidomycosis

• Diagnosis: isolation from culture, detection of anti-coccidioidal antibodies

• Treatment
  • Healthy, mild-moderate: Fluconazole for 3 months to 1 year
  • Severe/Disseminated: IV Amphotericin, then oral Fluconazole or Itraconazole for at least 1 year
Question

27 y/o male is evaluated in the hospital for a 1-month history of fever, drenching night sweats, malaise, fatigue, chest pain, and a nonproductive cough. He completed a 7-day course of levofloxacin without improvement. The patient works on a military base as a car mechanic stationed in Bakersfield, California. Chest x-ray showed a right lower lobe infiltrate & ipsilateral hilar lymphadenopathy. MTB QuantiFERON negative. WBC 11.9, Hgb 12.4. Which of the following is the most likely diagnosis?

A. Coccidioidomycosis
B. Sarcoidosis
C. Streptococcus pneumoniae pneumonia
D. Tuberculosis
Question

27 y/o male is evaluated in the hospital for a 1-month history of fever, drenching night sweats, malaise, fatigue, chest pain, and a nonproductive cough. He completed a 7-day course of levofloxacin without improvement. The patient works on a military base as a car mechanic stationed in Bakersfield, California. Chest x-ray showed a right lower lobe infiltrate & ipsilateral hilar lymphadenopathy. MTB QuantiFERON negative. WBC 11.9 (30% eosinophils), Hgb 12.4. Which of the following is the most likely diagnosis?

A. Coccidioidomycosis—pulmonary cocci. 1/3rd of cases of CAP caused by Cocci in endemic areas; Bakersfield is the epicenter of cocci

B. Sarcoidosis—young black female most common, indolent over months to years, bilateral hilar lymphadenopathy

C. *Streptococcus pneumoniae* pneumonia—symptoms for 1 month and peripheral eosinophilia inconsistent

D. Tuberculosis—negative MTB quantiFERON excludes diagnosis
Pneumonia
Fungal--Aspergillosis

- *Aspergillus* species; mold
- Fungal ball (aspergilloma)
- Invasive pulmonary aspergillosis
- Host: hematopoietic stem cell transplantation or solid organ transplant
- Diagnosis: Culture of organism; biomarkers—galactomannan, beta-D-glucan, and PCR testing
- Treatment of choice: Voriconazole
Pneumonia
Fungal--Aspergillosis
Pneumonia
Fungal--Mucormycosis

• Aggressive, angio-invasive fungal infection

• *High index of suspicion as signs, symptoms, imaging are non-specific in these patients

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 260, 2909-2919.e4
Pneumonia
Fungal--Mucormycosis

Image/Graphic: 19, 20
Pneumonia
Fungal--Mucormycosis

• Treatment
  • Surgery; immediately
  • IV Amphotericin, PO Posaconazole

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 260, 2909-2919.e4
Fungal Disease
Candidiasis
Fungal Disease
Candidiasis

• Candida—budding yeast, normal human commensals

• *C. albicans, C. glabrata*, *C. krusei* (*resistant to azoles*)

• Not pathogenic until host defense mechanisms are compromised
  • Antibiotics, prosthetic devices, indwelling IV catheters, hyperalimentation fluids, chemotherapy, immunosuppressive agents, burn victims

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 258, 2879-2894.e3
Fungal Disease
Candidiasis

• Diagnosis: Gram stain, fungal stains and culture
• Treatment: topical/oral/IV; Azoles (fluconazole, voriconazole), echinocandins (caspofungin), polyenes (amphotericin, nystatin)
Fungal Disease
Cryptococcosis

- *Cryptococcus neoformans*, *C. gattii*
- Found in pigeon guano, rotting trees

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 264, 2934-2948.e6
Graphic/Image: 33,34
Fungal Disease

Pneumocystis

- *Pneumocystis jirovecii*
- Found in humans, causes pneumonia (“PCP”) in immunocompromised patients
- Inhalation of cyst form of the organism—often within the first 2 years of life
- Host: most commonly HIV/AIDS
- Diagnosis: microscopic demonstration of organisms in respiratory tract specimens, and PCR

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 271, 3016-3030.e4
Fungal Disease
Pneumocystis

