**MRSA**

Methicillin-Resistant *Staphylococcus aureus*

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**Disease**

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacterium that is known for infecting many different parts of the body. It is the toughest strain of *S. aureus* to treat because it is resistant to most antibiotics. MRSA is also known as the “superbug” and though most infections are not that serious, in some cases it can be life threatening. There are many healthy people that are MRSA carriers and do not show any signs or symptoms of infection. Carriers, a third of the population, usually carry the bacteria in their noses, not to worry though, unless staph finds its way into the body. MRSA can be spread from person to person touch and by touching objects that have the bacteria on them. MRSA is constantly adapting and treatment is constantly being researched. (8).

**History**

*S. aureus* developed a resistance to penicillin in the late 1940’s, throughout this the 1950’s. Methicillin, the most common type of penicillin, was introduced to counter the resistance reaction the bacteria was having with penicillin. In doing so, British scientists identified the first strains of *S. aureus* bacteria that resisted methicillin, and this was the so called birth of MRSA. The first human case of MRSA was reported in 1968. There is a class of penicillin like antibiotics called “beta lactams” that mrsa is actually resistant to and *S. aureus* is evolving even
more and is showing resistance to even more antibiotics. MRSA has evolved so much that in 2002 physicians found strains that of S. aureus that are resistant to vancomycin was the last resort antibiotic used for resistance against mrsa. It is feared that this could become a major issue in antibiotic resistance, but so far vancomycin-resistant strains are still rare at this time (2).

**Etiology and General Characteristics**

MRSA itself is the etiological agent. It is a gram positive coccus bacteria, mostly in clusters. It is invasive to tissues and produces pus filled lesions. MRSA is extracellular and is non motile, does not form spores. Is facultatively anaerobic and causes acute illnesses (3). It can also infect the joints, and soft tissue, it can also cause bacteraemia and lung infections like pneumonia, but skin infections are the most common (8).

**Transmission**

Again transmission of this organism is through person to person contact, skin to skin, or through objects that have come in contact with a carrier’s infected site. It is also commonly transmitted by nosocomial infection(5).

**Reservoirs**

The most common reservoirs for MRSA would be hospitalized staff, patients and fomites. It is rare but there are also human carriers who are colonized with MRSA without any signs or evidence of infection and the risk of the bacteria spreading is higher if the carrier itself is unaware (4).

**Signs and Symptoms**

Symptoms of MRSA depends on the area of infection whether it's in the bloodstream, an infection through a surgical wound, respiratory or urinary thus causing a more serious infection, like pneumonia. Infections on the skin, sores or boils, would only cause a mild infection (8). Symptoms to look for are rash, headaches, muscle aches, chills, fever, fatigue, cough, shortness of breath, chest pain. Also with the skin infections swollen painful bumps, like a pimple or boil, that has drainage such as pus secreting from site (7).

**Virulence factors**

*S. aureus* strains have a wide variety virulence factors that include surface proteins that promote adherence to damaged tissues and bind to proteins in the blood evading anti mediated immune responses and also promote iron uptake. This organism also has membrane damaging toxins and superantigen toxins that cause tissue damage and septic shock (1).

**Prevention**

A great start at preventing mrsa is practicing good hygiene such as, keeping your hands clean by washing thoroughly with soap and water or using an alcohol-based hand sanitizer. Clean and cover wounds and cuts until fully healed. Avoid coming into contact with wounds or bandages of others. Try not to sharing personal items such as uniforms and personal protective equipment (5).

**Treatment**
Many staph skin infections may be treated by draining the lesion which may not require taking antibiotics and should only be done by a healthcare provider. However, some staph and MRSA infections are treated with antibiotics (6).

Testing

To diagnose *S. aureus*, a sample is obtained from the infection site and sent to a microbiology laboratory for testing. If *S. aureus* is found, the organism should be further tested to determine which antibiotic would be effective for treatment. Doctors often diagnose MRSA by checking a tissue sample or nasal secretions for signs of drug-resistant bacteria. Current diagnostic procedures involve sending a sample to a lab where it is placed in a dish of nutrients that encourage a culture. The tests involve subjecting it to the physical and chemical environments (3).

Works Cited


