Pre-Lecture

I. You are the Provider

Time: 10 minutes
Activity Type: Small Group Activity/Discussion

Purpose

This activity is designed to help introduce your students to the content of this chapter.

Instructor Directions

1. Direct students to read the "You are the Provider" scenario found throughout Chapter 36.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question. Facilitate a class dialogue centered on the discussion questions.
3. You may also assign this as an activity and ask students to hand in their comments on a separate piece of paper.

Lecture

I. Agencies Responsible for Protecting the Public Health

Time: 5 minutes
Slide: 2
Lecture

A. National Level

1. Occupational Health and Safety Administration (OSHA)
   a. Rules and regulations designed to protect employees of public and private organizations
   b. Blood-borne pathogen standard
2. Centers for Disease Control and Prevention (CDC)
   a. Data, research, and guidance for health care providers and the general public

B. State and Local Level

1. State and county public health departments
   a. Responsible for protection of public health from disease, prevention of epidemics, and management of outbreaks
   b. Supervision of water quality, cleanliness of restaurants, and routine inoculation programs

II. Host Defense Mechanisms

Time: 5 minutes

Slide: 3

Lecture

A. Human Body

1. Provides "built-in protection" from pathogenic organisms
2. Several defenses against infection
   a. Skin offers primary protective barrier
   b. Normal secretions of the skin also provide an antibacterial property that protects against pathogen entry. (Antibacterial handwashing solutions should not be used.)
   c. Mucous membranes protect eyes and urinary, respiratory, and gastrointestinal tracts.
   d. The immune system contains proteins that kill viruses, as well as antibodies directed against specific invading organisms.

III. The Cycle of Infection

Time: 5 minutes

Slide: 4

Lecture

A. Chain of Events

1. Sometimes as simple as retracing back to the source of the exposure
2. Other cases take years of research to find a pattern in the spread of the disease and planning a strategy to break the chain of infection
3. Study of infectious diseases considers the following population demographics:
   a. Age distributions
   b. Genetic factors
   c. Income levels
   d. Ethnic groups
   e. Workplaces and schools
   f. Geographic boundaries
   g. Expansion, decline, and movement of the disease

IV. Transmission of Communicable Diseases

Time: 10 minutes

Slides: 5–9

Lecture

A. Overview

1. By the very nature of their work, health care providers come into contact with sick people.
   a. A certain proportion have contagious diseases.

2. Communicable diseases
    a. Transmitted from one person to another under certain conditions
3. Spread from person to person by several specific mechanisms
    a. Direct contact with the infected person (touching)
    b. Indirect contact with an object harboring micro-organisms (fomites)
    c. Inhalation of infected droplets
    d. Puncture by a contaminated needle or other sharp instrument
    e. Transfusion of contaminated blood products
    f. Vectorborne, that is, a vehicle that transmits infection from a reservoir to a host (mosquito)
4. Factors influencing contraction of an infectious disease
    a. Dosage of the organism
    b. Virulence of the organism
    c. Mode of entry
    d. Host resistance of the health care provider

B. Type of Organism

1. Bacteria
    a. Grow and reproduce outside the human cell in an environment characterized by the appropriate temperature and nutrients
    b. Invade and multiply in the host
2. Viruses
    a. Smaller than bacteria
    b. Can multiply only inside a host
    c. Die when exposed to the environment
3. Fungi
    a. Grow rapidly in the presence of nutrients and organic material
    b. Acquired from contact with decaying organic matter or from airborne spores
4. Parasites
    a. Live in or on another living creature
    b. Feed off host's cells and tissues
    c. Protozoans: single-celled (microscopic), eukaryotic organisms
    d. Helminths: commonly called worms; invertebrates with long, flexible, rounded or flattened bodies

C. Dosage of the Organism

1. A certain number must be present for infection to occur.

D. Virulence of the Organism

1. Ability of an organism to invade and create disease in a host
2. Ability to survive outside the living host

E. Mode of Entry

1. If the organism does not enter the body by the correct route, infection cannot occur.

F. Host Resistance

1. The healthier you are, the less susceptible you are to infection.
2. Your ability to fight off infection
   a. The immune system will protect you from acquiring disease even though all other risk factors may be present.
   b. Wellness programs and vaccine/immunization programs serve to boost host resistance.
3. Incubation period
   a. Time from exposure to first symptoms
   b. Varies from disease to disease
4. Communicable period
   a. Period during which a person can transmit the illness to someone else
5. Contamination
   a. An object that has organisms on or in it
   b. Applies to water, food, dressing materials, linens, sharps, equipment, and even the ambulance
6. Infection
   a. Organisms actually produce an illness.
7. Carriers
   a. Infected individuals with no symptoms who are able to pass the disease on to others
8. Reservoir
   a. Place where organisms may live and multiply
   b. Air-conditioning systems and showerheads (Legionnaire's disease)
   c. The oxygen humidifier in ambulances is often implicated as a reservoir for infection.

G. You are the Provider

Slide: 10

Discussion

1. Present the case study provided on the slide:
   a. You are dispatched to a nursing home for a resident in respiratory distress.
   b. You arrive to the room and find a patient in moderate respiratory distress and very hot to the touch.
   c. *What do you suspect is wrong with this patient?*
      - Pneumonia or sepsis should be one of the first things that you suspect, especially in a nursing home. This will be a frequent call for paramedics.