- Treatment: IV or PO Bactrim (TMP-SMX) 15 mg/kg/day for 21 days
- Adjunctive therapy with Corticosteroids (prednisone) for moderate-to-severe PCP
  - PaO2 ≤70 mm Hg or alveolar-arterial O2 gradient >35 mm Hg
- Prevention: Bactrim (double or single-strength) 1-tablet PO daily
- Alternative agents: Pentamidine (IV/inhaled), Atovaquone, Dapsone

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 271, 3016-3030.e4
Fungal Disease
Pneumocystis

Image/Graphic: 35,36
Tuberculosis

- *Mycobacterium tuberculosis*

- Acid-fast bacillus; high cell wall content of lipids (fatty acids)

- Airborne droplet nuclei reach terminal alveoli and are ingested by alveolar macrophages, then carried to lymphatics

- Diagnosis: 3 sputum specimens increase sensitivity, PCR testing, solid and liquid media cultures; X-ray shows patchy infiltrate in lung apices, often with cavitation is highly suggestive
Mycobacterial disease
Tuberculosis—Active

Image/Graphic: 21,22
Tuberculosis

Image/Graphic: 23, 24
Mycobacterial disease
Tuberculosis

• Latent TB versus Active TB infection
  • Latent TB
    • Exposed to somebody with active pulmonary TB infection at some point in life
    • Screening test positive (skin test or QuantiFERON Gold)
    • Normal chest x-ray, asymptomatic (no cough, hemoptysis)
    • Immune system “controls” Mycobacteria; granulomas
  • Active TB
    • Mycobacterium tuberculosis “actively” dividing and infecting lung tissue
    • Infectious via airborne droplets
    • Cough, fever, chills, night sweats, weight loss, hemoptysis
    • Chest x-ray: Upper lobe infiltrate, +/- cavitation lesions
Question

55 y/o female undergoes annual TB skin testing. An 8-mm induration is recorded after 48 hours. She denies any symptoms/exposures. She works as a clerk in an internal medicine outpatient clinic in New York City. She takes no medications. Medical history and physical exam are unremarkable. Which of the following is the most appropriate management?

A. Chest radiography
B. Induce sputum for culture
C. Initiate INH for treatment of latent TB
D. Move patient to airborne isolation
E. No further testing or treatment
Question

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B. Induce sputum for culture
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D. Move patient to airborne isolation
E. No further testing or treatment
Mycobacterial disease
Tuberculosis—Latent

• TB skin-testing

• Skin-test—size of *induration* and risk factors
  • Positive:
    • ≥5mm: HIV, recent contact with person with TB, x-ray changes consistent with prior TB, organ transplant, immunosuppressed
    • ≥10mm: recent immigrant (<5 years), injection drug user, resident of high risk setting, mycobacterial lab personnel, children <4 years of age, infants/children exposed to adults in high-risk categories, persons with clinical conditions that place them at high risk (diabetes)
    • ≥15mm: no risk factors

http://www.cdc.gov/tb/publications/factsheets/testing/skintesting.htm
Mycobacterial disease
Tuberculosis—Active

• Acid-fast, aerobic bacillus; takes 3-8 weeks to grow on solid media, 1-3 weeks liquid media

• PCR with good sensitivity and specificity

• “Caseating granulomas”—incomplete necrosis produces cheesy, acellular material

• Infection due to inhalation of droplet nuclei

• Hospital—negative pressure isolation, N95 mask use

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 251, 2787-2818.e5
Mycobacterial disease
Tuberculosis-Treatment

• **Latent** TB infection
  • 9 months Isoniazid
  • +/- Vitamin B6 (pyridoxine) to prevent peripheral neuropathy due to Isoniazid

• **Active** TB infection
  • “RIPE”—Rifampin, Isoniazid, Pyrazinamide, Ethambutol
  • 6 months total (usually 2 months of all 4 drugs, then 4 months of 2 drugs-isoniazid & rifampin)
  • DOT—directly observed therapy
Bacterial Disease
Chlamydia

