Methicillin Resistant Staphylococcus aureus (MRSA)

By Ashley Peterson

Methicillin resistant staphylococcus aureus; etiological agent- Staphylococcus aureus (4).

Disease transmission:
MRSA can be spread through direct contact with an infected wound or by sharing personal items such as towels and razors that have come in contact with an infected wound (2).

Reservoir:
A person who is colonized with MRSA or someone who has been infected with MRSA (3). Pets can also be a carrier for MRSA (5).

General characteristics:
MRSA is a gram positive, non-pore forming, non-motile coccibacterium that colonizes in yellow clusters.

Taxonomy of MRSA: (4)
• Domain: bacteria
• Kingdom: eubacteria
• Phylum: firmicutes
• Class: bacilli
• Order: bacillales
• Family: staphylococcae
• Genus: staphylococcus
• Species: aureus

Specific tests for identification:
In order to find out if a person has MRSA, you can run a bacterial culture or a molecular test (11). The bacterial culture requires a nasal swab and then it is grown, it takes longer to get results because it does take a few days to grow the bacterial. The molecular test takes only hours to get results and it will show the DNA and the resistance gene of MRSA (11).

Signs and symptoms of MRSA:
The wound often starts off as a swollen, painful red bump that usually resembles a spider bite or a pimple (1). The infected area is usually warm to the touch, full of pus or other drainage, and it is also accompanied by a fever (9).

Historical information:
MRSA was discovered in 1880. It commonly caused people who were infected to have painful skin and soft tissue conditions, such as boils, scaled-skin syndrome and
impetigo (6). In the 1940’s the treatment for MRSA was routine and was treated with antibiotics such as penicillin (6). In the late 1940’s, early 1950’s, the misuse and overuse of penicillin caused the bacteria to become resistant to the drugs that were created to fight it off (6). In 1961, it became resistant to methicillin, which is where MRSA got its name from (6). The first human case in the United States was in 1968 and since then, it has spread and it is now resistant to a whole class of penicillin-like antibiotics called beta-lactams (10).

Virulence factors:
• Panton Valentine Leukocidin (PVL): this forms pores in leukocyte membranes, which causes the membrane to burst (7). PVL is associated with abscess formation and severe necrotizing pneumonia (7).
• Phenol soluble modulins (PSMs): these attack the human neutrophils (7).
• Biofilm: a biofilm has a greater resistance to antibiotics, which helps the microorganism evade the host immune system (7).

Control and treatment:
MRSA can be spread both in the clinical settings and in the community. In order to prevent the spread in a clinical setting, it is important to make sure that patients who are more prone to getting an infection are not placed near someone who has MRSA (9). If possible, it is best to keep the patient in a single room, but if one is not available it is important that hands are washed and gloves are being used. It is also important to make sure that linens are sanitized (3). In the community, it is important to always wash hands for at least 15 seconds or to make sure that you have sanitizer for when no soap and water are available, and it is also important to make sure that you don’t share personal items with others, such as razors, clothes, towels, or sports equipment (3). If someone is infected, they can either be treated with antibiotics (clindamycin, trimethoprim-sulfamethoxazole, linezolid, or vancomycin) or they can have the infection drained, cleaned, and then covered (5).

Prevention:
In order to prevent the spread of MRSA, it is important to wash hands for at least 15 seconds with water and soap or using sanitizer that contains at lease 62% alcohol. If you have a wound, it should always be covered until it is completely healed. Do not share razors, towels, sheets, or athletic equipment and always make sure to shower after athletic practices/games (9). When in the hospital, it is important to make sure to always use gloves to change dressings and to make sure that you properly dispose of the protective equipment and to wash your hands afterwards. It is also important to make sure that clean and dirty linens are kept separate (8).

Vaccines:
A possible vaccine that is being studied is called NDV-3 (12). This vaccine would help mobilize the immune system to fight off MRSA infections. It has A1s3, which helps enhance the skins molecular and cellular immune defenses (12).

Current outbreaks (locally):
There are over 80,000 outbreaks of MRSA a year and of those 80,000 cases, 11,285 end in death (14). MRSA continues to spread daily due to the transmission of the
bacteria from someone who is colonized to another person who will then become infected after coming into contact with the colonized person.

Current outbreaks (globally):
MRSA is one of the most common causes of skin and respiratory infections around the world (14). MRSA has a prevalence range from 23.3%-73% (13).

Works Cited:


   <http://www.cdc.gov/mrsa/healthcare/clinicians/precautions.html>. 