V. Precautions for the Health Care Provider

Time: 10 minutes

Slides: 11–14

Lecture

A. Designated Infection Control Officer

1. Ryan White Law
   a. Requires that every emergency response agency have a designated infection control officer (DICO)
   b. Ensures proper postexposure medical treatment and counseling
   c. Treatment should be offered within 24 to 48 hours following an exposure.
   d. The DICO tracks and follows correct time frames, serves as a liaison between the exposed employee and the medical facility, ensures that confidentiality is maintained, and makes sure that documentation adheres to guidelines.
2. Communication network
   a. Exposed paramedic
   b. DICO
   c. Treating physician

B. Public Health Department

1. State and local health departments are responsible for many activities related to infectious diseases.
   a. Collecting data on the incidences
   b. Performing contact follow-up
   c. Running TB and immunization clinics
2. Play a major role in outbreak investigations
   a. Backup for exposure notification and determination of the need for medical follow-up treatment
   b. Must know who the DICO is for each department
   c. Liaison for problems that may arise regarding exposure notification by the medical facility and the sharing of source-patient testing results

C. Standard Precautions

1. Infection control practices that reduce the opportunity for an exposure to occur
   a. Replaces the older terms universal precautions and body substance isolation (BSI)
2. Add another element to BSI precautions
   a. Protection from moist body substances that may transmit other bacterial or viral infections
   b. All body substances except sweat

D. CDC-Recommended Immunizations and Vaccinations

1. Keeping current with recommended vaccines and immunizations boosts resistance and immune response.
2. In 1997 the CDC published guidelines for these vaccines and immunizations (Table 36-1).
3. Each employer must offer these to staff and pay for them.

E. Personal Protective Equipment

1. Secondary protective barrier
2. Selection and use depend on the task and procedure at hand
3. CDC guideline for PPE (Table 36-2)
4. Handwashing is your major protective measure.
    a. Use of antimicrobial, alcohol-based foams or gels
    b. Antibacterial products are not recommended.
    c. Use of friction to get alcohol-based foams and gels to evaporate removes surface organisms and kills viruses, but leaves normal flora intact
5. Open cuts or sores
    a. Cover the area with a dressing.
    b. If the area is too large, you should not perform high-risk tasks and procedures.
6. PPE should consist of, but not be limited to
    a. Disposable gloves
    b. Protective eyewear
    c. Cover gowns
    d. Surgical masks
    e. N-95 respirators (in some cases)
    f. Waterless handwashing alcohol-based foam or gel
    g. Needlesafe or needleless devices
    h. Biohazard bags
    i. Resuscitative equipment
7. Gloves should be nonlatex, vinyl, nitrile, or rubber
    a. Helps reduce the risk for developing latex allergy/sensitivity
    b. Not needed for intramuscular or subcutaneous injections or contact with sweat
    c. Recommended for IV starts, suctioning, intubation, contact with blood or other potentially infectious materials (OPIM), and contact with patient mucous membranes or nonintact skin
    d. For cleansing activities, OSHA requires the use of utility-style gloves (dishwashing gloves), which are washable and reusable as long as they are free of tears or holes.
    e. Hands should be washed after glove removal.
8. Surgical masks
    a. Protect against splatter into the mouth or up the nose
    b. Placed on a patient deemed to have a respiratory or droplet-transmitted disease
9. N95 or P100 respirators
    a. Smallpox
    b. Severe acute respiratory syndrome (SARS)
    c. Never place a respirator on a patient
10. Protective eyewear
    a. Blocks splatter into the eye
    b. Prescription glasses may be worn with disposable or reusable shields.
    c. Goggles should not be worn over prescription glasses.

11. Cover garments
    a. Recommended for large-splash situations
    b. Washable or disposable jackets or gowns
    c. Uniforms (if the employer purchases them, maintains them, and launders them)
    d. Booties and hair covers are not needed in the prehospital setting.
    e. Pocket masks and/or respiratory assistive devices must be readily available.
12. Sharps
    a. More than 80% of exposures
    b. 2000 Needlestick Safety and Prevention Act

F. Postexposure Medical Follow-Up

1. Third line of defense
2. If exposure occurs, the DICO will ensure you receive proper postexposure medical treatment, including counseling.
3. Postexposure medical management begins with the source individual.
    a. Employer must pay for all costs related to exposure events, including testing the source individual.
    b. Rapid HIV, hepatitis B virus antigen, rapid hepatitis C virus antibody, and if positive syphilis
    c. HIV testing requires patient consent, but state law makes exceptions for occupational exposure of health care providers.

G. Department Responsibilities

1. Each EMS department is required to have a comprehensive Exposure Control Plan.
    a. Lays out the specifics of how the department plans to reduce the risk of exposure and provide postexposure medical follow-up
    b. Key elements include proper education and training and establishment of postexposure medical follow-up procedures (Table 36-3).
2. Compliance monitoring
    a. Spot checks to ensure staff members are following guidelines
3. Work restriction guidelines
    a. Indicate when employees with various illnesses may not care for high-risk patients
    b. Require employees to use sick time unless the illness is a result of an occupational exposure

VI. General Assessment Principles

Time: 5 minutes
Slide: 15
Lecture

A. Suspected Infectious Disease Patients

1. Should be approached like any other medical patient

2. Scene size-up and standard precautions
3. Initial assessment (MS-ABC plan)
4. Focused history and physical exam
   a. OPQRST
   b. SAMPLE
5. Always show respect for the feelings of patients, family, and others at the scene.

VII. General Management Principles

Time: 5 minutes
Slide: 16
Lecture

A. Suspected Infectious Disease Patients

1. First focus on any life-threatening conditions.
2. Be empathetic.
   a. Fever of an unexplained origin or mild breathing problems (position of comfort on the stretcher and keep warm)
3. Dehydration
   a. Normal saline or lactated Ringer's solution IV

VIII. Airborne Transmitted Diseases

Time: 20 minutes
Slides: 17–28
Lecture

A. Common Communicable Diseases of Childhood

1. In developed countries these are not so "common" anymore.
   a. Still sporadic cases and even epidemic outbreaks
2. Measles
   a. Also known as rubeola, hard measles, or red measles
   b. Highly communicable viral disease
   c. Characterized by fever, conjunctivitis, coughing, a blotchy red rash, and whitish gray spots on the buccal (mouth) mucosa
   d. Transmission by airborne aerosolized droplets or direct contact with the nasal or pharyngeal secretions of an infected person
   e. Less commonly spread by contact with articles recently soiled by the patient's nasal or throat sections
   f. The incubation period is 10 days.
   g. The onset of fever is 7 to 18 days after exposure and the rash appears about 14 days after exposure.
   h. The communicable period begins when the first symptoms appear (about 4 days before the rash) and diminish rapidly to end about 2 days after the rash appears.

i. The only certain protection against measles is immunity.

