

MRSA - The Facts

What is MRSA?

Staphylococcus aureus is a bacterium found on many individuals' skin and seems to cause no major problems. However if it gets inside the body, for instance under the skin or into the lungs, it can cause important infections such as boils or pneumonia. Individuals who carry this organism are usually totally healthy, have no problems whatever and are considered simply to be carriers of the organism.

The term MRSA or methicillin resistant Staphylococcus aureus is used to describe those examples of this organism that are resistant to commonly used antibiotics. Methicillin was an antibiotic used many years ago to treat patients with Staphylococcus aureus infections. It is now no longer used except as a means of identifying this particular type of antibiotic resistance.

What is MRSA infection?

Individuals can become carriers of MRSA in the same way that they can become a carrier of ordinary Staphylococcus aureus, which is by physical contact with the organism. If the organism is on the skin then it can be passed around by physical contact. If the organism is in the nose or is associated with the lungs rather than the skin then it may be passed around by droplet spread from the mouth and nose. We can find out if and where Staphylococcus aureus is located on a patient by taking various samples, sending them to the laboratory and growing the organism. Tests done on any Staphylococcus aureus grown from such specimens can then decide how sensitive the organism is to antibiotics and if it is a methicillin resistant (MRSA) organism.

Usually it is not necessary to do anything about MRSA organisms. However if passed on to someone who is already ill, then a more serious infection may occur in that individual. When patients with MRSA are discovered in a hospital, the hospital will usually try to prevent it from passing around to other patients. This is known as infection control.

What are the symptoms?

MRSA infections can cause a broad range of symptoms depending on the part of the body that is infected. These may include surgical wounds, burns, catheter sites, eye, skin and blood. Infection often results in redness, swelling and tenderness at the site of infection. Sometimes, people may carry MRSA without having any symptoms.

How is the spread of MRSA controlled?

Measures to prevent the spread of organisms from one person to another are called isolation or infection control. The type of infection control or isolation required for any patient depends on the organism, where the organism is found on an individual, and the patient. The most important type of isolation required for MRSA is what is called Contact Isolation. This type of isolation requires everyone in contact with the patient to be very careful about

hand washing after touching either the patient or anything in contact with the patient. If the organism is in the nose or lungs it may also be necessary to have the patient in a room to prevent spread to others by droplet spread. Because dust and surfaces can become contaminated with the organism, cleaning of surfaces is also important. This usually occurs after the patient leaves the hospital.

If a number of patients are infected with the same organism it is possible to nurse them in the same area. On occasions for the sake of other patients it may be necessary to move carriers of MRSA to an isolation unit which specialises in isolating all types of infections. The medical care of such patients will continue in an isolation unit.

Antibiotics are not completely powerless against MRSA, but patients may require a much higher dose over a much longer period, or the use of an alternative antibiotic to which the bug has less resistance.

Why does MRSA exist?

It's all about survival of the fittest - the basic principle of evolution - and bacteria have been around a lot longer than we have, so they're pretty good at it. There are countless different strains of a single type of bacterium, and each has subtle natural genetic mutations that make it different from the others. In addition, bacterial genes are constantly mutating.

Some strains' genetic makeup will give them a slight advantage when it comes to fighting off antibiotic attack. So when weaker strains encounter antibiotics, they die, while naturally resistant strains may prove harder to kill. This means that next time you encounter Staph, it is more likely to be one that has survived an antibiotic encounter, i.e. a resistant one.

The advice from doctors who give antibiotics is always to finish the entire course - advice that is often ignored. When you don't finish the course, there's a chance that you'll kill most of the bugs, but not all of them - and the ones that survive are likely to be those that are most resistant to antibiotics.

Over time, the bulk of the Staph strains will carry resistance genes, and further mutations may only add to their survival ability. Strains that manage to carry two or three resistance genes will have extraordinary powers of resistance to antibiotics. The reason that hospitals seem to be hotbeds for resistant MRSA is because so many different strains are being thrown together with so many doses of antibiotics, vastly accelerating this natural selection process.

Why is it so dangerous?

It is a fact of life that hospital patients are at higher than normal risk of picking up a Staph infection. This is for two reasons. Firstly, the population in hospitals tends to be older, sicker and weaker than the general population, making them more vulnerable to the infection. Secondly, conditions in hospitals, which involve a great many people living and working together and being examined by doctors and nurses who have just touched other patients, are the perfect environment for the transmission of all manner of infections.

Staph infections can be dangerous in weakened patients, particularly if they can't be cleared up quickly with antibiotic treatments. MRSA infections can prove tough to treat because they are resistant to treatment, making them more dangerous than a simple case of Staph.

What is likely to happen in the future?

Doctors are very worried about what the future holds for MRSA. The number of reports of MRSA infections rises year by year - and the latest evidence suggests that deaths due to MRSA are increasing at a similar rate. Already, the spectre of a bug resistant to all antibiotics is approaching. VRSA, or vancomycin resistant Staphylococcus aureus, has acquired resistance to a drug considered the 'last line of defence' when all other antibiotics have failed. The UK has already seen several cases of GISA, or glycopeptide intermediate Staphylococcus aureus, a kind of 'halfway house' between MRSA and VRSA, which has developed a resistance to antibiotics of the vancomycin family.

Although new antibiotics are being developed all the time, pessimistic experts believe it is only a matter of time at current rates until virtually every weapon in the pharmaceutical arsenal is nullified. Some suggest that there could come a point at which bacteria retake the advantage and doctors, as in previous centuries, have no answer to some bacterial infections. It should be noted, they say, that humans have only had the upper hand over bacteria for a few of decades - we have no right to expect that situation to last forever.

What can be done about it now?

The government is already trying to slow down the apparently relentless march of the bacterium. One of the main reasons behind their swift evolution into 'superbugs' is the overuse of antibiotics, both in human and veterinary medicine. Until recently, patients visiting their doctor with a viral infection might demand, and be given, an antibiotic prescription - despite the fact that antibiotics have no effect on this infection. All those patients were doing was strengthening the communities of bacteria in their bodies. Doctors have now been told to cut antibiotic prescribing.

Hygiene is another tried and tested way of at least protecting the most vulnerable patients from the most dangerous strains. Hand washing between patients should be a must for doctors and nurses, or they are simply doing more harm than good in their trips around the wards. Ministers are trying to improve overall standards of hygiene, perhaps by reintroducing the concept of the ward matron, with responsibility for cleanliness. New patient bedside phones are being introduced that include speed dial buttons to alert staff to the need to deal with a hygiene problem.

Whether a dirty ward rather than a dirty hand is a reservoir for Staphylococcus is a matter of debate, but MRSA patients are also increasingly being treated in isolation where possible. In the long run, many experts suggest it may take a breakthrough akin to the discovery of penicillin before humans can regain a temporary control over the bacteria.