MRSA- Super bug: Review

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Abstract

Methicillin resistant *Staphylococcus aureus* (MRSA) is an infection caused by *Staphylococcus* (staph*)* bacteria. This type of bacteria is resistant to many different antibiotics. These bacteria naturally live in the nose and on the skin and generally harmless. But, when they begin to multiply uncontrollably, a MRSA infection can occur. MRSA infections typically occur when there's a cut or break in your skin. MRSA is very contagious and can be spread through direct contact with a person who has the infection. MRSA infections are classified as either hospital-acquired (HA-MRSA) or community-acquired (CA-MRSA). Though a MRSA infection can be serious, it may be treated effectively with certain antibiotics. Now a day's even some medicinal plants also gives synergistic effect with antibiotics to overcome from treatment.

Keywords *Staphylococcus aureus*, infection, antibiotics, HA-MRSA, CA-MRSA.

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Introduction

Different varieties of *Staphylococcus aureus* bacteria, commonly called 'staph', exist. Staph bacteria are normally found on the skin or in the nose of about one-third of the population. The bacteria are generally harmless unless they enter the body through a cut or other wound, and even then they usually cause only minor skin problems in healthy people. According to the U.S. Centers for Disease Control and Prevention (CDC), around 2 % of the population chronically carries the type of staph bacteria known as Methicillin-resistant *Staphylococcus aureus* (MRSA)

MRSA is a bacterium that causes infections in different parts of the body. It is tougher to treat than most strains of *staphylococcus aureus* because it is resistant to some commonly used antibiotics like, β-lactam antibiotics that include some penams (penicillin derivatives such as methicillin and oxacillin) and cephems such as the cephalosporins. The symptoms of MRSA depend on where it causes infection. Mostly it causes mild infections on the skin, like sores, boils, or abscesses. But it can also cause more serious skin infections or infect surgical wounds, the bloodstream, the lungs, or the urinary tract. 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. Because it's hard to treat, MRSA is sometimes called a 'super bug'.

History

Staphylococcus aureus (staph) is a common skin bacteria. It most often causes skin and soft tissue infections. Although *S. aureus* has been causing staph infections as long as humans have existed, MRSA has only been around since 1961. Methicillin was one of the first antibiotics used to treat *S. aureus* and other infections. *S. aureus* developed a gene mutation that allowed it to escape being killed by methicillin, so it became resistant to methicillin. That makes it harder to treat someone who gets an infection. Stronger, more expensive, or intravenous antibiotics may be needed. Since the 1960s, MRSA has picked up more resistance to different antibiotics. Overuse of antibiotics has increased resistance in MRSA and other infectious bacteria because resistance genes (the genes that code for resistance) can be passed from bacteria to bacteria (Nichols H, 2017).

Causes

MRSA is the result of decades of often unnecessary antibiotic use. For years, antibiotics have been prescribed for colds, flu and other viral infections that don't respond to these drugs. 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.

Most MRSA infections occur in people who've been in hospitals or other health care settings, such as nursing homes and dialysis centers. When it occurs in these conditions, it is known as healthcare associated MRSA (HA-MRSA). HA-MRSA infections typically are associated with being hospitalized, invasive procedures or devices, such as surgeries, intravenous tubing or artificial joints.

Another type of MRSA infection has occurred in the wider community- among healthy people. This form, Community associated MRSA (CA-MRSA), often begins as a painful skin boil. It is spread by skin to skin contact. At risk populations include groups such as participating in contact sports, using intravenous drugs, during sex and people who live in crowded or unsanitary conditions.

Prevention

In general, healthy people with no cuts, abrasions, or breaks on their skin are at low risk for getting infected. Preventing HA-MRSA, in the hospital- people who are infected or colonized with MRSA often are placed in contact precautions as a measure 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 hygiene procedures. Contaminated surfaces and laundry items should be properly disinfected. Preventing CA-MRSA, following measures must

be taken as; washing of hands, keep wounds covered, Keep personal items personal, did shower after expose to crowded area, always sanitize linens and avoid use of Intravenous drug expect in emergency.

Sign and Symptoms

HA-MRSA is generally more likely to cause serious complications, such as pneumonia, urinary tract infections (UTIs), and the blood infection sepsis. Common symptoms are: rash, headaches, muscle aches, chills, fever, fatigue, cough, shortness of breath and chest pain.

CA-MRSA usually causes skin infections. Areas that have increased body hair, such as the armpits or back of the neck, are more likely to be infected. Areas that have been cut, scratched, or rubbed are also vulnerable to infection. The infection usually causes a swollen, painful bump to form on the skin. The bump may resemble a spider bite or pimple. It often has a yellow or white center and a central head. Sometimes an infected area is surrounded by an area of redness and warmth, known as cellulitis. Pus and other fluids may drain from the affected area even sometime fever also experience by patient.

Diagnosis

MRSA diagnose 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 bacterial growth (a culture). It takes about 48 hours for the bacteria to grow. Even new tests that can detect staph DNA in a matter of hours are now becoming more widely available.

Treatment

If MRSA is diagnosed, treatment will vary depending on the following factors: type of infection location of infection, severity of symptoms and antibiotics to which the strain of MRSA responds.

Management of MRSA infections may include: pus drainage from lesion, culture and susceptibility testing of drained material, wound care and hygiene antimicrobial therapy (in cases of possible cellulitis without abscess).

Medication options for MRSA skin and soft tissue infections may include: Use of medicines like clindamycin, tetracycline drugs - doxycycline and minocycline, trimethoprim and sulfamethoxazole, rifampin and linezolid (Gompf SG, 2019). The combination of a 4% tea tree oil nasal ointment and 5% tea tree oil body wash sometime preferred for the eradication of MRSA carriage (Caelli M *et al*, 2001). Even along with topical mupirocin ointment if ethanolic extract of Propolis drop was given it is result in more profound reduction in bacterial cell count and inflammatory response (Onlen Y *et al*, 2007).

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