Name: _____

SCC#: _____

INGALLS HOSPITAL
EMERGENCY MEDICAL SERVICES

Infectious Diseases / MRSA

Study Book
February 2008

Reading Assignment: Mosby Paramedic Textbook, Third Edition, Chapter 39 and MRSA Article

1. List the two classifications of disease according to the CDC.

2. Define the following stages of infection:

   Latent period

   Incubation period

   Communicability period

   Disease period

3. List a minimum of two examples of blood borne pathogens.

4. Compare and contrast Hepatitis A, B, and C.

	What is it?	Symptoms	Prevention
Hep A			
Hep B			
Hep C			

5. Discuss the pathophysiology of tuberculosis (TB). How is it diagnosed?

6. Discuss the pathophysiology and signs/symptoms of Meningitis.

7. Discuss the pathophysiology of Mumps.

8. Discuss the pathophysiology of Chickenpox (Varicella).

9. List the signs and symptoms for the following:

Gonorrhea

HIV

Measles

10. Discuss the pathophysiology of severe acute respiratory syndrome.

11. Discuss the pathophysiology and treatment of mononucleosis.

12 Define MRSA and discuss how patients become infected with the disease.

13 Define “colonization”:

14 List 3 possible causes of antibiotic resistance.

15. List 3 possible risk factors of (HA) MRSA.

16 List 3 possible risk factors of (CA) MRSA.

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Original Article:http://mayoclinic.com/health/mrsa/DS00735/DSECTION=5

MRSA infection

Introduction

Methicillin-resistant Staphylococcus aureus (MRSA) infection is caused by Staphylococcus aureus bacteria — often called "staph." Decades ago, a strain of staph emerged in hospitals that was resistant to the broad-spectrum antibiotics commonly used to treat it. Dubbed methicillin-resistant Staphylococcus aureus (MRSA), it was one of the first germs to outwit all but the most powerful drugs. MRSA infection can be fatal.

Staph bacteria are normally found on the skin or in the nose of about one-third of the population. If you have staph on your skin or in your nose but aren't sick, you are said to be "colonized" but not infected with MRSA. Healthy people can be colonized with MRSA and have no ill effects. However, they can pass the germ to others.

Staph bacteria are generally harmless unless they enter the body through a cut or other wound, and even then they often cause only minor skin problems in healthy people. But in older adults and people who are ill or have weakened immune systems, ordinary staph infections can cause serious illness.

In the 1990s, a type of MRSA began showing up in the wider community. Today, that form of staph, known as community-associated MRSA, or CA-MRSA, is responsible for serious skin and soft tissue infections and for a serious form of pneumonia.

Signs and Symptoms

Staph skin infections, including MRSA, generally start as small red bumps that resemble pimples, boils or spider bites. These can quickly turn into deep, painful abscesses that require surgical draining. Sometimes the bacteria remain confined to the skin. But they can also burrow deep into the body, causing potentially life-threatening infections in bones, joints, surgical wounds, the bloodstream, heart valves and lungs.

Causes

Although the survival tactics of bacteria contribute to antibiotic resistance, humans bear most of the responsibility for the problem. Leading causes of antibiotic resistance include:

- **Unnecessary antibiotic use.** Like other superbugs, MRSA is the result of decades of excessive and unnecessary antibiotic use. For years, antibiotics have been prescribed for colds, flu and other viral infections that don't respond to these drugs, as well as for simple bacterial infections that normally clear on their own.

- **Antibiotics in food and water.** Prescription drugs aren't the only source of antibiotics. In the United States, antibiotics can be found in beef cattle, pigs and chickens. The same antibiotics then find their way into municipal water systems when the runoff from feedlots contaminates streams and groundwater. Routine feeding of antibiotics to animals is banned in the European Union and many other industrialized countries. Antibiotics given in the proper doses to animals who are sick don't appear to produce resistant bacteria.

- **Germ mutation.** Even when antibiotics are used appropriately, they contribute to the rise of drug-resistant bacteria because they don't destroy every germ they target. Bacteria live on an evolutionary fast track, so germs that survive treatment with one antibiotic soon learn to resist others. And because bacteria mutate much more quickly than new drugs can be produced, some germs end up resistant to just about everything. That's why only a handful of drugs are now effective against most forms of staph.

Risk factors

Because hospital and community strains of MRSA generally occur in different settings, the risk factors for the two strains differ.

Risk factors for hospital-acquired (HA) MRSA include:

- **A current or recent hospitalization.** MRSA remains a concern in hospitals, where it can attack those most vulnerable — older adults and people with weakened immune systems, burns, surgical wounds or serious underlying health problems. A 2007 report from the Association for Professionals in Infection Control and Epidemiology estimates that 1.2 million hospital patients are infected with MRSA each year in the United States. They also estimate another 423,000 are colonized with it.

- **Residing in a long term care facility.** MRSA is far more prevalent in these facilities than it is in hospitals. Carriers of MRSA have the ability to spread it, even if they're not sick themselves.

- **Invasive devices.** People who are on dialysis, are catheterized, or have feeding tubes or other invasive devices are at higher risk.

- **Recent antibiotic use.** Treatment with fluoroquinolones (ciprofloxacin, ofloxacin or levofloxacin) or cephalosporin antibiotics can increase the risk of HA-MRSA.

