SECTION 2: INFECTIOUS DISEASE
CHAPTER 10: RESPIRATORY INFECTIONS

Q.1. A 21-year-old woman presents with malaise, fever, and sore throat of four days’ duration. On physical examination, she is febrile (T 38.3° C), and bilateral exudates are noted in her pharynx. Anterior and posterior cervical adenopathy is noted. There is no nuchal rigidity. Lungs are clear and cardiac examination is normal. On examination of the abdomen, mild splenomegaly is noted. Laboratory examination shows transaminases to be two times the upper limit of normal. A complete blood count shows a normal hematocrit and platelet count; her lymphocyte count is mildly elevated with a predominance of atypical lymphocytes. The most likely cause of this patient’s clinical presentation is

A. Group A β-hemolytic streptococcus
B. Group D streptococcus
C. Acute retroviral syndrome
D. Epstein-Barr (EBV) infection
E. Lymphoma

Answer: D. This patient demonstrates the classic presentation of mononucleosis, due to infection with EBV. Patients with EBV commonly develop malaise, fevers, exudative pharyngitis, and lymphadenopathy. Additional findings may include splenomegaly, a mild elevation of transaminases, and a predominance of atypical lymphocytes. Bacterial infection would be unlikely to explain all the findings in this patient. Acute HIV infection, which may result in the acute retroviral syndrome, is not associated with exudative pharyngitis or splenomegaly. However, acute HIV infection should always be considered in a patient who presents with a viral syndrome. Lymphoma is much less common than EBV infection, and although it could explain much of this patient’s presentation, it would not be the most likely explanation for her presentation.

Q.2. A 61-year-old male with COPD presents with worsening dyspnea, increased sputum production, and fevers. The most common bacterial cause of acute exacerbations of chronic bronchitis is
A. *Moraxella catarrhalis*

B. *Hemophilus influenzae*

C. *Pseudomonas aeruginosa*

D. *Staphylococcus aureus*

E. *Klebsiella pneumoniae*

**Answer: B.** Acute exacerbation of chronic bronchitis (AECB) is a common cause of morbidity and mortality in patients with COPD. AECB is usually precipitated by infection (viral or bacterial), but pulmonary embolus should be considered in the appropriate setting. The most common bacterial cause of AECB is *Hemophilus influenzae*, followed by *Moraxella catarrhalis* and *S. pneumoniae*. Gram-negative organisms are less common; *Pseudomonas* infection is more likely in patients who have recently been hospitalized, and in patients with frequent flares of symptoms.

Q.3. Which one of the following statements about treatment for influenza is true?

A. Amantadine is effective for treatment of influenza B, but not for influenza A.

B. Zanamivir works by preventing neuraminidase activity of influenza A, but is ineffective for treatment of influenza B.

C. Amantadine, zanamivir, and oseltamivir may be used to prevent influenza in an individual who has not been immunized.

D. Treatment for influenza with amantadine or neuraminidase inhibitors is only useful if initiated within one week of onset of symptoms.

E. All of the above are true.

**Answer: C.** There are two classes of medications used for the treatment of influenza: ion channel blockers (amantadine, rimantadine) and neuraminidase inhibitors (oseltamivir, zanamivir). Ion-channel blockers are only effective against influenza A infection, while neuraminidase inhibitors are effective against both influenza A and B. Treatment with any of these agents must be initiated within the first 48 hours of symptoms to impact clinical outcomes. All of these agents may be used to prevent influenza infection in the patient who has not been immunized, although ion-channel blockers will only prevent infection with influenza A.
Q.4. A 24-year-old man calls the office to report bilateral maxillary sinus congestion, pain, and discharge that initially was clear, but now is disturbingly yellow-green six days into the illness. He states that this condition feels exactly like the sinusitis he had several years ago, which responded well to an antibiotic. He feels feverish and achy with mild headache. He feels no better, but not clearly worse off than when the discharge was clear. Which of the following is correct based on current guidelines?

A. Amoxicillin is suggested for 10 days since no other antibiotic has been shown to be superior for uncomplicated acute bacterial sinusitis (ABS)

B. The greenish tinge to the purulent discharge may suggest a gram-negative organism such as *Pseudomonas aeruginosa*.

C. Continued observation is suggested because this is likely viral and will resolve without antimicrobial treatment

D. Arrange for a CT scan of the sinuses to prove whether an air-fluid level exists in a sinus.

E. Arrange for otolaryngology consultation

**Answer: C.** Since the symptoms have existed for only six days and are not clearly worsening, the symptom complex is likely virally based and will resolve with only symptomatic care. Most mild ABS is self-limiting. If symptoms persist beyond 10 days or are worsening after 5 to 7 days then antimicrobial treatment may be considered for ABS. The character of the discharge had no bearing, since viral or bacterial infections can produce such purulence. Radioimaging is not recommended as part of the evaluation of initial, uncomplicated ABS. Currently, ABS remains a clinical diagnosis for in which laboratory or radiological testing plays a small role. Specialty consultation may be useful in cases refractory to standard therapy in order to aspirate sinuses for culture.

Q.5. A 34-year-old woman has missed two days of work because of an illness characterized by purulent cough, tactile fever, and myalgia. Symptoms began four days ago and she is now requesting an antibiotic. She has no significant past medical history and she is a nonsmoker. In the office, she has a temperature of 38.8°C, pulse rate of 100, blood pressure of 110/70 mm Hg, and unlabored respirations. Light expiratory wheezing is heard diffusely on exam of the lung without evidence of percussed dullness or auscultory egophony. Which following statement is false?
A. Doxycycline is a preferred agent for treatment of otherwise healthy patients under 40 with community acquired pneumonia

B. Albuterol inhaler therapy reduces cough of acute bronchitis most effectively

C. This patient most likely has a diagnosis of new onset asthma

D. A chest radiograph should be ordered to exclude pneumonia

**Answer: C.** Because abnormal vitals signs are present, a chest x-ray should be ordered to exclude pneumonia. If the radiograph indicates an infiltrate, doxycycline or a macrolide antibiotic is a preferred agent to treat otherwise healthy young adults because of the prevalence of atypical agents such as *M. pneumoniae* and *C. pneumoniae*. Even in the absence of wheezing, albuterol treatments have been most effective at reducing the severity and duration of cough due to acute bronchitis. Virally induced bronchospasm is more common than the diagnosis of new-onset asthma, and although some patients tend toward more bronchospasm than others, it is a generally self-limited problem.

**Q.6.** A 68-year active smoker with long-standing chronic obstructive pulmonary disease and five admissions to the hospital in the past two years is admitted to the intensive care unit because of respiratory failure. He had complained of worsening respiratory symptoms and cough for one week but claimed to experience no fevers. Admission chest radiograph shows new infiltrates in left upper and right lower lobes. Purulent sputum is obtained immediately following intubation that shows greater than 25 PMN's/hpf and small gram-negative bacilli. Which of the following statements regarding treatment is true?

A. Antibiotic selection should include coverage for *Pseudomonas aeruginosa*

B. The lack of fevers suggests that aspiration pneumonia is highly likely

C. Legionella rarely affects patients with COPD, and therapy with a cephalosporins drug such as cefotaxime or ceftazidime should be sufficient

D. Bronchoscopy should be ordered to rule out an obstruction because of this patient’s smoking history

E. *Streptococcus pneumoniae* is the most likely cause of pneumonia in this patient

**Answer: A.** Patients admitted to the intensive care unit should have antibiotic coverage covering resistant pathogens such as *P. aeruginosa*, especially if they have
structural lung disease (COPD) and have had recent prior courses of antibiotics. Though bilobar pneumonia increases the likelihood of the pneumococcus, the gram stain suggests otherwise. Bronchoscopy is normally not required for initial diagnosis in the nonimmunocompromised patient. Persisting infiltrates beyond six weeks or recurrence of pneumonia in the same lobe in a smoker should prompt consideration of an obstruction.

**Q.7.** A 53-year-old male complains of worsening productive cough. He is a long-time smoker, and admits to a daily “smoker’s cough,” especially in the morning, which is productive of thick tan sputum. Four days ago his cough increased, sputum darkened to a greenish color, and baseline dyspnea worsened. Past medical history is otherwise unremarkable. On physical examination, vital signs are normal, except for a low-grade fever (T 38.1° C). There is no evidence of consolidation on chest examination, and the cardiac examination is normal. Appropriate management at this point would be

A. Reassurance; prescribe an antitussive

B. Outpatient treatment with bronchodilators and nicotine patch

C. Outpatient treatment with penicillin

D. Outpatient treatment with azithromycin

E. Hospitalization; treatment with anti-pseudomonal penicillin

**Answer: D.** This patient has chronic bronchitis, as evidenced by his daily “smoker’s cough.” However, there are no other risk factors for more serious lung disease evident on examination. Most likely causative agents of his worsening cough, sputum, and dyspnea include *H. influenzae*, other *Haemophilus* species, *M. catarrhalis*, and *S. pneumoniae*. Appropriate first-line treatment would include a second generation macrolide (e.g., azithromycin, as in answer D), amoxicillin, doxycycline, TMP/SMX, or a second- or third-generation cephalosporin. Hospitalization is not indicated.
Q.1. A 45-year-old man presents to the emergency department with low-grade fever, malaise, and arthralgias. He reports that six weeks before evaluation he had anonymous, receptive, unprotected sexual intercourse with a male sex worker. His physical examination is remarkable for a maculopapular rash involving his entire body, including the palms and soles, and enlargement of the epitrochlear lymph nodes. The diagnosis can be established with which of the following tests?

A. HIV Western blot antibody test
B. Tzanck smear
C. Gram stain
D. Fluorescent treponemal antibody absorption test
E. Ligase chain reaction

Answer: D. The man has developed the constitutional symptoms, rash, and lymphadenopathy associated with secondary syphilis. Two types of serologic tests are used for presumptive diagnosis. The nontreponemal tests include rapid plasma reagin (RPR) and venereal disease research laboratory (VDRL) tests. The nontreponemal tests are used as screening tests, but because of low specificity, must be confirmed by treponemal tests. These include the fluorescent treponemal antibody absorbed (FTA-ABS) and *T. pallidum* particle agglutination (TP-PA) tests. Because of his history of anonymous unprotected sex, he should also be screened for HIV infection.