3. Rubella
   a. Also known as German measles or three-day measles
   b. Characterized by a low-grade fever, headache, runny nose, swollen lymph glands, and usually a diffuse rash that may look a bit like the rash of measles
   c. In children, mild, uncomplicated disease
   d. In women during the first 3 to 4 months of pregnancy it may cause severe abnormalities in the developing fetus, including deafness, cataracts, mental retardation, and heart defects.
   e. Occurs most often during the winter and spring
   f. Highly communicable to susceptible individuals
   g. Transmission by direct contact with the nasopharyngeal secretions of an infected person (droplet spread or touching the patients or articles freshly contaminated)
   h. The incubation period is 14 to 23 days.
   i. The communicable period starts about a week before the rash appears and continues until 4 days after the rash becomes evident.
   j. Immunity is the only certain protection.
4. Mumps
   a. Viral disease that occurs most commonly in winter and spring
   b. Signs and symptoms in children include fever plus swelling and tenderness of one of the salivary glands (parotid).
   c. Mumps in males past the age of puberty may have a very painful complication (inflammation of the testicles).
   d. Transmission by droplet spread or direct contact with saliva of an infected person
   e. The incubation period is 12 to 26 days.
   f. The communicable period lasts 9 days after the salivary glands swell up.
5. Chickenpox
   a. Also known as varicella
   b. Highly contagious viral disease that produces a slight fever, photosensitivity, and a vesicular rash that gradually crusts over, leaving a series of scabs
   c. Can lead to herpes zoster ("shingles") in adults (virus takes up residence in the ganglion of a nerve)
   d. Transmission by direct contact or droplet spread of respiratory secretions from patients with chickenpox
   e. The incubation period is 10 to 21 days.
   f. The communicable period starts 1 to 2 days before the appearance of the rash and lasts about 5 days after the first vesicles become apparent.
   g. Having chickenpox as a child usually provides lifelong immunity.
6. Pertussis
   a. Also known as whooping cough
   b. Bacterial infection
   c. Insidious onset characterized by an irritating cough that becomes paroxysmal in about 1 to 2 weeks (may last for 1 to 2 months)

d. Transmission by direct contact with discharges from mucous membranes and/or airborne droplets
e. The incubation period is 7 to 14 days.
f. Highly communicable in its early stages (before the cough becomes paroxysmal), then becomes negligible in about 3 weeks

B. Other Common or Serious Communicable Diseases

1. Meningitis
   a. Inflammation of the membranes that cover the brain and spinal cord
   b. Two types: bacterial and viral
   c. The bacterial form is communicable, viral is not.
   d. Droplet-transmitted disease
   e. Type most often involved in epidemic outbreaks is meningococcal meningitis caused by *N. meningitides*
   f. Epidemic outbreaks can occur at any time.
   g. Signs and symptoms (same for viral and bacterial) include sudden-onset fever, severe headache, stiff neck, photosensitivity, and a pink rash that becomes purple in color.
   h. Changes in mental status, ranging from apathy to delirium
   i. Projectile vomiting common
   j. The incubation period for meningococcal meningitis lasts between 2 and 10 days.
   k. The communicable period is variable (as long as meningococcal bacteria are present in the patient's nasal and oral secretions).
2. Tuberculosis (TB)
   a. Was once widespread in the US, but no longer
   b. Not a highly communicable disease
   c. Three types: typical (communicable), atypical, and extrapulmonary (noncommunicable)
   d. TB infection means that the individual has tested positive for exposure to TB but does not have, and may never develop, active disease.
   e. TB disease means the individual has active disease.
   f. Multidrug-resistant TB occurs in immunocompromised people.
   g. Signs and symptoms include a persistent cough for more than 3 weeks plus one or more of the following: night sweats, headache, weight loss, hemoptysis, or chest pain.
   h. Transmission by airborne droplets
   i. The incubation period is 4 to 12 weeks.
   j. Communicable only when an active lesion develops in the lungs and droplets are expelled into the air by coughing
   k. Early infection can be detected either by a tuberculin skin test or by the QFT-TB Gold blood test.
3. Pneumonia
   a. Inflammation of the lungs
   b. Caused by bacteria, viruses, fungi, or other organisms
   c. More than 50 types identified, ranging from mild to life-threatening

   d. Older adults, heavy smokers or alcoholics, individuals with chronic illnesses, and immunocompromised individuals are most susceptible.
   e. Worldwide, leading cause of death in pediatric patients

4. Other respiratory conditions
   a. A number may (or may not) be associated with fever and may (or may not) be infectious.
   b. Bronchiolitis: an infection of the lungs and airways (children 3 to 6 months of age); viral; transmission by inhaling droplets
   c. Bronchitis: infection and inflammation of the inner walls of the bronchioles; symptoms include soreness in chest and throat, congestion, wheezing, dyspnea, and a slight fever; caused by the same virus that produces the common cold and gastric reflux disease, as well as by common pollutants and smoking (secondhand smoke)
   d. Laryngitis: inflammation of the voice box (overuse, irritation, or infection); usually viral; symptoms include hoarseness, weak voice, sore throat, dry throat, and cough
   e. Croup: inflammation of the larynx and airway just below it; children 5 years or younger; symptoms include a loud, harsh, barking cough, fever, noisy inhalations, hoarse voice, and mild to moderate dyspnea; caused by a virus; transmission by respiratory secretions or droplets
   f. Epiglottitis: life-threatening condition causing swelling of the epiglottis and supraglottic tissue; most prevalent in 2- to 7-year-olds; symptoms include difficulty breathing and swallowing with stridor and drooling
   g. Common cold: infection of the upper respiratory system characterized by a runny nose, sore throat, cough, congestion, and watery eyes

5. Respiratory syncytial virus (RSV)
   a. Leading cause of lower respiratory tract infections in infants, older people, and immunocompromised individuals
   b. Signs and symptoms include sneezing, runny nose, nasal congestion, cough, and fever.
   c. Transmission by direct contact or indirect contact (contaminated hands or items)

6. Mononucleosis
   a. Caused by Epstein-Barr virus (herpesvirus)
   b. Suspected of causing chronic fatigue syndrome
   c. Transmission by direct contact with saliva of an infected person
   d. The incubation period is 4 to 6 weeks.
   e. Prolonged communicable period
   f. Signs and symptoms include sore throat, fever, secretions from the pharynx, and swollen lymph glands with or without malaise, anorexia, headache, muscle pain, and an enlarged liver or spleen.