CHLAMYDIA BY STATE
Rate per 100,000 people

Source: CDC | ANITA RAHMAN / © LiveScience.com

Image/Graphics: 25, 26, 27
Bacterial Disease
Chlamydia

- *Chlamydia trachomatis*
- Ocular disease—leading infectious cause of blindness worldwide
- Genital infections—#1 bacterial STI in the world
  - 100 million new cases per year
  - Often asymptomatic
  - Women—involuntary infertility and ectopic pregnancy
  - Transmission during vaginal delivery can lead to neonatal conjunctivitis and pneumonia

Mandell, Douglas, and Bennett’s Principles and Practice of Infectious Diseases, 182, 2154-2170.e7
Bacterial Disease
Chlamydia

• Diagnosis—nucleic acid amplification tests of first-catch urine in men; vaginal swabs in women

• Treatment for urogenital infection
  - Azithromycin 1 gram PO single dose or Doxycycline 100 mg PO BID x 7 days
  - *Treatment of sex partners is crucial

• Prevention
  - Screening high-risk men/women, all women sexually active <25 years annually, all pregnant women

Mandell, Douglas, and Bennett’s Principles and Practice of Infectious Diseases, 182, 2154-2170.e7
Bacterial Disease
Gonococcal infections
Bacterial Disease
Gonococcal infections

• Gonorrhea is a sexually transmitted infection caused by *Neisseria gonorrhoeae*

• Often asymptomatic

• Cervicitis, urethritis, pelvic inflammatory disease

• Routine screening women <25 years, or older women with risk factors

• Nucleic acid amplification testing at all potentially infected anatomic sites

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 214, 2446-2462.e3
Bacterial Disease
Gonococcal infections

• Treatment
  • Ceftriaxone (IV/IM)
  • Also cover for Chlamydia--Azithromycin or Doxycycline
  • Sexual partners should be treated presumptively

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 214, 2446-2462.e3
Spirochetal disease
Syphilis

- *Treponema pallidum*
- Chronic, multistage sexually transmitted infection
- “The Great Imitator”
- Direct contact with a syphilis sore during vaginal, anal, or oral sex

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5
http://www.cdc.gov/std/syphilis/stdfact-syphilis.htm
Spirochetal disease
Syphilis

• Primary syphilis
  • Sore (chancre) is firm, round, painless ulcer, lasts 3-6 weeks, heals regardless of treatment

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5
Image/Graphic: 45,46
Spirochetal disease
Syphilis

- Secondary syphilis
  - Rash on palms of hands and soles of feet
  - Fever, sore throat, patchy hair loss, fatigue

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5
Image/Graphic: 47,48
Spirochetal disease
Syphilis

- Tertiary/Late syphilis
  - Can occur 10-30 years after infection
  - Paralysis, loss of coordination, blindness, damage to internal organs ("gummas")
Spirochetal disease
Syphilis

- Diagnosis: Darkfield microscopy and PCR of chancre
  - Serology: Treponemal & nontreponemal antibody tests.
  - Nontreponemal tests (RPR)-indicate disease activity
  - Treponemal tests (TP-PA) confirm reactivity of nontreponemal tests & remain active for life

- Treatment: IM benzathine Penicillin G 2.4 million units
  - Penicillin allergic pregnant females—should be desensitized

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 239, 2684-2709.e5
Question

32 y/o female who is sexually active with a new male partner & reports consistent condom use. PMHx significant for chlamydia cervicitis 5 years ago & treatment for syphilis 6 years ago. Physical exam unremarkable. A syphilis enzyme immunoassay is positive; RPR testing negative. A fluorescent treponemal antibody test is positive. Nuclear acid amplification testing is negative for GC/Chlamydia. HIV testing negative. Which of the following is the most appropriate management?

A. IM benzathine penicillin, Single Dose
B. IM benzathine penicillin, Weekly for 3 weeks
C. Repeat serology with *Treponema pallidum* particle agglutination assay
D. No further testing or treatment
Question

32 y/o female who is sexually active with a new male partner & reports consistent condom use. PMHx significant for chlamydia cervicitis 5 years ago & treatment for syphilis 6 years ago. Physical exam unremarkable. A syphilis enzyme immunoassay (treponemal test, EIA) is positive; RPR testing (Non-treponemal) negative. A fluorescent treponemal antibody test is positive (confirms EIA). Nuclear acid amplification testing is negative for GC/Chlamydia. HIV testing negative. Which of the following is the most appropriate management?