Q.2. Which of the following statements regarding herpes simplex virus infection is true?

A. Primary genital herpes lesions begin as macules and papules followed by vesicles and ulcers
B. Treatment with acyclovir, valacyclovir, or famciclovir eradicates the virus
C. Clinical diagnosis can be confirmed only by viral isolation in cell culture
D. Because common sites of infection are skin and mucous membranes, HSV infection is seldom undiagnosed
E. Asymptomatic shedding does not occur in seropositive individuals

**Answer: A.** Primary herpes presents with painful macules and papules that evolve into vesicles and ulcers. Treatment does not eradicate the virus. Clinical diagnosis can be confirmed by viral isolation in cell culture, detection of viral antigen, polymerase chain reaction, and serology. Subclinical disease is common and infection is often undiagnosed. Asymptomatic shedding occurs in 1% to 2% of seropositive individuals by culture and up to 10% by PCR.

**Q.3.** A 26-year-old woman presents to the outpatient clinic with purulent vaginal discharge. Her past medical history is significant for an allergy to penicillin, which causes hives. She has recently become sexually active with a new partner. On physical examination, she is afebrile. She does not have abdominal pain, adnexal pain, or cervical motion tenderness, but there is purulent discharge at the cervical os. Gram stain reveals gram-negative intracellular diplococci. Appropriate treatment includes

A. Treatment with cefixime 400 mg PO and azithromycin 1 g PO once
B. Treatment with ceftriaxone 125 g IM and azithromycin 1 g PO once
C. Treatment with azithromycin 1 g PO once
D. Treatment with ciprofloxacin 500 mg PO and azithromycin 1 g PO once

**Answer: D.** The woman has cervicitis because of a gonorrheal infection. Because she develops hives from penicillin, she cannot be treated with cefixime or ceftriaxone. Ciprofloxacin is an appropriate alternative and should be combined with azithromycin to treat possible concurrent chlamydia infection. Azithromycin dosed at 1 g will not treat gonococcal infection, and the 2-g dose often causes nausea and vomiting. Appropriate therapy will reduce the risk of pelvic inflammatory disease and subsequent infertility.

**Q.4.** What symptoms do the majority of women infected with *Chlamydia trachomatis* experience?

A. Vaginal discharge
B. No symptoms
C. Genital warts

D. Fitz-Hugh-Curtis syndrome

E. Dysuria-pyuria syndrome

**Answer: B.** The majority of women with *C. trachomatis* infection are asymptomatic. Cervicitis may present with vaginal discharge and lower abdominal pain. Symptoms of urethritis include urinary frequency and dysuria. Fitz-Hugh-Curtis syndrome is inflammation of the liver capsule and adjacent peritoneal surfaces seen in pelvic inflammatory disease. Human papillomavirus is the etiologic agent of genital warts.

**Q.5.** A 25-year-old woman presents to her primary medical provider with fever, headache, myalgias, and dysuria. She has been sexually active with a single partner who has never been diagnosed with sexually transmitted infection. She is diagnosed with primary genital herpes confirmed by isolation of HSV-2 virus in cell culture. Which of the following statements is false?

A. Most people infected with HSV-2 have not been diagnosed

B. Treatment eradicates the herpes simplex virus

C. Testing for HIV infection should be considered

D. Both HSV-1 and HSV-2 cause genital infections

E. Recurrence is less frequent with HSV-1 compared to HSV-2

**Answer: B.** Asymptomatic herpes simplex virus infection is common. First-episode primary genital infection may be caused by HSV-1 or HSV-2. Recurrence rates with HSV-1 and HSV-2 are 55% and 90%, respectively. Treatment does not eradicate the virus. HIV testing should be considered in all patients presenting with a sexually transmitted disease.

**Q.6.** A 65-year-old man with past medical history of HIV infection (HIV viral load <50 copies/mL and CD4 cell count of 430 cells/mm²) and prostatic adenocarcinoma status post radium seed implantation presents with two days of penile discharge and dysuria without fever. In addition to urinalysis and urine culture, initial diagnostic testing should include which of the following?
A. CT scan of abdomen and pelvis
B. Urine for nucleic acid amplification for gonococcus and chlamydia
C. Repeat HIV viral load and CD4 cell count
D. Post-void residual urine
E. Fluorescent treponemal antibody absorbed (FTA-ABS) test

**Answer: B.** The man has urethritis with dysuria and mucopurulent discharge. He was diagnosed with Chlamydia trachomatis by nucleic acid amplification test. Treatment included azithromycin 1 g PO once. Serologic testing with rapid plasma reagin (RPR) is appropriate and would preceed the treponemal FTA-ABS test.

Q.7. A 21-year-old man presents with a painless papule on his lip. Physical examination reveals painless cervical lymphadenopathy. The most likely diagnosis is

A. Herpes simplex virus, subtype 1
B. Gonorrhea (*Neisseria gonorrhoeae*)
C. Syphilis (*Treponema pallidum*)
D. Chancroid (*Haemophilus ducreyi*)
E. HIV infection

**Answer: C.** Primary syphilis typically begins as a painless papule (chancre) at the site of inoculation accompanied by rubbery, painless, and bilateral lymphadenopathy. HSV and chancroid cause ulcerative lesions accompanied by tender lymphadenopathy. Gonococcus causes a submucosal inflammation with purulent discharge. Signs and symptoms of primary HIV infection include fever (96%), adenopathy (74%), rash (70%), and erythematous pharyngitis (70%).

Q.8. Which of the following statements regarding genital warts and human papilloma virus (HPV) is false?

A. Large exophytic lesions may result in obstruction of the urethra
B. HPV types 16 and 18 are associated with cervical neoplasia
C. Symptoms may include bleeding and pain
D. Ulcerative lesions are a hallmark of HPV infection

E. HPV is the most common viral sexually transmitted infection in the United States

Answer: D. HPV presents as exophytic verrucous white or pigmented lesions, whereas herpes simplex virus (HSV) lesions begin as macules and papules and progress to vesicles and ulcers.

Q.9. A 24-year-old heterosexual man with no prior history of sexually transmitted disease has been informed that a recent sexual partner has been diagnosed with gonorrhea. He is asymptomatic. On examination, there are no penile lesions or urethral discharge. A urethral swab is negative for gonorrhea or chlamydia. Urinalysis shows 0 to 1 WBC per high power field. An RPR and FTA performed on the same visit are both positive with an RPR titer of 1:32. Appropriate treatment includes

A. Benzathine penicillin 2.4 million units, single dose

B. Benzathine penicillin 2.4 million units, three doses one week apart

C. Benzathine penicillin 2.4 million units, three doses one week apart plus ciprofloxacin 500 mg, single dose and azithromycin 1 gm single dose

D. Doxycycline 100 mg a day for seven days

Answer: C. Current guidelines recommend treatment of sexual partners of the last 60 days or the last sexual partner of patients with gonorrhea or chlamydia. Despite his recent exposure to gonorrhea, there is no way of knowing when he was infected with syphilis. He therefore falls into the late latent category for treatment purposes and should receive three doses of 2.4 million units of benzathine penicillin.

Q.10. An 18-year-old woman presents with right knee pain that began four days ago. Her right ankle had hurt previously and she thinks she hurt the knee by favoring the ankle. She also notes some soreness in her left wrist when she lifts her infant. She does not use injection drugs. She has not been camping, but does report two bug bites on her palms. On examination she has pain over the radial aspect of the left wrist along the tendon sheath and has two small erythematous pustules on her left palm. Her right knee is painful on range of motion, but has no erythema,
warmth, or tenderness. Arthrocentesis reveals a WBC count of 1000. No organisms are identified on Gram stain. Which of the following is appropriate?

A. Begin ceftriaxone and doxycycline
B. Treat based on culture of the joint fluid
C. Perform interarticular injection of a corticosteroid
D. Perform serial aspiration of the affected joint

**Answer: A.** Disseminated gonococcal infection (DGI) typically presents as a triad of tenosynovitis, dermatitis, and migratory polyarthritis, or as a monoarticular septic arthritis. This patient has a left-wrist synovitis, acral lesions consistent with the pustular or vesicular lesions seen in DGI, and polyarthralgia. Urogenital symptoms are present in only 25% of patients presenting with DGI. In patients with polyarthralgia joint fluid is sterile, and even with septic arthritis, gonococcus is cultured from less than 50% of patients. Patients should be treated with a third generation cephalosporin and doxycycline for concomitant chlamydia.

**CHAPTER 12: HIV INFECTION**

**Q.1.** A 34-year-old woman with HIV and a CD4 count of 60/mm³ presents with fever, diplopia, and difficulty speaking for the past four days. Most recent labs, drawn four months ago, document the following: reactive RPR (1:1 titer) with nonreactive FTA, reactive CMV IgG, nonreactive toxoplasma IgG, and reactive VZV IgG. A brain CT is obtained in the emergency room and shows three low-density lesions in the left and right parietal cortex and in the posterior fossa. They are ring-enhancing with contrast infusion. Which of the following processes is most likely?

A. CMV encephalitis
B. Toxoplasmosis
C. Cryptococcosis
D. CNS gumma
E. VZV encephalitis
F. Progressive multifocal leukoencephalopathy (PML)
**Answer:** B. The panel of serologic results presented is commonly available in patients receiving HIV clinical care. The results of these tests are often useful in two situations: (1) predicting the complications of AIDS for which a patient might be at risk, and (2) in developing a differential diagnosis for a presenting complaint. However, they are not very useful here. The syphilis serologic results are compatible with a “biologic false positive” reaction (reactive nontreponemal test, nonreactive treponemal test), making active syphilis infection unlikely. The patient has had exposure to both cytomegalovirus (CMV) and to varicella zoster virus (VZV) in the past and therefore harbors latent viruses that may cause clinical disease at this stage of immunocompromise. Mass CNS lesions are not characteristic of either of these pathogens. Cryptococcus usually presents with a meningitis picture and uncommonly has a mass lesion. PML may cause multiple focal lesions, although ring enhancement with contrast infusion, such as that seen in the scan provided here, is not characteristic. Toxoplasmosis is a common complication of AIDS when the CD4 cell count declines to less than 100/mm³, and it does cause focal neurological lesions that often are often ring-enhancing on either CT or on MRI imaging. Though serology is usually reactive in AIDS patients presenting with proven CNS toxoplasmosis, it can be negative in up to 15% of cases. CNS toxoplasmosis is the most likely diagnosis with this presentation.