7. Influenza
   a. Causes acute respiratory illnesses
   b. Droplet transmission
   c. The incubation period is 1 to 4 days.
   d. The communicable period lasts from the day before symptoms begin until about 5 days after the onset of illness.

e. Signs and symptoms include systemic fever, shaking chills, headache, muscle pain, malaise, and loss of appetite; dry cough, hoarseness, and nasal discharge.

C. You are the Provider (continued)

Slide: 29

Discussion

1. Continue reading the case study provided on the slide:
   a. The patient does not normally speak; her blood pressure is 140/80 mm Hg; heart rate is 130 beats/min, and respiratory rate is 36 breaths/min.
   b. She is extremely hot to the touch and her skin is moist.
   c. *What treatment should you provide for this patient?*
      - As always, maintain her airway, provide 100% oxygen via a nonrebreathing mask, administer IV therapy, and provide fluids as necessary. Transport the patient to the hospital.

IX. Sexually Transmitted Diseases

Time: 10 minutes

Slides: 30–35

Lecture

A. Gonorrhea

1. Infection caused by gonococcal bacteria, *Neisseria gonorrhoeae*
2. In 2005, more than 300,000 cases reported
3. Transmission by contact with the pus-containing fluid from mucous membranes of infected persons
4. The incubation period is usually 2 to 7 days (may be longer).
5. Communicable for months if not treated; if treated noncommunicable within hours
6. Signs and symptoms of gonorrhea differ between males and females.
   a. Males see a pus-containing discharge from the urethra and often experience pain on urination (dysuria).
   b. For females, initial inflammation of the urethra or cervix may be so mild that it passes unnoticed, and the illness may progress until it presents as pelvic inflammatory disease.
7. Risk of acquiring through a route other than sexual contact is remote.

B. Syphilis

1. Acute and chronic disease caused by the spiral-shaped bacteria *Treponema pallidum*
2. Incidence rate increasing for the past 5 years
3. Transmission by direct contact with the infectious fluids of the primary lesion
   a. Can be transmitted across the placenta from an infected mother to her fetus and by sexual contact

4. The incubation period is 10 days to 3 months.
5. The communicable period has a variable length; if treated with penicillin, the individual is considered noncommunicable within 24 to 48 hours.
6. Chancre
    a. Ulcerative lesion caused by initial infection
    b. Most commonly located in the genital region
7. Complications
    a. Cardiac, ophthalmic, auditory, and central nervous system complications, as well as lesions of the tissues and bone

C. Genital Herpes

1. Chronic, recurrent illness produced by infection with the herpes simplex virus
    a. Type 1 is generally transmitted via contact with oral secretions.
    b. Type 2 is spread through sexual contact.
2. Characterized by vesicular lesions
    a. Women: initially on the cervix; during recurrent infections, vesicles may also appear around the vulva, legs, and buttocks
    b. Men: commonly on the penis, as well as around the anus (depending on their sexual practices)
    c. May also be present on the mouth as a result of oral sex
3. Transmission usually occurs through sexual contact, but infants may become infected if delivered through the birth canal of a woman with active disease.
4. The incubation period is 2 to 12 days.
5. Secretion of the virus in saliva has been noted to persist for up to 7 weeks following the appearance of a lesion.
6. Genital lesions are infectious for 4 to 7 days.
7. Can suddenly become reactivated
    a. Repeatedly, over many years
    b. Outbreaks are often stress related.
8. No cure

D. Chlamydia

1. Highest incidence of all STDs
    a. In 2005 more than 900,000 cases were reported to the CDC.
2. In women, infection initially remains asymptomatic, develops into pelvic inflammatory disease.
3. In men, infection may lead to epididymitis, prostatitis, proctitis, and proctocolitis.
4. Transmission occurs through sexual contact.
    a. Perinatal infections may result in premature rupture of membranes, premature birth, or stillbirth.
5. The incubation period is believed to be 7 to 14 days or longer.
6. The communicable period is unknown.

7. Signs and symptoms include inflammation of the urethra, epididymis, cervix, and fallopian tubes when the infection is acquired through sexual transmission.
    a. Urethral discharge may appear gray or white in color.
    b. Amount of discharge variable
8. Treated with antibiotics

E. Scabies

1. Caused by infection with *Sarcoptes scabiei*, a parasite
2. Incidence increasing over the past few years
3. Transmission occurs via direct skin-to-skin contact (wrestling, sexual contact, undergarments, towels, and linens).
4. The incubation period is 2 to 6 weeks.
5. The communicable period lasts until the mites and eggs are destroyed by treatment.
6. Signs and symptoms include nocturnal itching and the presence of a rash involving the hands, flexor aspects of the wrists, axillary folds, ankles, toes, genital areas, buttocks, and abdomen.

F. Lice

1. Small insects that live in hair and feed on blood through the skin
2. Three types
    a. Head lice
    b. Body lice
    c. Pubic lice
3. All types of lice are acquired through direct contact with an infested person.
    a. Head and body lice can be acquired from objects such as hats, combs, or clothes infested with lice.
4. Signs and symptoms include itching and irritation, and possibly sores.
5. Pubic or crab lice
    a. *Phthirus pubis* is a parasite that is usually grayish in color.
    b. Transmission through intimate physical or sexual contact
    c. The incubation period is approximately 8 to 10 days after the eggs hatch.
    d. The communicable period ends when all lice and eggs are destroyed.
    e. Signs and symptoms include slight to severe itching and visual nits clinging to the pubic, perianal, or perineal hair.
    f. Can also infest eyelashes, eyebrows, axilla, scalp, and other body hairs.

