

## Please read this bit first

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a "Journal Club" activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out "correct" answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

## Cycle 23 Organism 5:

### MRSA

The organism *Staphylococcus aureus* is 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.

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.

### Why is MRSA important?

A large study led by the Centers for Disease Control and Prevention and published in the October 17, 2007 issue of the *Journal of the American Medical Association* estimated that MRSA would have been responsible for 94,360 serious infections and associated with 18,650 hospital stay-related deaths in the United States in 2005. These figures would make MRSA infection responsible for more deaths in the U.S. each year than AIDS.

The UK Office for National Statistics reported 1,629 MRSA-related deaths in England and Wales for the same year, indicating a MRSA-related mortality rate half the rate of that in the United States for 2005, even though the figures from the British source were explained to be high because of "improved levels of reporting, possibly brought about by the continued high public profile of the disease" during the time of the 2005 United Kingdom General Election.

### How do we prevent the spread of MRSA?

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 are 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 specializes in isolating all types of infections to protect other persons. The medical care of such patients will continue in an isolation unit which is well used to caring for all types of medical and surgical problems associated with infections.

MRSA is resistant to traditional anti-staphylococcal beta-lactam antibiotics, such as cloxacillin and cefazolin. Treatment options generally include the glycopeptides such as vancomycin and teicoplanin, as well as linezolid (belonging to the newer oxazolidinone class).

Teicoplanin is a structural congener of vancomycin that has a similar activity spectrum but a longer half-life ( $t_{1/2}$ ). Because the oral absorption of vancomycin and teicoplanin is very low, these agents must be administered intravenously to control systemic infections. Treatment of MRSA infection with vancomycin can be complicated, not only due to its inconvenient route of administration, but also its side-effect profile. Moreover, many clinicians believe that the efficacy of vancomycin against MRSA is inferior to that of anti-staphylococcal beta-lactam antibiotics.

Several newly discovered strains of MRSA show reduced susceptibility to vancomycin and teicoplanin. These new evolutions of the MRSA bacterium have been dubbed glycopeptide intermediate S.aureus (GISA). Linezolid, quinupristin/dalfopristin, daptomycin, and tigecycline can be used to treat more severe infections that do not respond to glycopeptides, if susceptible in vitro. In non-critical infections, and if susceptible, oral agents such as co-trimoxazole (trimethoprim-sulfamethoxazole), tetracycline, erythromycin, clindamycin, rifampicin and fusidic acid may be used. The latter two should never be used as single agents as resistance develops rapidly. Linezolid is also available in an oral formulation.

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### CPD Questions:

1. Discuss the relative importance of MRSA- versus AIDS-related deaths in South Africa.
  2. What is your own laboratory's approach to sensitivity reporting for MRSA? What guidelines do you use and why?
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