**Q.2.** A 28-year-old previously healthy man presents to the emergency department with complaints of fever, nonproductive cough, and progressive fatigue for three weeks. He has additionally noted a 15 pound weight loss over the past three months. On examination, his temperature is 38.8 °C, pulse 124/min, respirations 28/min, and blood pressure 110/78. He has scant thrush in the oropharynx, but his chest is clear to auscultation and percussion and he has no other examination findings. Laboratory testing showed WBC of 3.2K (with 83% polys, 6% bands, 5% lymphs, 3% eosinophils, 3% basophils); hematocrit of 31%; arterial blood gas (room air) with pH 7.51; pO₂ 29 mm Hg; and pCO₂ 62 mm Hg. A CXR shows bilateral interstitial infiltrates throughout all lung fields. Which of the following should therapy include?

A. Amphotericin B
B. Trimethoprim-sulfamethoxazole
C. Penicillin
D. Trimethoprim-sulfamethoxazole and prednisone
E. Isoniazid/rifampin

Answer: D. The case described is a classic presentation for *Pneumocystis carinii* pneumonia (PCP). Answer D represents the optimum therapy for a patient presenting with presumptive PCP and this severity of respiratory compromise. Though PCP is easily preventable with chemoprophylaxis in patients engaged in regular care, PCP may present as the first indicator of HIV infection in those whose HIV infection remains undiagnosed. Because heterosexual transmission has accounted for an ever-increasing proportion of AIDS cases since AIDS was first described, it is important to think of it as a possibility even when there are no traditional risk factors (e.g., injection drug use, male same-sex contact, or blood product exposure). A subacute or indolent course of fevers, dry cough, and fatigue, along with interstitial infiltrates on CXR, is typical. In this case, the finding of thrush on examination provided an additional clue that immunocompromise was present. Trimethoprim-sulfamethoxazole is considered first-line therapy for PCP. The use of adjunctive corticosteroids is associated with decreased mortality when the A-a gradient is greater than 35 or when the presenting pO₂ is less than 70 mm Hg.

Q.3. A 26-year-old female recently treated for gonorrhea and chlamydia and with a history of occasional crack cocaine use presents with one week of fevers, muscle aches, loose stools, and a sore throat. She recently took in a stray cat and removed a tick from her trunk three days before onset of her symptoms. She is sexually active with one male partner. On physical examination, she had a temperature of 39.3 °C and a faint macular rash on her trunk. Mucosal ulcerations are visible in her posterior oropharynx along with pharyngeal erythema. She has pea-sized, anterior cervical lymph nodes but no additional findings. Laboratory tests reveal WBC 4800, hematocrit 39%, AST 78 U/L, ALT 67 U/L, normal chest x-ray, negative Monospot, and nonreactive HIV serology. What is the most likely infectious cause of her symptoms?

A. Gram-negative diplococci
B. DNA virus
C. RNA virus
D. Gram-negative bacillus
E. Gram-positive coccus
**Answer: C.** The patient presents with a mononucleosis-like illness but with a negative screening test for heterophile antibodies, making infectious mononucleosis (caused by EBV, a DNA virus) unlikely. Given her recent history of treatment for sexually transmitted infections and her inhaled cocaine use, she has an increased likelihood of being linked to a high-risk sexual network and acquiring other STDs including HIV. There are no skin lesions described that would be characteristic of disseminated gonococcal infection or of meningococcal infection (both gram-negative diplococci). This presentation is most compatible with the acute retroviral syndrome (ARS) caused by HIV, an RNA retrovirus. Aphthous ulcerations have been reported with this syndrome, and although they are not specific for ARS, the other possibilities listed for this answer would not be expected to present with that clinical feature.

**Q.4.** A 27-year-old male HIV-positive construction worker presents to your office for his first appointment. His CD4 is 140/mm³. He has been asymptomatic. He is married with two young children. He lives in a rural area but travels at times for his construction work. He has not had any regular medical care and does not believe he received any vaccinations as a child. Which vaccine should not be given?

A. Tetanus-diphtheria

B. Hepatitis A

C. MMR (measles, mumps, rubella)

D. Pneumovax

E. Influenza

**Answer: C.** The MMR vaccination is a live vaccine. Because of potential for disseminated infection, live vaccines are generally not recommended for patients with advanced or symptomatic HIV disease. They may be considered in patients with high CD4 counts who are at increased risk—for example, a health care worker who has never had an MMR vaccine in the past. Each of the other vaccines do not contain live virus, and all are appropriate and recommended for this patient.

**Q.5.** A 32-year-old woman is seen in the HIV clinic. She appears cachectic and has oral thrush. She has never received any regular medical care and has never had a
A gynecologic exam or a Pap smear. She does not describe any abnormal vaginal bleeding or pelvic pain. How frequently should she have a Pap smear performed?

A. Now and in six months, then annually if the first two are normal
B. Every six months
C. At least once every three years if the first is normal
D. Only if she develops symptoms
E. Annually, if she is monogamous

**Answer: A.** Because Pap smears have a relatively low sensitivity (~50%) and because cervical dysplasia can have an accelerated progression in HIV patients, a Pap smear is recommended around the time of initial diagnosis and six months later. If these are normal, most gynecologists recommend that the woman can then be followed with annual Pap smears.

**Q.6.** A 43-year-old man presents for HIV management. He has been on a regimen of zidovudine, epivir, and nevirapine. Because of increased liver enzymes on nevirapine, his regimen was changed to zidovudine, epivir, and efavirenz. Indications for a screening lipid profile include

A. At the initial visit
B. Six months after changing therapy
C. Only when starting a protease inhibitor
D. Only if other cardiac risk factors are present
E. A and B are both correct
F. C and D are both correct

**Answer: E.** HIV and the antiretroviral medications used to treat it may alter patients’ lipid profiles. LDL cholesterol increases an average of 30 mg/dL with protease-inhibitor-based ART, and triglycerides may increase dramatically with both protease-inhibitor-based ART and with efavirenz. Increased LDL cholesterol and triglycerides increase the risk of coronary artery disease and may partially explain the increased risk of cardiac death seen in patients with HIV. Experts recommend checking a fasting lipid profile at baseline (before initiating or changing antiretroviral
therapy), three to six months afterwards, and then annually if the levels meet target cholesterol goals.

Q.7. A 31-year-old woman presents for her first clinic visit. She was diagnosed with HIV six months ago when she was evaluated for weight loss. She has had no opportunistic infections. Her CD4 is 190. Her main symptoms are weight loss, poor appetite, irritability, and feelings of suicide since receiving her diagnosis. Her husband died of an undiagnosed illness two years ago. She recalls that he also lost weight. She is currently caring for their three children. Her exam is unremarkable, but she is intermittently tearful. Which of the following factors are most likely to negatively affect her adherence to antiretroviral therapy?

A. Low educational attainment

B. Possible depression

C. History of intravenous drug use

D. Dependent children

E. Low-income level

Answer: B. This patient is reporting several depressive signs and symptoms and should be screened for depression. Depression is associated with lower rates of access to the health care system, as well as decreased rates of adherence and increased rates of HIV-associated death. Other factors that influence adherence include a poor social network, low self-efficacy ratings, and active substance abuse.

Q.8. A 41-year-old man with HIV and an unknown CD4 count presents to reinitiate HIV primary care. He complains of difficulty swallowing for the past two weeks, characterized as a feeling of food sticking in his subxyphoid region. His examination is notable for the presence of white plaques on his buccal mucosa and in his posterior oropharynx, but the rest of his examination is unremarkable. The best management strategy is

A. Obtain an exercise stress test

B. Obtain a chest CT

C. Prescribe clotrimazole troches for 10 days.
D. Perform upper endoscopy to rule out CMV or HSV esophagitis.

E. Prescribe fluconazole for 7 to 10 days

**Answer: E.** The patient’s presentation (feeling of difficulty swallowing without clear pain) is classic for esophageal candidiasis, which very commonly occurs when the CD4 cell count falls below 250/mm³. Often patients will have oral thrush (white pseudomembranous plaques evident in the oral cavity), but this physical sign might not be present. Although topical agents (such as clotrimazole troches) are effective for the treatment of oral thrush, a systemic antifungal, such as fluconazole, is required for successful therapy for esophageal candidiasis. Endoscopy for direct visualization and biopsy of the esophageal mucosa would be the next reasonable management strategy if presumptive therapy for esophageal candidiasis should be unsuccessful.

**Q.9.** A 25-year-old man with HIV infection presents with complaints of tingling and numbness in his toes bilaterally which, over several weeks, have progressed to involve the soles of both feet. He now also has complaints of burning pain in the same area. He was initiated on his first antiretroviral regimen with stavudine, epivir, and efavirenz eight months ago, when his CD4 cell count was 190/mm³ and his HIV-RNA (viral load) was measured at 112,000 copies/mL. His current CD4 cell count is 324/mm³ and his viral load is less than 40 copies/mL. His physical examination reveals present, though diminished, reflexes at the ankles bilaterally. There are also hyperalgesia on sensory testing of the soles of his feet. Which of the following would be an appropriate management step?