X. Bloodborne Diseases

Time: 15 minutes
Slides: 36–43
Lecture

A. Viral Hepatitis

1. Inflammation of the liver produced by a virus
2. Five distinct forms of viral hepatitis (A, B, C, D, and E)
    a. Present with the same signs and symptoms
    b. A and E are not bloodborne infections.
3. Hepatitis B virus infection
    a. Serum hepatitis
    b. Greatly diminished due to vaccination programs
    c. Transmission through sexual contact, blood transfusion, or puncture of the skin with contaminated needles
    d. Particularly common in intravenous drug users
    e. Limited data suggest that this virus can survive outside the body in the presence of dried blood for as long as 7 days.
    f. The incubation period varies widely from 45 to 200 days.
    g. The communicable period starts weeks before the first symptoms appear and may persist for years in chronic carriers.
    h. Signs and symptoms include loss of appetite, nausea, vomiting, general fatigue and malaise, low-grade fever, vague abdominal discomfort, and sometimes aching in the joints.
    i. In the second phase of the disease, urine turns dark, and then a day or two later, the patient develops jaundice and scleral icterus (a yellowing of the eyes).
    j. Usually lasts several weeks, although complete recovery may take 3 to 4 months
    k. Immunization protects only against HBV, but offers that protection for life (three-dose series)
4. Hepatitis C virus infection
    a. Most common chronic bloodborne infection and the leading cause of liver transplant in the US
    b. Occupational risk related to a contaminated deep needlestick with visible blood on the sharp, a sharp that has been in the patient's vein or artery, a hollow-bore needle, and a source patient with a high viral load
    c. Transmission may occur by blood-to-blood contact with an open area of the skin, sexual contact, blood transfusion, organ donation, unsafe medical practices, and from an infected mother to her infant.
    d. Cannot survive in the environment long enough to pose a risk for any means of transmission except via bloodborne contact
    e. The incubation period ranges from 2 to 24 weeks.
    f. Signs and symptoms are the same as for hepatitis B.
    g. No vaccine
5. Hepatitis D virus infection
    a. Also called delta hepatitis
    b. Requires that the host be infected with hepatitis B
    c. Transmission is generally by percutaneous exposure (not effectively transmitted through sexual contact).

d. Incubation ranges from 30 to 180 days
e. Blood is considered infectious during all phases of the illness.
f. Signs and symptoms are the same as hepatitis B.

B. Human Immunodeficiency Virus (HIV) Infection

1. Type 1 identified in the late 1970s
   a. Estimated 60 million people infected worldwide
2. Primarily a sexually transmitted disease
   a. Bloodborne and transmitted from mother to infant in the birthing process and donated blood
   b. Not transmitted through casual or even household contact or droplets; not airborne
3. The pathogen envelops infected cells and attacks the immune system and other body organs.
   a Takes 7 days to envelop a cell; process begins 4 to 6 weeks after the exposure event
4. The communicable period is unknown.
5. Signs and symptoms include acute febrile illness, malaise, swollen lymph glands, headache, and possibly rash.
   a. Following initial infection, most individuals present with enlargement of the lymph nodes and appear healthy.
   b. The number of T-helper lymphocytes gradually declines.
   c. Seroconversion occurs (antibodies can be detected in the blood).
6. The risk of acquiring HIV infection is sharps-related.
7. Acquired immunodeficiency syndrome (AIDS)
   a. End-stage disease process caused by HIV
   b. The patient is extremely vulnerable to numerous bacterial, viral, and fungal infections.
   c. Opportunistic infections include pneumonia in infants or people with compromised immune systems, loss of vision due to cytomegalovirus, reddish/purple skin lesions, atypical TB, and cryptococcal meningitis.
   d. The incubation period of AIDS spans the time between documented infection (HIV) and the development of the end-stage disease; determined by the CD4 cell count and the presence of opportunistic infections.
   e. The communicable period is presumed to last as long as the patient is seropositive, even before clinically apparent AIDS develops.
   f. Antiretroviral drugs are toxic. (Careful and complete counseling should be provided.)

XI. Enteric (Intestinal) Diseases

Time: 5 minutes
Slides: 44–46
Lecture

A. Gastroenteritis

1. Stomach flu

2. Compromises many types of infections and irritations
3. Symptoms such as nausea and vomiting, fever, abdominal cramps, and diarrhea

B. Hepatitis A Virus Infection

1. Infectious hepatitis
2. Most common type of hepatitis
3. Transmission by the fecal-oral route
   a. Contaminated drinking water, milk, sliced meats, and undercooked shellfish
4. Benign
   a. Once you acquire it you have lifelong immunity to it.
5. The incubation period is usually 2 to 4 weeks (can range from 15 to 50 days).
6. The communicable period probably starts toward the end of incubation and continues for a few days after the patient becomes jaundiced.
7. Signs and symptoms
   a. Phase 1: fatigue, loss of appetite, fever, nausea, and abdominal pain
   b. Phase 2: jaundice, dark-colored urine, and whitish stools

C. Hepatitis E Virus Infection

1. Also referred to as enterically transmitted non-A, non-B hepatitis (ET-NANB)
   a. Accounts for 50% of hepatitis cases in developing countries
2. Transmission via the fecal-oral route
   a. Contaminated water
   b. Floods, poor sanitation, and primitive hygiene
3. Not chronic
4. The incubation period is about 15 to 64 days.
5. The communicable period is the same as for hepatitis A.
6. Signs and symptoms are the same as other forms of hepatitis.

XII. Vectorborne Diseases

Time: 5 minutes
Slides: 47 and 48
Lecture

A. West Nile Virus

1. Relatively new disease in the US
   a. First discovered in Uganda in the 1930s
   b. First appeared in the western hemisphere in New York City in 1999
2. Transmission via bite from a mosquito carrying the virus
   a. Not from person to person (no communicability)
   b. Has been transmitted via donated blood and organs, as well as during hemodialysis
3. The incubation period is from 3 to 14 days following the bite.