These are the main risk factors for community-acquired (CA) MRSA:

- **Young age.** CA-MRSA can be particularly dangerous in children. Often entering the body through a cut or scrape, MRSA can quickly cause a widespread infection. Children may be susceptible because their immune systems aren't fully developed or they don't yet have antibodies to common germs. Children and young adults are also much more likely to develop dangerous forms of pneumonia than older people are.

- **Participating in contact sports.** CA-MRSA has crept into both amateur and professional sports teams. The bacteria spread easily through cuts and abrasions and skin-to-skin contact.

- **Sharing towels or athletic equipment.** Although few outbreaks have been reported in public gyms, CA-MRSA has spread among athletes sharing razors, towels, uniforms or equipment.

- **Having a weakened immune system.** People with weakened immune systems, such as those living with HIV/AIDS, are more likely to have severe CA-MRSA infections.

- **Living in crowded or unsanitary conditions.** Outbreaks of CA-MRSA have occurred in military training camps and in American and European prisons.

- **Association with health care workers.** People who are in close contact with health care workers are at increased risk of serious staph infections.

When to seek medical advice

Keep an eye on minor skin problems — pimples, insect bites, cuts and scrapes — especially in children. If wounds become infected, see your doctor. Ask to have any skin infection tested for MRSA before starting antibiotic therapy. Some drugs that treat ordinary staph aren't effective against MRSA, and their use could lead to serious illness and more resistant bacteria.

Screening and diagnosis

Doctors diagnose MRSA by checking a tissue sample or nasal secretions for signs of drug-resistant bacteria. The sample is sent to a lab where it's placed in a dish of nutrients that encourage bacterial growth (culture). But because it takes about 48 hours for the bacteria to grow, newer tests that can detect staph DNA in a matter of hours are now becoming more widely available.

In the hospital, you may be tested for MRSA if you show signs of infection or if you are transferred into a hospital from another health care setting where MRSA is known to be present. You may also be tested if you have had a previous history of MRSA.

Treatment

Both hospital- and community-associated strains of MRSA still respond to certain medications. In hospitals and care facilities, doctors often rely on the antibiotic vancomycin to treat resistant germs. CA-MRSA may be treated with vancomycin or other antibiotics that have proved effective against particular strains. Although vancomycin saves lives, it may become less effective as well; some hospitals are already seeing outbreaks of vancomycin-resistant MRSA. T help reduce the threat, doctors may drain an abscess caused by MRSA rather than treat the infection with drugs.

Prevention

Hospitals are fighting back against MRSA infection by using surveillance systems that track bacterial outbreaks and by investigating products such as antibiotic-coated catheters and gloves that release disinfectants.

Still, the best way to prevent the spread of germs is for health care workers to wash their hands frequently, to properly disinfect hospital surfaces and to take other precautions, such as wearing a mask when working with people with weakened immune systems.

In the hospital, people who are infected or colonized with MRSA are placed in isolation to prevent the spread of MRSA. Visitors and health care workers caring for people in isolation may be required to wear protective garments and must follow strict hand-washing procedures.

What you can do in the hospital
Here's what you can do to protect yourself, family members or friends from health care-associated infections.

- Ask all hospital staff to wash their hands or use an alcohol-based hand sanitizer before touching you — every time.
- Wash your own hands frequently.
- Make sure that intravenous tubes and catheters are inserted under sterile conditions, for example, the person inserting them wears a gown, gloves and mask and sterilizes your skin first.

What you can do in your community
Protecting yourself from MRSA in your community — which might be just about anywhere — may seem daunting, but these common-sense precautions can help reduce your risk:

- **Wash your hands.** Careful hand washing remains your best defense against germs. Scrub hands briskly for at least 15 seconds, then dry them with a disposable towel and use another towel to turn off the faucet. Carry a small bottle of hand sanitizer containing at least 62 percent alcohol for times when you don't have access to soap and water.

- **Keep personal items personal.** Avoid sharing personal items such as towels, sheets, razors, clothing and athletic equipment. MRSA spreads on contaminated objects as well as through direct contact.

- **Keep wounds covered.** Keep cuts and abrasions clean and covered with sterile, dry bandages until they heal. The pus from infected sores may contain MRSA, and keeping wounds covered will help keep the bacteria from spreading.

- **Shower after athletic games or practices.** Shower immediately after each game or practice. Use soap and water. Don't share towels.

- **Sit out athletic games or practices if you have a concerning infection.** If you have a wound that's draining or appears infected — for example, is red, swollen, warm to the touch or tender — consider sitting out athletic games or practices until the wound has healed.

- **Sanitize linens.** If you have a cut or sore, wash towels and bed linens in a washing machine set to the "hot" water setting (with added bleach, if possible) and dry them in a hot dryer. Wash gym and athletic clothes after each wearing.

- **Get tested.** If you have a skin infection that requires treatment, ask your doctor if you should be tested for MRSA. Doctors may prescribe drugs that aren't effective against antibiotic-resistant staph, which delays treatment and creates more resistant germs. Testing specifically for MRSA may get you the specific antibiotic you need to effectively treat your infection.

- **Use antibiotics appropriately.** When you're prescribed an antibiotic, take all of the doses, even if the infection is getting better. Don't stop until your doctor tells you to stop. Don't share antibiotics with others or save unfinished antibiotics for another time. Inappropriate use of antibiotics, including not taking all of your prescription and overuse, contributes to resistance. If your infection isn't improving after a few days of taking an antibiotic, contact your doctor.

By Mayo Clinic Staff
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