A. Substitute zidovudine for stavudine

B. Substitute didanosine for stavudine

C. Discontinue stavudine

D. Discontinue epivir

E. Continue antiretroviral therapy and initiate ibuprofen therapy

**Answer: A.** The patient presents with progressive lower extremity neuropathy symptoms, which are a common toxicity associated with stavudine (d4T). Though NSAIDs might offer symptomatic improvement, this type of toxic sensory neuropathy progresses to an irreversible stage and continuation of the offending agent is not a
good option, particularly in a patient who had so little exposure to other antiretroviral agents and is likely to have a good result with appropriate substitution. Didanosine (ddI) also causes neuropathy as an adverse event, so a substitution with that agent would be harmful. Epivir (3TC) is not reported to cause this toxicity, so there is no rationale for its discontinuation here. Discontinuation of stavudine without the addition of another agent would risk loss of virologic control, as dual therapy is unlikely to be suppressive. Substitution of zidovudine (AZT), which does not have sensory neuropathy as part of its toxicity profile, would maintain the patient on triple drug therapy and is the best management strategy of those presented here.

**Q.10.** A 40-year-old male with HIV infection and CD4 cell count of 40/mm³ presents with fevers and progressive headache for one week. On examination, his temperature was 38.5°C and he appeared uncomfortable; his neck was supple and his neurologic exam was normal. CT (without contrast) was consistent with mild cortical atrophy. A lumbar puncture was performed, with an opening pressure measured at 280 mm H₂O. CSF showed 4 WBC/mm³ (100% monocytes), protein 52 mg/dL, glucose 60 mg/dL. What type of organism is most likely the cause of infection?

A. Fungus

B. Gram-negative diplococcus

C. Gram-positive diplococcus

D. *Mycobacterium* species.

E. DNA virus

**Answer: A.** This case represents a typical presentation for meningitis due to *Cryptococcal neoformans*, which is a fungus, and is a common opportunistic complication of AIDS when the CD4 cell count is below 100/mm³. Elevated protein and WBC (mononuclear cells) are common laboratory findings on evaluation, although a normal WBC count does not rule out cryptococcal meningitis in AIDS patients, and is, in fact, associated with higher mortality. The organism can often be visualized on an India ink preparation of the CSF; another more sensitive and very specific diagnostic test is the cryptococcal antigen assay that can be done on serum or on CSF.
Q.11. A 47-year-old business man presents with fever, headache, malaise, a penile ulcer, and a rash. His symptoms started seven days ago. He is concerned about having recent unprotected sexual intercourse with a prostitute while on a business trip. HIV testing with a home self-testing kit was negative. On examination his temperature is 38.8°C, he has mild posterior oropharyngeal erythema, and shotty cervical lymphadenopathy. He has a penile ulcer and a diffuse maculopapular exanthem over his chest, arms, and palms. What is the most appropriate next step?

A. RPR for secondary syphilis
B. Repeat HIV antibody
C. HIV RNA PCR
D. Tzank test for disseminated HSV

Answer: C. This man has a mononucleosis-like illness after recent high-risk sexual activity. The most common symptoms of acute HIV infection are fever, maculopapular rash, pharyngitis, and lymphadenopathy. Other symptoms include arthralgias, myalgias, GI symptoms, aseptic meningitis, and mucocutaneous ulcers. Acute HIV infection may mimic secondary syphilis or acute hepatitis. Acute HIV is not ruled out by a negative HIV antibody test as antibodies are detected usually only three to four weeks after acute infection. HIV RNA PCR is the test of choice in acute HIV infection.

Q.12. A 32-year-old scrub nurse sustained a needle stick exposure from a solid bore needle during a trauma surgery. The patient has known HIV infection, as well as hepatitis C and a history of poor compliance with his antiretroviral medications. Which of the following are true?

A. Post-exposure prophylaxis should be initiated after information is received about the patient’s antiretroviral resistance profile
B. Hollow bore needles, visible blood, and hepatitis C coinfection increase the risk of HIV infection
C. Over 50% of health care workers stop post-exposure prophylaxis due to side effects
D. Splash exposures are lower risk and do not require post-exposure prophylaxis.
Answer: C. Despite a risk of seroconversion of 0.3% following needle stick injury from an HIV positive source, less than 50% of health care workers successfully complete the four-week course of post-exposure prophylaxis. Post-exposure prophylaxis should be considered for both percutaneous and mucocutaneous exposures. When indicated, post-exposure prophylaxis should be initiated without delay. Increased risk of transmission is associated with hollow needles, visible blood, a needle in a vessel, and high viral load. Hepatitis C coinfection has not been associated with increased risk of transmission.

Q.13. A 30-year-old construction worker with a CD4 count of 240/mm³ presents for his annual physical. His social history is notable for smoking one-half pack of cigarettes per day. He is a former intravenous drug abuser but has not used in over five years. He is now married with two children and a dog. He plans to travel to Mexico for vacation soon. His labs show that he is hepatitis A IgG negative, hepatitis B surface antibody positive, and varicella IgG negative. Which vaccination should not be given?

A. Tetanus-diphtheria
B. Hepatitis A
C. Varicella
D. Pneumococcal

Answer: C. Patients with HIV should receive hepatitis A and B vaccine, pneumococcal vaccine, influenza vaccine and tetanus-diphtheria vaccine. Live vaccines including MMR, varicella, and smallpox are contraindicated. If he is exposed to a person with chickenpox or shingles, he should receive VZIG.

Q.14. A 32-year-old teacher with HIV and CD4 count of 320/mm³ presents with a complaint of feeling like he has the flu. He notes two days of fever, cough, mild shortness of breath, and myalgias. He is currently on an antiretroviral regimen of zidovudine, epivir, abacavir, and efavirenz, initiated three weeks ago for a high viral load and declining CD4 count. He reports that he has been trying to take his medications but feels worse after taking them. On examination his temperature is 39.3° C, his lungs are clear to auscultation, he has mild diffuse abdominal pain, and a faint maculopapular rash over his chest. Laboratory data show a WBC of 3.2,
hematocrit of 32, and platelet count of 124. Chest roentgenogram does not show any infiltrates. What is the best course of treatment?

A. Neuraminidase inhibitor
B. Trimethoprim-sulfamethoxazole
C. Fluoroquinolone
D. Modify antiretroviral therapy
E. Symptomatic management

**Answer: D.** This patient has abacavir hypersensitivity syndrome, which occurs in approximately 3% to 5% of patients in the first six weeks. This syndrome is characterized by a fever (usually 39° to 40° C), skin rash (maculopapular or urticarial), fatigue, malaise, GI symptoms (nausea, vomiting, diarrhea, abdominal pain), arthralgias, cough, and/or dyspnea. Continuation of the drug or rechallenge can be life threatening. Therefore, modification of his antiretroviral regimen is indicated.

**CHAPTER 13: MYCOBACTERIAL INFECTIONS**

**Q.1.** Which statement about tuberculin skin testing (TST) is false?

A. TST can be used to reliably distinguish latent from active TB
B. TST induration of greater than or equal to 5 mm is considered positive in a person with HIV-infection
C. TST should typically be performed only in persons with risk factors for recent TB infection or risk factors for progression from latent to active TB
D. TST of greater than or equal to 10 mm is considered positive in a health care worker

**Answer: A.** A TST cannot distinguish between latent and active TB. Statements B, C, and D are all true.

**Q.2.** Which statement about treatment of latent TB is false?

A. Isoniazid (INH) daily for nine months is the preferred treatment regimen
B. Persons over age 35 should never receive isoniazid (INH)
C. Monthly monitoring for signs and symptoms of hepatotoxicity should be performed on all individuals taking INH

D. Patients with HIV have a higher rate of progression from latent to active TB

Answer: B. There is no age cut-off for treatment of latent TB. Statements A, C, and D are all correct.

Q.3. Rifampin has clinically significant drug-drug interactions with which of the following?

A. Warfarin
B. Oral contraceptives
C. Methadone
D. Most HIV protease inhibitors

1. None of the above
2. All of the above
3. D only
4. A and D

Answer: 2. Rifampin is a potent inducer of the liver cytochrome P450 system, and stimulates the clearance of warfarin, oral contraceptives, methadone, most HIV protease inhibitors, most HIV non-nucleoside reverse transcriptase inhibitors, and some other medications, potentially resulting in loss of effectiveness (of warfarin, etc).

Q.4. A 30-year-old Mexican man is brought to the emergency room by relatives. He recently arrived in the United States from Mexico. He reports three months of cough, fever, sweats, and weight loss. Chest x-ray shows a right upper lobe cavity (4 × 4 cm) with surrounding dense infiltrate. Which of the following tests is most likely to yield the correct diagnosis?

A. Sputum Gram stain
B. Chest CT
C. Sputum smear for acid-fast bacilli, and mycobacterial culture
D. Tuberculin skin test (TST)

**Answer:** C. Cavitary pulmonary tuberculosis is the most likely cause of this patient’s illness, and sputum should be sent for acid-fast smear and mycobacterial culture. A TST may be positive but cannot be used to distinguish active from latent TB. If hospitalized, this patient should be placed in respiratory isolation to prevent transmission of *M. tuberculosis*.

**Q.5.** Hepatotoxicity is a major toxicity of which of the following medications?

A. Isoniazid  
B. Rifampin  
C. Pyrazinamide  
D. Ethambutol  

1. None of the above  
2. All of the above  
3. A, B, and C  
4. D only

**Answer:** 3. Hepatotoxicity is a major toxicity of isoniazid, rifampin, and pyrazinamide, but not ethambutol. The major toxicity of ethambutol is optic neuritis, manifest by change in visual acuity or color vision.

**Q.6.** Which mycobacterium is/are correctly paired with a typical clinical manifestation?

A. *M. marinum*: ulcerative skin nodules after trauma occurring in water  
B. *M. leprae*: skin nodules and peripheral neuropathy  
C. *M. kansasii*: cavitary lung lesion in a patient with AIDS  
D. *M. avium-intracellulare*: disseminated infection in a patient with AIDS  

1. All are correct  
2. None are correct  
3. Only A and D are correct
4. Only C and D are correct

**Answer: 1.** All of the above statements are correct.

**Q.7.** A 36-year-old male, born in China, comes to the clinic for an annual physical. He has no health complaints. He moved to the United States at age 24 for graduate training, and had a CXR at that time as a screen for TB. The CXR was normal. He has no current risk factors for TB and has never returned to China, but requests his screening for TB to be updated. He states that he was immunized against TB as a child. You place a PPD, and 48 hours later 6 mm induration is noted at the injection site. A CXR is repeated and is normal. Appropriate management at this point includes

A. Isoniazid daily for nine months
B. Repeat CXR in three months
C. Rifampin/pyrazinamide daily for two months
D. No further treatment

**Answer: D.** This patient was most likely treated with BCG as a child in China, where it is commonly used to immunize against TB. BCG immunization will result in a false positive PPD result, and thus PPD testing is often not performed in individuals treated with BCG (which explains why he received a CXR as an initial screen for TB when entering the country). BCG is not used in the United States, as it obscures PPD testing results, and the low reservoir of TB infection in the United States does not warrant mass inoculations with BCG.