4. In the majority of cases, the disease is mild and uneventful.
    a. 80% remain unaware that they have it.
    b. 20% exhibit fever, headache, body rash, and swollen lymph glands.
    c. 1 in 150 will develop severe signs and symptoms, including encephalitis, meningitis leading to neurologic complications, and death.

B. Lyme Disease

1. Most common tick-borne disease in the US
2. Highest prevalence of this disease is found along the Atlantic coast, the upper Midwest, and the Pacific coast
3. Peak season between June and August
4. Primarily affects the skin, heart, joints, and nervous system
5. The incubation period ranges from 3 to 32 days.
6. Stages
    a. Early localized stage characterized by a round, red skin lesion (groin, thigh, or axilla); warm to the touch and may blister or scab
    b. Early disseminated stage characterized by secondary lesions and flu-like symptoms
    c. Late manifestation stage involves arthritis, intermittent joint pain, and chronic neurologic symptoms (memory impairment, depressed mood, and severe fatigue)

XIII. Zoonotic (Animal-Borne) Diseases

Time: 5 minutes
Slides: 49–51
Lecture

A. Hantavirus

1. Also known as hemorrhagic fever with renal syndrome
2. Associated with the deer mouse, white-footed mouse, and common rat
    a. Urban areas
3. First identified in Korea in the early 1950s and in the Southwestern United States in 1993
4. Found in the urine, feces, and saliva of chronically infected rodents
5. Transmission via direct contact with rodent waste matter (aerosol inhalation)
6. The incubation period usually lasts 12 to 16 days (can range from 5 to 42 days).
7. Not transmitted from person to person
8. Signs and symptoms
    a. Sudden onset of fever, which lasts 3 to 8 days
    b. Accompanied by headache, abdominal pain, loss of appetite, and vomiting

B. Rabies

1. Hydrophobia
2. Found worldwide

3. Vaccination of domestic animals and the development of vaccine and rabies immunoglobulin have greatly reduced the number of deaths in humans.
4. Transmission is primarily related to the direct bite of an infected animal.
   a. Contamination of mucous membranes
5. The incubation period is usually 2 to 8 weeks.
   a. Varies depending on the severity of the bite and the location of the wound
6. Signs and symptoms are nonspecific.
   a. Neurologic phase: hyperactivity, seizures, bizarre behavior, and hydrophobia
   b. Paralysis and deterioration of mental status leading to coma

C. Tetanus

1. Lockjaw
2. More common in agricultural areas and in underdeveloped areas, where contact with animal waste is common and immunization is inadequate
3. Tetanus bacillus found in the intestines of horses and other animals
4. Transmission when tetanus spores enter the body by two means
   a. A puncture wound contaminated with animal feces, street dust, or soil
   b. Contaminated street drugs
5. The incubation period is usually about 14 days.
   a. Can be as short as 3 days (higher level of contamination)
6. Signs and symptoms begin at the site of the wound.
   a. Painful muscle contractions in the neck and trunk muscles
   b. Abdominal rigidity (key sign)

XIV. Antibiotic-Resistant Organisms

Time: 5 minutes
Slides: 52 and 53
Lecture

A. Overview

1. Overuse and misuse of antibiotics has led some pathogens to develop resistance to the antibiotic drugs commonly prescribed.

B. Methicillin-Resistant *Staphylococcus aureus*

1. Resistant to penicillin (late 50s); treated with methicillin and by mid-1970s became resistant to methicillin
2. Resistant to some other antibiotics
3. Transmitted from patient to patient via unwashed hands
4. Factors that increase the risk include antibiotic therapy, prolonged hospital stays, a stay in intensive care or a burn unit, and exposure to an infected patient.
5. Patients may be colonized with this organism or infected.
6. The incubation period appears to be between 5 and 45 days.

7. The communicable period varies.
8. Signs and symptoms may involve localized skin abscesses and cellulites, empyemas, and endocarditis.
    a. Secondary infections such as osteomyelitis and septic arthritis

C. Vancomycin-Resistant Enterococci

1. Normal organism of the GI tract, urinary tract, and genitourinary tract
2. Primarily a hospital-acquired infection
3. Transmission by direct contact with contaminated surfaces or equipment
    a. Only infected patients can transmit

XV. New and Emerging Diseases

Time: 5 minutes
Slides: 54 and 55
Lecture

A. Severe Acute Rrespiratory Syndrome (SARS)

1. New disease from the merger of two viruses
    a. One from mammals and one from birds
    b. Source identified as bats found in Hong Kong
2. First reported in Asia in February 2003
    a. Within months spread from Asia to Canada, South America, and Europe.
3. Transmission by close personal contact—living with and caring for a person with the disease or having direct contact with respiratory secretions or body fluids of an infected person
4. The incubation period is 10 days.
5. The communicable period has not been well defined.
6. Signs and symptoms include a fever of greater than 100.4ºF, headache, overall feeling of discomfort, and body aches.
    a. Resembles any flu-like illness
    b. After 2 to 7 days a dry cough appears, and patients with severe illness progress to pneumonia.

B. Avian Flu

1. Bird flu
2. Caused by a virus that occurs naturally in the bird population
    a. Infected bird used for food (cooked) does not pose a risk.
3. First case in Hong Kong in 1997
4. No rapid human-to-human cases of this disease have been reported.
    a. Close contact to infected birds
5. Signs and symptoms include fever, sore throat, cough, and muscle aches (some eye infections).

a. May eventually progress to pneumonia and severe respiratory distress

XVI. Ambulance Cleansing and Disinfection

Time: 5 minutes

Slide: 56

Lecture

A. Obligation

1. Protect patients from nosocomial infections.
   a. Comply with work restriction guidelines.
   b. Keep ambulance interior and equipment clean.
2. Select cleaning solutions to fit the equipment category.
   a. Critical equipment: High-level disinfection, EPA-registered chemical "sterilants"
   b. Semicritical equipment: Solutions that have a label claiming to kill HBV
   c. Noncritical equipment: EPA-registered hospital-grade cleaner or bleach and water mixture
3. General cleaning routines following every call
   a. Strip used linens from the stretcher immediately after use.
   b. Discard all disposable equipment used for care of the patient.
   c. Wash contaminated areas with soap and water. (Cleaning must be done first for disinfectant to work.)
   d. Disinfect all nondisposable equipment used in the care of the patient.
   e. Clean the stretcher with an EPA-registered germicidal/virucidal solution or bleach and water at 1:100 dilution.
   f. If any spillage or other contamination occurred in the ambulance, clean it up with the same germicidal/virucidal or bleach/water solution.
   g. Create a schedule for routine full cleaning for the vehicle, as required by the Exposure Control Plan.
   h. Have a written policy/procedure for cleaning each piece of equipment. Refer to the manufacturer's recommendations as a guide.