A. IM benzathine penicillin, Single Dose—If RPR was positive, then it would indicate a new infection, then treatment would be based on stage of disease

B. IM benzathine penicillin, Weekly for 3 weeks—same as A, but if no history of syphilis, then treat as syphilis of unknown duration

C. Repeat serology with Treponema pallidum particle agglutination assay—not needed as the fluorescent treponemal AB was positive—confirming the EIA.

D. No further testing or treatment
Bacterial Disease
Cholera

- *Vibrio cholerae*—curved Gram-negative rod
- Acute, severe watery diarrhea ("rice-water with fishy odor")
- Cholera toxin on intestinal epithelial cells
- Fecal-oral transmission—brackish water, inadequate sanitation
- Current pandemic
  - Haiti following earthquake 2010
Bacterial Disease
Cholera

- Treatment—IV fluids, electrolyte repletion
  - Antibiotics secondary—Azithromycin or Ciprofloxacin
- Prevention—oral vaccination, adequate sanitation and safe water

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 216, 2471-2479.e2; Image: 29
Fungal Disease
Cryptococcosis

- Majority of infections are asymptomatic in exposed populations
- Risk factors for disease: AIDS, corticosteroid use, organ transplantation, cancer, monoclonal antibody use
- Major sites of infection are CNS and lung
- Diagnosis: India ink staining of CNS/tissue, Cryptococcal antigen on serum and CSF is sensitive and specific
- Treatment: IV Amphotericin + Flucytosine

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 264, 2934-2948.e6
Spirochetal disease
Lyme Disease

- *Borrelia burgdorferi*
- Multisystem illness—skin, joints, nervous system, heart
- Tick-borne infection—Ixodes tick

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 243, 2725-2735.e2
Image/Graphic: 38,39
Erythema migrans
Spirochetal disease
Lyme Disease

• Diagnosis: clinical features, and positive IgG serology testing (ELISA & Western Blot testing)

• Treatment
  • Early infection: PO Doxycycline x 21 days; Pregnancy—PO Amoxicillin x 21 days
  • CNS/Heart/Joint involvement: IV Ceftriaxone for 28 days

• Prevention: Avoid ticks, tick checks after exposure in endemic areas

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 243, 2725-2735.e2
Spirochetal disease
Rocky Mountain spotted fever (RMSF)

• *Rickettsia rickettsii*

• Tick-borne—*Dermacentor* tick

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 188, 2198-2205.e4
Image/Graphic: 41,42
Spirochetal disease
Rocky Mountain spotted fever

• Fever, headache, myalgias, abdominal pain

• Rash—starts on wrists & ankles, then spreads proximally

• Complications—skin necrosis, neurologic, pulmonary edema, acute respiratory distress

• Fatality rate
  • 23% without treatment
  • 4% with treatment
Spirochetal disease
Rocky Mountain spotted fever

Image/Graphic: 43,44
Spirochetal disease
Rocky Mountain spotted fever

- Diagnosis: IgG serology testing—fourfold rise in titer confirms diagnosis; PCR in blood, skin biopsy
- Treatment: PO Doxycycline x 7-10 days

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 188, 2198-2205.e4
Viral disease
HIV

- Human Immunodeficiency Virus—infects CD4 T-cells
- Causes Acquired Immunodeficiency Syndrome (AIDS)
- Transmitted via sex & injection drug use
- Uses a reverse transcriptase to turn RNA $\rightarrow$ DNA and integrate into the genome
- Diagnosis: HIV serology screening, confirmation with Western blot, and detection of viral RNA (viral load)

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3
Viral disease

HIV

• Treatment: Antiretroviral therapy (ART)
  • Combination of 3 Active Drugs
    • 2 nucleoside reverse-transcriptase inhibitors PLUS
    • 1 protease inhibitor or integrase inhibitors, or non-nucleoside reverse-transcriptase inhibitors, or entry inhibitors