**CHAPTER 14: INFECTIOUS DIARRHEA**

**Q.1.** A 34-year-old woman with no medical problems presents with two days of watery diarrhea. No blood is present in the stool. She has mild abdominal cramping and is afebrile. What is the most appropriate diagnostic step?

A. Fecal leukocytes
B. Stool culture
C. Ova and parasite stool examination
D. All of the above
E. None of the above

**Answer: E.** This is a noninflammatory diarrhea by history. Inflammatory diarrhea is commonly associated with bloody stools, fever, tenesmus, and abdominal pain—none of which are present in this patient. Fecal leukocytes and stool culture are of exceedingly low yield without a history consistent with inflammatory diarrhea. Ova and parasites are not indicated in the evaluation of acute diarrhea unless travel or exposure history suggests a parasitic infection.

**Q.2.** A 72-year-old nursing home resident develops diarrhea while on cefuroxime for pneumonia. She has a WBC of 16,000/mm³ and mild diffuse abdominal tenderness. What is the most appropriate treatment for the likely organism?

A. No treatment
B. Oral metronidazole
C. Intravenous vancomycin
D. Cholestyramine
E. Oral bacitracin

**Answer: B.** This patient likely has *Clostridium difficile*, for which the first-line therapy is oral metronidazole. Oral (not IV) vancomycin can also be used. In mild cases, discontinuation of the causative antibiotic is sometimes adequate, but given the patient’s abdominal tenderness, leukocytosis, and likely requirement for continued cefuroxime, antibiotic treatment of her *C. difficile* is appropriate. Cholestyramine can be an effective adjunctive treatment but is not the primary treatment, and oral bacitracin is not first-line therapy.

**Q.3.** A 19-year-old woman becomes ill with bloody diarrhea for three days. She is febrile to 38° C and has vague diffuse abdominal pain. On presentation to the emergency department, she is volume-depleted and is noted to have extensive petechiae on her limbs. Which of the following interventions is contraindicated for this patient?

A. IV hydration
B. Obtain stool for fecal leukocytes
C. Obtain stool for culture
D. Begin ciprofloxacin
E. Use bismuth as an antidiarrheal agent

**Answer: D.** This patient has bloody diarrhea and therefore has an inflammatory process. The petechiae are a red flag for thrombocytopenia and in the presence of bloody diarrhea should raise suspicion for *E. coli* 0157:H7 infection with hemolytic uremic syndrome (HUS) as a complication. IV hydration is always appropriate in a patient with moderate to severe diarrhea. While this is clearly a case of inflammatory diarrhea, fecal leukocytes are not contraindicated, and in this ill patient can help confirm an inflammatory diarrhea, but may not alter management dramatically. Stool for culture is necessary to try to confirm an *E. coli* infection. Bismuth can be used to treat inflammatory diarrhea, but loperamide and diphenoxylate should be avoided as they may slow transit of toxin. Antimicrobial treatment of *E. coli* is felt to potentially contribute to HUS and is therefore contraindicated in this patient.

**Q.4.** A 46-year-old woman has the sudden onset of nausea and vomiting. Several hours into her illness she begins to have nonbloody large volume diarrhea. The entire illness lasts about 24 hours. She is an ICU nurse and several coworkers and patients on her unit had a similar illness within the past week. The most likely cause of her illness is

A. Salmonella
B. Campylobacter
C. Norovirus
D. *C. difficile*
E. Rotovirus

**Answer: C.** This patient has a noninflammatory diarrheal illness with predominant nausea and vomiting. Epidemiologically, the most common cause of infectious diarrhea is viral gastroenteritis, with norovirus being the most common cause in adults. Salmonella and *Campylobacter* would cause an inflammatory diarrhea. No history of recent antibiotic use is given so *C. difficile* is unlikely. In addition, *C. difficile* generally does not cause vomiting as the predominant symptom. Rotovirus generally causes illness in children.
Q.5. A 53-year-old man develops diarrhea two days after returning from a Caribbean vacation. He had a large meal of mostly seafood, including raw oysters, on his last night there. His wife is also ill and ingested the oysters. The most likely pathogen in this is case is

A. *E. coli*
B. Campylobacter
C. Salmonella
D. *Yersinia enterocolitica*
E. *Vibrio parahemolyticus*

**Answer: E.** The food ingestion history can be very useful in determining the etiology of infectious diarrhea. In this case, the history of ingesting raw seafood within 48 hours of the onset of symptoms is strongly suggestive of *Vibrio sp.* infection. The other bacteria listed can certainly be the cause here, but are unlikely to be transmitted by raw seafood. This is also relevant because most labs do not specifically test for *Vibrio sp.* and if suspected it needs to be asked for.

Q.6. A 21-year-old male presents with one day of a large volume of watery diarrhea. He is afebrile, his abdomen is benign, and the stool is not bloody. He has no other medical problems. The treatment of choice is

A. Ciprofloxacin
B. Doxycycline
C. Loperamide
D. Hydration
E. Bismuth

**Answer: D.** This is a noninflammatory diarrhea, therefore there is no indication to start antibiotics. Bismuth and loperamide are effective to reduce the volume of the diarrhea but are primarily used to reduce symptoms. Hydration (oral or IV) is the first step in treating this patient as volume loss represents the primary health risk.
Q.7. A 21-year-old male presents with one day of a large volume of watery diarrhea. He is afebrile, his abdomen is benign, and the stool is not bloody. He returned from a trip to Indonesia two days ago. The most appropriate treatment is

A. Ciprofloxacin
B. Doxycycline
C. Loperamide
D. Hydration
E. Bismuth

**Answer: A.** This patient has traveler’s diarrhea, therefore antibiotic treatment is indicated. Fluoroquinolones tend to be more effective than doxycycline and are the treatment of choice. Hydration and symptomatic treatment should be considered as well, but it is most important to start this patient on antibiotics.

Q.8. Antibiotics are usually indicated for each of the following organisms except

A. Shigella
B. *Clostridium difficile*
C. *Vibrio cholera*
D. Giardiasis
E. Salmonella

**Answer: E.** Fluoroquinolones should be used to treat both Shigella and *Vibrio cholera*, metronidazole should be used to treat both clostridium *C. difficile* and giardiasis. While the effect of antibiotic use on the chronic carrier state of Salmonella is controversial, there is no evidence that antibiotics reduce the duration or complications of Salmonella enteritis.

Q.9. A 39-year-old woman presents with three days of bloody diarrhea. On examination, she has a fever of 101.5° F and has right lower quadrant tenderness. The most likely etiology of her diarrhea is

A. Shigella
B. *Yersinia enterocolitica*
C. Salmonella

D. *Campylobacter jejuni*

E. *E. coli* O157:H7

**Answer: D.** This is an inflammatory diarrhea, which is usually bacterial in origin, and *Campylobacter jejuni* is the most commonly identified bacterial pathogen in infectious diarrhea.

**CHAPTER 15: SELECTED TOPICS IN INFECTIOUS DISEASE I**

**Q.1.** A 21-year-old college student is brought to the emergency department by her roommate because of bizarre behavior. She has had fever and a headache since yesterday; now she is confused and acting strangely. She has been otherwise healthy and is on no medications except birth control pills. On examination she has a temperature of 103° F, blood pressure of 120/80, pulse of 110, waxing and waning level of consciousness, mild photophobia, mild nuchal rigidity, and has an expressive aphasia. Lumbar puncture reveals a WBC of 80 with 40% PMN, 60% lymphs, RBC of 250, protein of 70, normal glucose. Which of the following is least likely in this case?

A. MRI with gadolinium shows temporal lobe enhancement

B. Gram stain of the CSF is negative

C. The patient improves spontaneously without treatment

D. PCR of the CSF is positive for HSV-1

**Answer: C.** This patient has HSV encephalitis with alterations in level of consciousness, bizarre behavior, expressive aphasia, and a CSF profile consistent with the diagnosis. It is likely that the Gram stain of the CSF will be negative, but PCR will detect HSV-1 DNA. MRI with gadolinium may show temporal lobe enhancement. She needs urgent therapy with acyclovir. Unlike HSV meningitis, HSV encephalitis carries a significant morbidity and mortality and requires IV acyclovir.

**Q.2.** A 30-year-old man presents with a history of fever and swelling and pain in his right knee. He has a history of intravenous drug use. On exam he has a temperature of 101° F, and has warmth, swelling, and tenderness of the right knee with limited
range of motion. Joint fluid aspiration shows a synovial WBC of 75,000/mL (98% PMN), high protein, and low glucose. All of the following are relative indications for surgical intervention except

A. Involvement of the left hip with pain, swelling, and limited range of motion
B. Gram stain of synovial fluid showing intracellular gram-negative diplococci
C. MRI of the knee showing a loculated effusion
D. Repeat aspiration of the knee four days after starting antibiotic therapy showing 100,000 WBC
E. History of symptoms starting 10 days prior to presentation

**Answer: B.** This patient has acute bacterial arthritis of the right knee. The two most likely causes would be *S. aureus* or *N. gonorrhoeae*. Involvement of the hip, presence of a loculated effusion, symptoms for more than one week prior to initiation of therapy, and failure to decrease WBC count with therapy are all relative indications for surgical drainage. Presence of *N. gonorrhoeae* (gram-negative diplococci) on Gram stain would guide antibiotic choice, but not be an indication for surgery.