B. You are the Provider Summary

Slide: 57

Discussion

1. Continue reading the case study provided on the slide:
   a. More than 50 types of pneumonia have been identified, ranging from mild to life-threatening.
   b. Individuals who are most susceptible to pneumonia are older adults, heavy smokers, or alcoholics.

C. Summary

1. Infectious and communicable diseases pose a risk to both patients and providers.
2. It is your responsibility to help prevent the spread of diseases.

Post-Lecture

I. Prep Kit Activities

Time: 65 minutes

Note: This section contains various student-centered end-of-chapter activities designed as enhancement to instructor's preparation. As time permits, these activities may be presented in class. They are also designed to be used as outside homework/activities.

A. Assessment in Action

Time: 20 minutes

Individual/Small Group Activity/Discussion

Purpose

This activity is designed to assist students in gaining a further understanding of the chapter content. This activity allows students an opportunity to analyze an emergency care scenario, develop responses, and integrate what they have learned.

Instructor Directions

1. Direct students to read the "Assessment in Action" scenario located in the Prep Kit at the end of Chapter 36.
2. Direct students to read and individually answer the quiz questions at the end of the scenario. Facilitate a class review and dialogue of the answers, allowing students to correct responses as may be needed. Use the quiz question answers noted below to assist in building this review.
3. You may also wish to assign these as individual activities and ask students to turn in their comments on a separate piece of paper.

Answers to Multiple-Choice Questions

A call goes out for a patient complaining of fever, rash, and weakness. The location given is the local university. When the paramedics arrive, they are taken to a dorm room where a student is lying on the sofa. Patient assessment reveals a pinkish-colored rash, rapid onset of a headache, and stiff neck; also, the patient does not want to be in bright light.

During transport to the local hospital, the patient vomits. The next day, a rumor circulates that the student was diagnosed with bacterial meningitis. The medical facility contacts the DICO, who then contacts the crew members who were on the call.

1. What is meningitis?
   A. Inflammation of the lining of the myocardium
   B. Inflammation of the meninges, the membranes that cover the brain and spinal cord
   C. Inflammation of the pleura
   D. Inflammation of the endocrine system

Answer: B. Meningitis is inflammation of the meninges, the membranes that cover the brain and spinal cord. There are two types of meningitis: bacterial and viral. The bacterial form is communicable; the viral form is not.

2. What is the transmission mode for meningitis?

   A. Vector-borne
   B. Direct contact with the nasopharyngeal secretions of an infected person
   C. Indirect contact
   D. Inhalation of infected droplets

Answer: B. The transmission mode for meningitis is by direct contact with the nasopharyngeal secretions of an infected person. Therefore it can occur from administration of mouth-to-mouth resuscitation, suctioning, or intubation with spraying of secretions.

3. How is the diagnosis of meningitis made?

   A. Gram's stain
   B. Standard blood work
   C. Chest radiographs
   D. Arterial blood gas analysis

Answer: A. The diagnosis of meningitis is made in the hospital by Gram's stain of a spinal fluid sample. It takes about 10 minutes in the laboratory.

4. What is the incubation period of meningitis?

   A. 12 to 24 hours
   B. 8 to 36 hours
   C. 2 to 10 days
   D. 10 to 21 days

Answer: C. The communicable period can range from 2 to 10 days; it lasts as long as the bacteria are present in the patient's nasal and oral secretions. Usually the microorganism disappears from the patient's upper respiratory tract within 24 hours of starting antibiotic treatment.

5. Which type of meningitis is communicable?

   A. Viral
   B. Bacterial

Answer: B. Viral meningitis is not communicable; bacterial meningitis is. It is important to note that meningitis is not airborne; it is a droplet-transmitted disease.

6. Communicable diseases are caused by microorganisms. How many means of transmission are there?

   A. 3
   B. 6
   C. 8

D. 4

Answer: D. Communicable diseases spread in four ways: direct contact, indirect contact, foodborne, and vectorborne. Usually communicable diseases are caused by bacteria or viruses, but sometimes they can be caused by fungi and parasites.

7. What are bacteria?

   A. Small organisms that can grow and reproduce outside the human cell in the presence of the right temperature and nutrients
   B. Small organisms that multiply inside a host; they die when exposed to the environment
   C. Organisms that grow rapidly in the presence of nutrients and organic material
   D. Small living organisms in or on any living creature

Answer: A. Bacteria are small organisms that can grow and reproduce outside the human cell in the presence of the right temperature and nutrients. They cause disease by invading and multiplying in the tissues of the host.

8. Who does the postexposure medical management begin with?

   A. Employee
   B. Source individual
   C. Family members
   D. DICO

Answer: B. Postexposure management begins with the source individual in the exposure, not the exposed employee, as clarified by OSHA in 1999. Employers must provide and pay for all costs related to exposure events.

9. The liaison who handles notification between the hospital and an exposed responder is the:

   A. medical director.
   B. DICO.
   C. chief supervisor.
   D. dispatcher.

Answer: B. The DICO is responsible for contacting the receiving facility and the exposed responder, as mandated by the Ryan White Act.

10. In an approach to infection control, which of the following is based on the assumption that all blood and body fluids are potentially infectious?

    A. PPE
    B. Hand washing
    C. Biohazard labeling
    D. Standard precautions

Answer: D. The paramedic must assume that all blood and body fluids are infectious. After each call, wash your hands: It is one of the best methods of preventing infection.