• Decreases viral load, resulting in increased CD4 levels

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3
Viral disease
HIV

- Drugs to know:
  - Efavirenz—do not use in pregnant women, or history of psychiatric disorder
  - Tenofovir—increases risk of kidney injury and osteoporosis
  - Abacavir—increases risk of myocardial infarction

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3
Viral disease
HIV

• Opportunistic infections
  • Depends on CD4 levels
  • CD4 < 200—Pneumocystis pneumonia
    • Prophylaxis with daily Bactrim
  • CD4 < 100—Toxoplasmosis
    • Prophylaxis with daily Bactrim
  • CD4 < 50—MAC (mycobacterium avium complex)
    • Prophylaxis with weekly Azithromycin

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 171, 2054-2065.e3
Question

27 y/o male is evaluated for a routine health maintenance visit. He asks about reducing his risk for HIV infection because he has sex with men, has multiple partners, and sometimes uses condoms. He takes no meds. Normal exam. Labs show normal serum creatinine, serum RPR negative, negative GC/Chlamydia from urine, pharynx, and rectum, and negative HIV testing. Which of the following is the most appropriate preventive measure?

A. Reinforce consistent condom use and avoid antiretroviral therapy
B. Tenofovir and emtricitabine single dose before each sexual encounter
C. Tenofovir and emtricitabine single dose after each sexual encounter
D. Tenofovir disoproxil fumarate and emtricitabine daily
Question

27 y/o male is evaluated for a routine health maintenance visit. He asks about reducing his risk for HIV infection because he has sex with men, has multiple partners, and sometimes uses condoms. He takes no meds. Normal exam. Labs show normal serum creatinine, serum RPR negative, negative GC/Chlamydia from urine, pharynx, and rectum, and negative HIV testing. Which of the following is the most appropriate preventive measure?

A. Reinforce consistent condom use and avoid antiretroviral therapy—PrEP & barrier protection is now the standard of prevention for MSM at risk for HIV infection

B. Tenofovir and emtricitabine single dose before each sexual encounter—lower effectiveness and possible selection for resistance

C. Tenofovir and emtricitabine single dose after each sexual encounter—lower effectiveness and possible selection for resistance

D. Tenofovir disoproxil fumarate and emtricitabine daily—more than 90% effective if taken consistently in preventing HIV
Parasitic disease
Malaria

• Transmission via bite from *Anopheles* mosquito

• *Plasmodium falciparum, P. vivax, P. ovale, P. malariae, P. knowlesi*

• History of travel and exposure to malaria-endemic area (Africa, South America, Asia)

• Fever, headaches, body aches, malaise

• Severe malaria—convulsions, hyperparasitemia, severe anemia, hypoglycemia, jaundice, shock, vomiting, high fevers

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 276, 3070-3090.e9
Parasitic disease
Malaria

Malaria Endemic Countries

No malaria
Malaria risk

Note: This map shows countries with endemic malaria. In most of these countries, the malaria risk is limited to certain areas.
Parasitic disease
Malaria

- Diagnosis: Thick and thin blood smears (x3)
- Treatment: Depends on disease severity, drug-resistance, age, pregnancy status
  - Uncomplicated: Chloroquine if sensitive (Mexico, Carribbean); if resistant, then Atovaquone, mefloquine, quinone plus doxycycline
    - *P. vivax, P. ovale*—give Primaquine to prevent relapsing malaria
  - Severe: IV Quinidine, Artensunate (only from CDC)
- Prevention: Doxycycline or Atovaquone; mosquito repellants/nets, avoidance measures

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, Updated Edition, 276, 3070-3090.e9
Parasitic disease

Malaria

- **Diagnosis:** Thick and thin blood smears (x3)
- **Treatment:** Depends on disease severity, drug-resistance, age, pregnancy status
  - Uncomplicated: Chloroquine if sensitive (Mexico, Caribbean); if resistant, then Atovaquone, mefloquine, quinone plus doxycycline
    - *P. vivax, P. ovale*—give Primaquine to prevent relapsing malaria
  - Severe: IV Quinidine, Artensunate (only from CDC)
- **Prevention:** Doxycycline or Atovaquone; mosquito repellants/nets, avoidance measures

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Questions & Discussion