**Q.3.** All of the following are true statements regarding suspected bacterial meningitis except

A. Immunocompromised patients should undergo a CT scan of the head prior to lumbar puncture
B. Blood cultures should be performed immediately
C. Antibiotics should be delayed until after the CT scan is performed in a patient with new onset seizures
D. Dexamethasone should be given prior to or along with empiric antibiotics if pneumococcal meningitis is suspected in an adult patient
E. Once the bacterial etiology of meningitis is established and the susceptibility testing is done, antibiotics should be tailored down

**Answer: C.** Delay in the initiation of antibiotics has the potential to increase morbidity and mortality in bacterial meningitis. In patients where a CT scan is indicated, blood cultures should be drawn and appropriate antimicrobial and
adjunctive therapy given prior to sending the patient to radiology. Immunocompromised patients, those with history of CNS disease, new onset seizures, papilledema, abnormal level of consciousness, or a focal neurologic deficit should have a head CT prior to LP. In adults dexamethasone is recommended for presumed pneumococcal meningitis. Also, once the bacterial pathogen is isolated and in vitro susceptibility testing is performed, antimicrobial treatment should be modified for optimal therapy.

**Q.4.** A 68-year-old woman presents with a two-month history of fever of unknown origin. Her past medical history is significant for mild hypertension, which is well controlled. Over the last two months she reports headaches and a 10 pound weight loss. She is a housewife and has lived in a suburban setting on the East Coast all her life. Physical exam is normal except for a temperature of 38.4° C. Laboratory studies reveal WBC of 7,800, hematocrit of 31%, and plt of 300,000. Liver enzymes and creatinine are normal; ESR is 110; ANA is less than 1:40. Three sets of blood cultures drawn show no growth to date. Lumbar puncture was performed in the emergency room and is unrevealing. A PPD is placed and is negative, and chest x-ray is normal. The most likely diagnosis is

- A. Subacute bacterial endocarditis
- B. Systemic lupus erythematosus
- C. Giant cell (temporal) arteritis
- D. Tuberculosis
- E. Factitious fever

**Answer: C.** An elderly patient presenting with FUO, headaches, and weight loss should prompt the consideration of temporal arteritis. Patients often present with anemia and an ESR of greater than 100. Alkaline phosphatase and AST are sometimes mildly elevated. Other causes of FUO should be entertained and appropriate evaluation performed. However, with no heart murmur and negative blood cultures, endocarditis seems less likely; a negative ANA makes SLE unlikely; a negative PPD, normal CXR, and no reported TB exposures make TB less likely; and factitious fever is a diagnosis of exclusion.
Q.5. All of the following are true regarding prosthetic joint infections except

A. Early-onset (<3 months after surgery) infection is often caused by bacteria such as coagulase negative staphylococci
B. Late-onset infection is usually caused by hematogenous seeding from bacteria such as S. aureus
C. Fever and leukocytosis is always present in late-onset infection
D. Late-onset infection often causes chronic unremitting joint pain and sometimes loosening of the joint
E. If not caught rapidly, most cases require removal of the prosthetic material for cure of the infection

Answer: C. Early-onset infection is usually caused by low virulent organisms that are commonly found as skin flora; whereas late-onset infection is usually hematogenous in origin. Late-onset infection often lacks fever and leukocytosis; instead patients often present with pain. If caught very early, prosthetic joint infections may be treated with antibiotics and debridement without removal of the prosthesis. However, most cases require removal of the prosthetic material along with antibiotics for a complete cure.

Q.6. Which of the following is true regarding drug-induced fever?

A. If a patient has been on a medication for a long time it cannot be the cause of a fever
B. Rash is always present with a drug fever
C. An elevated white blood cell count with eosinophilia is uncommon
D. If a medication is the cause of fever, the fever will resolve immediately after the medication is stopped
E. NSAIDs cannot cause fever because they are antipyretic

Answer: C. Virtually any medication, whether it is new to the patient or not, can cause a fever. Rash may be present, but typically is not. It is true that absolute eosinophilia is rare in such cases. An elevated white blood cell count and eosinophilia is present in less than 20% of cases. If a medication has a long half-life, fevers may persist for several days after discontinuation even if the fever was due to the drug.
NSAIDs are a less common cause of fever than B-lactam antibiotics and sulfonamides, but they too can cause a fever.

**Q.7.** A 66-year-old woman with a history of diabetes presents complaining of a two-day history of pain, swelling, and erythema of her left thigh. She notes that the symptoms have been worsening over the past 24 hours. Her physical examination reveals an obese woman in moderate distress: temperature is 39°C, pulse 115 beats/min, respirations 24/min, blood pressure 98/60. Examination of the left thigh reveals erythema, swelling, and pain from the mid-thigh to the perineum, and into the lower abdomen. There are tense bullae scattered throughout the area of erythema.

Her labs reveal the following:

- WBC: 22,000/μL with 90% neutrophils
- HCT: 39%
- PLT: 150/μL
- BUN: 45 mg/dL; Cr-2.2 mg/dL
- Bicarbonate: 18 mg/dL
- ABG: 7.29/44/82

Which of the following statements is correct?

A. Staphylococcus is likely to be cultured from the blood

B. Treatment should begin with an antistaphylococcal penicillin

C. If the patient is treated with broad spectrum antibiotics, resolution can be expected within 48 to 72 hours

D. Rapid progression and death can be expected without surgical exploration

E. Both A and B are correct

**Answer: D.** This patient has evidence of a rapidly progressive infection of the perineum consistent with necrotizing fasciitis or Fournier’s gangrene. In diabetics, the cause is often polymicrobial so broad spectrum antibiotic coverage is necessary. However, immediate surgical exploration in addition to antibiotics is required to minimize mortality risk.
Q.8. A 26-year-old man presents with a two-day history of fever, swelling, and pain in his right knee. He has a history of intravenous drug use. On examination he has a temperature of 101° F, and has warmth, swelling, and tenderness of the right knee with limited range of motion. Joint fluid aspiration shows a synovial WBC of 80,000/mL (98% PMN), high protein, and low glucose. All of the following are correct regarding this man’s condition except

A. His history of intravenous drug use puts him at high risk for infection with *Pasteurella multocida*

B. If repeat aspiration of his knee reveals 120,000 WBCs after five days of antibiotic therapy, surgical exploration is indicated

C. If he has gonococcal arthritis, culture of the synovial fluid will be positive in less than 50% of cases

D. Blood cultures can be helpful if he has a staphylococcal infection

E. If the Gram stain is negative, empiric coverage with a third-generation cephalosporin is indicated

**Answer: A.** This patient has acute bacterial arthritis. The most likely etiologies include *Neisseria gonorrhea* and *Staphylococcus aureus*. *Pasteurella multocida* is associated with dog or cat bites but not with intravenous drug use. In cases of GC arthritis, the Gram stain and culture are frequently negative. Therefore, the oropharyngeal, genital, and anal orifices should be cultured, if the diagnosis is suspected. Blood cultures are not helpful for GC but can be positive in more than 60% of cases of staphylococcal arthritis. Indications for surgical exploration in this patient would include loculated effusion, poor response to therapy, hip joint involvement, or delay in beginning therapy of more than one week. Broad spectrum empiric antibiotic therapy should be initiated in cases where the Gram stain is negative.

Q.9. A 70-year-old man with a history of hypertension presents complaining of fevers for the past month. He reports that he has had intermittent temperatures as high as 102° F but did not seek medical care since he had no other symptoms. Of note, he had a negative screening colonoscopy one year ago and a PSA of 3.2 mg/mL eight months ago. His review of systems is only notable for mild fatigue. His
examination is unremarkable. Which of the following tests should be obtained at this time?

A. Sinus CT scan
B. Skeletal survey
C. Erythrocyte sedimentation rate
D. Gallium scan
E. Echocardiogram

**Answer: C.** This patient presents as a fever of unknown origin. He has had no evaluation for this condition prior to his presentation. Initial studies for FUO include chest x-ray, urinalysis, complete blood count, comprehensive metabolic panel, and blood cultures. A PPD should be placed. Although nonspecific, a sedimentation rate should be obtained. In a patient of this age with no other localizing signs, temporal arteritis needs to be strongly considered. An abdominal and/or sinus CT scan can be considered if the initial studies are negative.

**CHAPTER 16: SELECTED TOPICS IN INFECTIOUS DISEASE II**

**Q.1.** A 45-year-old housewife with a prior history of Lyme disease with Bell’s palsy presents in June with a several-day history of enlarging rash on her lower leg. She has cats as pets and often sustains scratches and bites, although she cannot remember a specific bite at the area of infection. On examination, she has a uniformly red, minimally tender, 6-cm red patch. The remainder of the examination is unremarkable. Because you cannot reliably distinguish a cat-related cellulitis from Lyme disease, you decide to cover her for both potential infections. Which of the following choices adequately covers both cat-associated infections and Lyme disease?

A. Amoxicillin
B. Doxycycline
C. Clindamycin plus ciprofloxacin
D. Cephalexin
E. Amoxicillin/clavulanate
Answer: E. Amoxicillin and doxycycline are adequate for Lyme disease but do not cover the staphylococcal organisms associated with cat bites. Clindamycin with ciprofloxacin is the choice for penicillin-allergic patients with cat bites but has no activity for Lyme. Cephalexin covers neither infection. Amoxicillin/clavulanate covers all the potential pathogens including *Pasteurella multocida* (associated with cat bites).

Q.2. A 40-year-old dentist from the suburban Northeast presents with several days of headache, generalized aches, and fever. She thinks she may have had a tick bite the week before the symptoms began while she was vacationing at the beach in North Carolina. She is otherwise healthy except for a history of depression. The only regular medication is birth control pills. On physical examination the patient has a temperature of 103° F. There is no meningeal irritation and the neurologic, joint, and general examinations are unremarkable. There is no rash. She brings a representative tick from the beach where she was vacationing. Which one of the following is true about the possible diagnosis in this patient?