Challenging Question

It's 2:00 AM and you are dispatched to a private residence for a man who doesn't feel good. When you arrive on the scene, the patient tells you he has been coughing for approximately 2 weeks. During that time he has had a headache, unexplained weight loss, and night sweats. On the way to the hospital, the patient begins to cough uncontrollably, including in your face.

11. What are some communicable diseases this patient may possibly have, and how can you prevent becoming exposed to them?

Rationale: This patient could have tuberculosis. TB is caused by infection with *Mycobacterium tuberculosis*, a bacterium that most commonly affects the lungs but can affect the central nervous system, lymphatic system, circulatory system, genitourinary system, bones, and joints. TB becomes communicable when an active lesion develops in the lungs and droplets are expelled into the air by coughing, sneezing, or speaking, or through spit. This period lasts about 24 to 48 hours after antibiotic treatment has been started.

TB infection means the patient has tested positive for exposure to TB but does not have active disease and may never develop active TB. Such an individual does not pose a threat to other people. *TB disease* means the patient has active TB verified by blood testing and a positive chest radiograph.

As a preventive measure, you should apply a nonrebreathing mask to this patient to help prevent inhalation of droplets. Report the incident to your DICO. It is now the DICO's responsibility to see whether this patient has active TB.

B. Points to Ponder

Time: 20 minutes
Individual/Small Group Activity/Discussion

This activity addresses the affective objectives of the chapter, allowing you to help students probe the more difficult situations that they face. Use this as an opportunity to allow them to express differences of opinion and approach, while directing them to be thorough and decisive in their answers. Encourage challenges.

Purpose

To allow students an opportunity to apply critical thinking analysis to a given case study.

Instructor Directions

1. Direct students to read the "Points to Ponder" scenario found in the Prep Kit at the end of Chapter 36.
2. You may wish to assign students to a partner or a group and direct them to review the discussion question at the end of the scenario and prepare a response. Facilitate a class dialogue centered on the discussion point.
3. You may also ask students to complete this activity on their own and hand in their comments on a separate piece of paper.

4. Personally review the scenario and discussion question based on your experience and knowledge as an emergency care worker. Develop your own key points for guiding this discussion.

Scenario

You are dispatched to a private residence for a 42-year-old man complaining of right-sided chest pain. During your assessment you find the patient to be in supraventricular tachycardia at a rate of 220 beats/min, with blood pressure of 100/70 mm Hg and a respiratory rate of 22 breaths/min. He's pale in color and slightly diaphoretic. Before starting an IV, your partner practices the appropriate standard precautions. You are helping your partner clean up when you suddenly feel a sharp prick in the palm of your hand. You have just received a needlestick from the used catheter. Your palm has small specks of blood coming from it. When you arrive at the hospital, the patient informs you that he has hepatitis C virus and is currently under treatment for this disease.

Issues

Safe Management of a Patient With an Infectious and Communicable Disease, Compliance With Standard Precautions and BSI, Managing an Exposure.

Discussion

Health care providers exposed to blood in the workplace are at risk for infection by bloodborne pathogens. You as the paramedic must protect yourself from such possible exposures. *Standard precautions* is a term used to describe the infection control practices that will reduce the opportunities for exposure in the daily care of patients. Standard precautions are based on the premise that *all* exposures to body fluids, under any circumstances, are potentially infectious. Handwashing is one of the best ways to prevent such exposures. The current standard calls for the use of antimicrobial, alcohol-based foams or gels for handwashing. All health care providers involved with treating patients with an infectious disease *must* observe personal protective measures, including effective handwashing.

In this scenario, you were not treating the patient but still received a needlestick. The needle penetrated your skin enough to produce blood. Puncture by a contaminated needle or other contaminated sharp instrument is a mode of transmission that is responsible for a significant number of bloodborne diseases. You should immediately wash your hands thoroughly and properly. You must familiarize yourself with your department's policies on reporting all exposures, including needlesticks. Every agency must have a DICO. Postexposure follow-up is your third protective level.

When treating patients with an infectious or communicable disease, accord them the respect and dignity they deserve. Treat them as you would want yourself or your family members treated. Don't judge these individuals, don't neglect or hold back any treatment from them, and don't be afraid to touch or treat them.

Take the time to properly educate yourself about disease issues. Listen to the patient or family and answer their questions to the best of your ability and knowledge. Don't judge or assume you know how a patient may feel about having the disease.

Although all exposures can't be prevented, their impact can be reduced through patient assessment for signs and symptoms and appropriate use of PPE. Continuously practice standard precautions, and properly wash your hands after each call. Clean all equipment thoroughly as well.

II. Lesson Review

Time: 10 minutes

Discussion

Note: Facilitate the review of this lesson's major topics using the review questions as direct questions or overhead transparencies. Answers are found throughout this lesson plan. Each question includes a reference to the slide where the information is covered.

1. What are the types of organisms that cause infectious diseases in humans? (Lecture IV-B)
2. What is the term for the time between exposure to an infectious disease and the time when the first symptoms appear? (Lecture IV-F)
3. Who should be contacted immediately after an exposure? (Lecture V-A)
4. What is an airborne disease that causes fever, blotchy red rash, and conjunctivitis? (Lecture VIII-A)
5. What is a viral disease that causes swelling of one of the salivary glands? (Lecture VIII-A)
6. What is a common, highly contagious disease that causes a vesicular rash that crusts over? (Lecture VIII-A)
7. What is another name for whooping cough? (Lecture VIII-A)
8. What are the signs and symptoms of meningitis? (Lecture VIII-B)
9. What is a sexually transmitted viral disease that may reappear for years? (Lecture IX-C)
10. What is a disease spread by rodent droppings? (Lecture XIII-A)

III. Assignments

Time: 5 minutes

Lecture

1. Review all materials from this lesson and be prepared for a lesson quiz to be administered (date to be determined by instructor).
2. Read Chapter 37: *Behavioral Emergencies* for the next class session.