A. The absence of an erythema migrans rash rules out primary Lyme disease
B. The diagnostic test of choice to order at this point is a Lyme ELISA with confirmatory western blot
C. A finding of thrombocytopenia on the CBC would point to a diagnosis of ehrlichiosis
D. Identification of the tick as a dog tick would increase the likelihood of ehrlichiosis
E. Rocky Mountain spotted fever is unlikely because the patient has not been in the Rocky Mountains

Answer: C. Symptoms are compatible with any of the tick-borne illnesses, although high fever suggests ehrlichiosis. Rash is not a completely sensitive diagnostic finding in Lyme disease, and the serologic diagnostic tests are often negative early in infection. Rocky Mountain spotted fever occurs in the southeast, south central, and occasionally in the northeastern parts of the United States and is transmitted by the dog tick. Granulocytic ehrlichiosis is transmitted by the lone star tick and the CBC is very helpful in diagnosis, often showing leukopenia or thrombocytopenia.
Q.3. A 65-year-old tobacco user with no history of cardiac disease or valvular heart disease presents with fatigue, fever, and malaise of one week’s duration. On examination, there is poor dentition, aortic ejection and insufficiency murmurs, trace heme-positive stool, and a rash consistent with psoriasis. A urinalysis shows 10 to 20 WBCs and 2 to 3 RBCs. You are called with a preliminary report that blood cultures are growing gram-positive cocci. Which of the following organisms is least likely to be associated with endocarditis in this patient?

A. *S. aureus*

B. *S. mutans*

C. Group A streptococcus

D. Enterococcus

E. *S. bovis*

Answer: C. All of the organisms except Group A strep are common causes of endocarditis. Although any streptococcus can cause endocarditis, it is important to identify the specific organism involved in an episode of bacteremia because each organism has its own unique probability of being associated with endocarditis and other clinical sites of infection. This patient has risk factors for endocarditis with all of the other organisms: skin disease for *S. aureus*, dental disease for *S. mutans*, urinary abnormalities for *Enterococcus*, and heme-positive stool for *S. bovis*.

Q.4. A 60-year-old man presents with a six-week history of inguinal lymphadenopathy in the absence of systemic symptoms. He lives in a Lyme endemic region and has had tick bites in the past. He owns a cat. He does not recall a rash or flu-like illness. Which one of the following is true?

A. If the patient has Lyme disease the antibody should be positive at this point in the illness

B. The absence of a currently infected scratch from a cat rules out cat scratch disease

C. Most people with Lyme disease recall a recent tick bite
D. Treatment with quinolone therapy will cover both cat scratch disease and Lyme disease

**Answer: A.** Seroconversion in Lyme disease occurs within two to five weeks after infection and should be positive in the absence of treatment in a patient with a six-week illness. The initial cat scratch is often resolved by the time lymphadenopathy occurs in cat scratch disease. Only 30% of patients with Lyme disease recall a tick bite preceding the illness. Quinolone therapy would be appropriate for cat scratch disease, but not Lyme disease.

Q.5. A 60-year-old woman with long-standing mitral valve prolapse and moderate mitral regurgitation presents from a Lyme endemic area in June with a one-week history of malaise, loss of appetite, and low-grade temperature. She has had no recent dental work. Which of the following is true?

A. Blood cultures are unlikely to be helpful because cultures for *Borrelia burgdorferi* are not available for commercial labs

B. Low-grade temperature and nonspecific symptoms are compatible with the diagnosis of either endocarditis or acute Lyme disease

C. Mitral valve prolapse is an uncommon risk factor for endocarditis

D. The absence of recent dental work makes endocarditis unlikely

**Answer: B.** A patient with mitral valve prolapse and murmur has significant risk of endocarditis even without recent dental work. Fever may be low-grade or absent and can be nonspecific and overlap with both infectious and noninfectious causes. Blood cultures are the mainstay of diagnosis and are critical in making a timely diagnosis of this potentially life threatening infection in this patient. Serology for Lyme disease can be sent separately.

Q.6. A 65-year-old man presents with a painful swollen left knee. He is in excellent health and has never had previously diagnosed or treated Lyme disease. There is no history of gout or trauma. He is afebrile and otherwise feels well, without any systemic symptoms. He does not recall a remote erythema migrans rash or primary Lyme illness. Which one of the following is true?
A. Since this patient may have had Lyme disease for more than six months, the antibody test for Lyme disease should be negative

B. If this were Lyme disease, arthrocentesis of joint fluid should show increased leukocytes, a negative culture for bacterial pathogens, and a negative crystal exam for gout

C. Treatment with antibiotics is not indicated for late Lyme arthritis

D. The presence of documented neurologic symptoms in a patient with late Lyme disease would be an indication for treatment with corticosteroids

**Answer: B.** Antibody tests for Lyme should be positive late in infection. Lyme arthritis results in effusions with elevated leukocytes, but negative culture, and patients are treated with antibiotics. Intravenous antibiotics are indicated if neurologic disease is documented in Lyme disease; corticosteroids are not used.

**Q.7.** A 30-year asplenic traveler returns from vacation on Martha’s Vineyard. She is febrile and acutely ill and is worried she has Lyme disease because of exposure to ticks during her vacation. Which one of the following diagnostic tests would be the most important to order in this patient.

A. Serology for Rocky Mountain spotted fever

B. PCR and peripheral blood smear for babesia

C. Lyme serology

D. PCR test for ehrlichia

E. Blood cultures

**Answer: B.** All of the tests could be considered appropriate, but in a patient with a splenectomy it is important to evaluate for babesia. Deer ticks (*Ixodes scapularis*) can transmit Lyme disease, granulocytic ehrlichiosis, and babesia. Co-infection with any of the three can occur. Doxycycline would be appropriate to cover Lyme disease and ehrlichia, but the diagnosis of babesia would require additional therapy.

**Q.8.** You are treating a 36-year-old male injection drug user for bacterial endocarditis. On admission five days ago, he was started on nafcillin and gentamicin for presumed bacterial endocarditis. Since then, three sets of blood cultures have
grown *Staphylococcus aureus* sensitive to oxacillin. An echocardiogram showed a small vegetation on the tricuspid valve. The most appropriate management at this point would be:

A. Continue nafcillin and gentamicin to complete two weeks of therapy

B. Discontinue nafcillin and gentamicin; start oxacillin to complete two weeks of therapy

C. Continue nafcillin and gentamicin to complete four weeks of therapy

D. Continue nafcillin only to complete six weeks of therapy

**Answer: A.** The antibiotics used and duration of therapy completed to treat bacterial endocarditis depend on both the infecting organism and the valve involved. *Streptococcus viridans*, the most common cause of bacterial endocarditis, can be treated with four weeks of daily penicillin, unless the organism demonstrates insensitivity to penicillin (i.e., MIC > 0.1). With less sensitive *S. viridans*, four weeks of daily penicillin is used, with gentamicin added during the first two weeks of therapy. *S. aureus* infecting the left side of the heart is treated with four weeks of nafcillin, with gentamicin given during the first three to five days of therapy. If *S. aureus* infects the right side of the heart (as seen in this case), two weeks of therapy with both nafcillin and gentamicin are adequate. Enterococcal endocarditis is treated with six weeks of penicillin/gentamicin. Prosthetic valve endocarditis also requires six weeks of therapy, with bacterial sensitivities guiding management, with the addition of rifampin (and an aminoglycoside for the first two weeks of therapy). Fungal endocarditis requires surgery.

**Q.9.** The following are clinical scenarios associated with bacterial endocarditis and their most likely causative organism. Three of the four clinical scenarios are correctly paired with the most likely causative organism. Which clinical scenario is not associated with its most common causative organism?

A. “Typical” endocarditis: *Streptococcus viridans*

B. Endocarditis in an injection drug user: *Staphylococcus aureus*

C. Early prosthetic valve endocarditis: *Staphylococcus aureus*

D. Late prosthetic valve endocarditis: *Staphylococcus epidermidis*
**Answer:** D. *S. epidermidis* is the most common causative agent of both early and late prosthetic valve endocarditis. *S. aureus* does cause both early and late prosthetic valve endocarditis (more commonly early rather than late), but is less common than *S. epidermidis*. Excluding prosthetic valve endocarditis and endocarditis in injection drug users, *S. viridans* is the most common causative agent in bacterial endocarditis. In “culture negative” endocarditis, there is no dominant organism, but the differential is remembered by the mnemonic “HACEK,” which denotes *Hemophilus* (*aphrophilus* or *parainfluenzae*), *Actinobacillus*, *Cardiobacterium*, *Eikenella*, or *Kingella*.

**CHAPTER 17: BIOTERRORISM**

**Q.1.** A 22-year-old man presents to his physician’s office with a two-day history of fever, headache, and a rash on his face, arms, and chest. On examination, he has a temperature of 102° F and a rash that consists of erythematous papules, vesicles, and scabs. What feature of the patient’s history and exam is *not* consistent with the diagnosis of smallpox?

A. The distribution of the rash  
B. The presence of fever  
C. The presence of headache  
D. The appearance of the rash

**Answer:** D. Smallpox is characterized by a prodrome of high fever, malaise, headache, and backache for one to four days prior to the onset of the rash. The rash usually initially appears in the oropharynx and on the face and arms. The lesions are at the same stage of development and evolve at the same rate. Therefore, in this patient it is the appearance of the rash—a mixture of papules, vesicles, and scabs—early in the course of disease that strongly suggests that this patient has chickenpox, not smallpox.

**Q.2.** A 45-year-old man presents at the clinic with concerns about a lesion on his arm that developed the day before. On examination, he has a 1 cm by 2 cm pustule surrounded by two vesicles on his right forearm. In addition, he has edema involving...
the tissue around the lesion. You suspect cutaneous anthrax. Which of the following statements is true about the diagnosis and management of cutaneous anthrax?

A. The patient is likely to have blood cultures that grow *B. anthracis*

B. Cultures of the lesion are likely to grow *B. anthracis*

C. The physician should immediately place the patient on contact precautions to prevent spread of disease to staff and other patients

D. Initial therapy should consist of either penicillin or ciprofloxacin

E. The patient should be admitted to the hospital as he is likely to develop disseminated anthrax

**Answer B.** The diagnosis of cutaneous anthrax can usually be made by culturing the base of the lesion or fluid from the surrounding vesicles, although the sensitivity of culture decreases after the patient receives a dose of antibiotics. Most patients with cutaneous anthrax do not progress to have disseminated disease and usually do not have positive blood cultures. Nevertheless, therapy should be initiated quickly with either a fluoroquinolone or doxycycline. Penicillins are no longer recommended as first-line therapy because *B. anthracis* produces an inducible-β-lactamase that can confer resistance to penicillins. Anthrax is not transmitted person to person; therefore, patients can be managed using standard precautions only.

**Q.3.** Airborne isolation with a negative pressure room and N95 masks or personal air purification respirators (PAPRs) is recommended for patients infected with which of the following?

A. Inhalational plague

B. Inhalational anthrax

C. Smallpox

D. Inhalational tularemia

E. All of the above

**Answer: C.** Of the options listed, only smallpox requires negative pressure rooms and N95 masks or PAPRs. Plague is transmissible from infected patients, but it appears that transmission can be halted simply by private rooms and surgical masks. Tularemia and anthrax are not transmissible person to person.
Q.4. A 40-year-old man presents to your office in January worried that he has anthrax. He says his symptoms started about seven days ago with nasal congestion, dry cough, and a runny nose. These symptoms were soon followed by high fevers and diffuse myalgias. After three days of these symptoms he began to feel slightly better but then developed right-sided chest pain. His cough became productive of green sputum and he noted mild shortness of breath with exertion. On examination his temperature is 38.7 °C, pulse is 115, and room air oxygen saturation is 93%. His pulmonary examination reveals dullness to percussion and decreased breath sounds over the right lower lobe. A chest x-ray confirms a consolidated infiltrate in the right lower lung field. The patient works in a golf pro shop and has a 20- to 30-year pack-a-day tobacco history. He is very concerned that he has anthrax because his next-door neighbor works in the Senate office building that was heavily contaminated and has been on prophylactic antibiotics. The day before your patient’s symptoms started, he had spent quite a bit of time talking to this neighbor. What should you do next?

A. Perform a nasal culture to make sure that he has not been exposed to anthrax

B. Begin a course of ciprofloxacin to treat him for community-acquired pneumonia and to cover the possibility of anthrax

C. Assure him that he probably does not have anthrax and tell him to call you back in two to three days if his symptoms have not improved

D. Reassure him that he probably does not have anthrax and begin antibiotics for community-acquired pneumonia

Answer: D. When the question of anthrax is raised, an epidemiologic risk assessment should factor into clinical decision making. In this case, the assessment reveals that the patient is at very low risk. Anthrax is not transmissible person to person, and thus exposure to his neighbor would not pose a real risk, even if his neighbor later developed inhalational anthrax. In addition to having a low epidemiologic risk, this patient’s symptoms are not typical for inhalational anthrax. Nasal symptoms have not been present in the cases reported by the CDC. Also, anthrax does not commonly cause pulmonary infiltrates and a productive cough because it is usually limited to the mediastinal lymph nodes. This patient’s symptoms are much more typical of a community-acquired pneumonia complicating a viral respiratory infection such as influenza, and thus he should be treated for community-
acquired pneumonia, not anthrax. A is incorrect because nasal cultures are felt to be useful only in epidemiologic investigations. B is wrong because ciprofloxacin would not be appropriate treatment for community-acquired pneumonia. C is incorrect because, although he does not have anthrax, he does appear to have a significant community-acquired pneumonia that merits treatment.

Q.5. A 42-year-old postal employee presents to your office in December concerned that she may have anthrax because an employee at a nearby postal facility was recently diagnosed with anthrax. Her history is remarkable only for tobacco use of about one pack of cigarettes per day. She has had fevers to 39.3 °C, along with chest pain, myalgias, and malaise for two to three days. On examination she appears uncomfortable but in no distress. Her temperature in your office is 39.0 °C, pulse is 110, blood pressure is 117/73, and the room air oxygen saturation is 98%. The rest of her examination, including the pulmonary examination, is unremarkable. A chest x-ray done in the clinic is normal. What should you do next?

A. Prescribe antibiotics for bronchitis.
B. Provide reassurance and ask her to call you if her symptoms don’t improve in 48 hours
C. Draw blood cultures, perform a chest CT scan, and admit her to the hospital for intravenous antibiotics
D. Offer her treatment for influenza
E. Perform a nasal culture to see if she has been exposed to anthrax

Answer: C. One of the keys to approaching patients who may have anthrax is the epidemiologic risk assessment. The early signs of anthrax are nonspecific, and thus a patient’s risk factors should factor into the decision about how to proceed. The patient presented here has symptoms that are quite consistent with anthrax (e.g., fever, myalgias, and chest pain), and she has a very strong epidemiologic risk given that she works in a mail facility and that a worker in a nearby mail facility was recently diagnosed with anthrax. Because her risk is so high, she should be admitted for further evaluation and presumptive treatment of inhalational anthrax. The lack of mediastinal widening on the chest x-ray is not definitive evidence against anthrax because early in the disease the chest x-ray is not as sensitive as a chest CT. Nasal cultures can be falsely negative, and thus a negative nasal swab would not rule out
anthrax as a possibility here. Nasal cultures are recommended only as an epidemiologic tool.

Q.6. A 46-year-old man who works at the mailroom on Capitol Hill presents to your office complaining of a sore on his hand that has increased in size over the last week. He notes that the lesion began as a small red pimple seven days ago but has now enlarged, developed a crater, and has turned black. Of note, he is worried about anthrax, given that one of his colleagues was just hospitalized with fever, dyspnea, and a similar lesion. His physical examination reveals a painless, 2-cm black eschar surrounded by erythema on the dorsum of the right hand. He has numerous paper cuts on his fingers. Which of the following statements is correct regarding his management?

A. Treatment with antibiotics should begin only after the diagnosis of anthrax has been made by obtaining blood cultures
B. Antibiotics should be started immediately after obtaining tissue/fluid for culture
C. Antibiotic therapy is not indicated for this patient
D. He should be admitted immediately to an isolation room in the hospital
E. Both B and D are correct

Answer: B. This patient has a lesion that is concerning for cutaneous anthrax. Although blood should be obtained for culture, serology, and potentially PCR diagnostic tests, a swab of vesicles and/or punch biopsy for Gram stain, culture, and histologic evaluation will provide a more rapid and direct diagnosis. Treatment for suspected cases should begin immediately after obtaining tissue for culture given the risk for development of disseminated disease. Since person-to-person spread does not occur, isolation is unnecessary.

Q.7. A 36-year-old reporter presents one week after returning from covering a military conflict in the Middle East. He reports that he has had two days of fevers to 104°F, malaise, and a rash that began on his face and has now developed all over his body. Of note he reports never having had chicken pox, the varicella vaccine, or smallpox vaccine. His examination reveals vesicles and pustules on his arms, legs, trunk, and face. Which of the following statements is correct?
A. The patient most likely has chickenpox, since the rash began on his face
B. One of the vesicles should be unroofed, examined with a Tzanck preparation, and sent for culture before the patient is sent home
C. The patient should immediately be transferred to an emergency room equipped to handle smallpox cases
D. Antiviral agents have no role in the management of this disease if it is smallpox
E. Patients with smallpox are typically contagious from one week prior to development of the rash until the rash disappears

Answer: D. The rash for smallpox can be confused with chickenpox. A few features can help distinguish the two. First, smallpox begins in the oropharynx or on the face. Second, pustules develop all over the body concomitantly in smallpox rather than in crops (as seen with chickenpox). When the diagnosis is suspected, patients should not be moved, but should be quarantined immediately. Collection of fluid from vesicles can be hazardous, and should not routinely be done. Patients are considered contagious only after the rash has developed. Antiviral agents have not been shown to be effective in treatment of smallpox.

Q.8. A 36-year-old health care worker presents to your office to discuss a smallpox vaccine. He is being offered the vaccine by his hospital but he is not sure he wants to go through with it given the potential for side effects. All of the following statements regarding the smallpox vaccine are correct except

A. Vaccinia immune globulin (VIG) has been shown in controlled studies to be effective therapy for adverse events caused by vaccination
B. Severe adverse reactions are more common in persons receiving primary vaccination compared to those being revaccinated
C. The risk of death from vaccination is quite low
D. Lesions at the vaccine site will contain high titers of vaccinia virus, which can be transferred to other sites of the body (and to other individuals) by the hands
E. Local reactions to the vaccine include pain, swelling of the lymph nodes, and inflammation at the site
**Answer: A.** Smallpox vaccination can cause number of local and systemic reactions including fever, malaise, soreness and inflammation at the site, myalgias, lymphadenopathy, and rash. Rashes include urticaria, Stevens-Johnson syndrome, generalized vaccinia (vesicles and pustules), and eczema. Death from vaccination does rarely occur and usually results from post-vaccine encephalitis or progressive vaccinia. VIG may help those with serious reactions to the vaccine but this is a recommendation that has not been evaluated in controlled trials.

**Q.9.** A 46-year-old postal worker from Washington, DC presents complaining of a three-day history of malaise, fever, cough, myalgias, and a runny nose. He is concerned because some of his colleagues were involved in the anthrax cases in 2001. He denies any chest pain or dyspnea. His physical examination reveals a temperature of 37.9º C, pulse of 90/min, respiratory rate 18/min, and blood pressure 140/70. Which of the following courses of action is most appropriate?

A. Admit the patient to the hospital, obtain a chest x-ray, and begin ciprofloxacin

B. Start ciprofloxacin as an outpatient and follow up in one week

C. Reassure him that he likely has a viral syndrome and have him follow up in a few days

D. Quarantine the office until a portable chest x-ray can be done to rule out lymphadenopathy

E. Admit him to the hospital in an isolation room and observe for one to two days

**Answer: C.** Symptoms of anthrax are similar to those of common viruses, including influenza. One apparently distinguishing feature has been the absence of coryza in anthrax cases. Subsequently, this patient probably has a viral syndrome and can follow up if the symptoms do not improve over the next few days. Quarantine and isolation is not needed for cases of anthrax since person-to-person spread does not occur.