

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Summary

S. aureus is part of our normal flora, colonising the nose, axillae, groin, perineum and skin of 10-40% of the population.

S. aureus is a gram positive coccus and can be a common cause of serious bacterial infections.

S. aureus is mainly spread by contact including from the hands of health care providers.

MRSA are *S. aureus* strains which are resistant to all penicillin and cephalosporin antibiotics.

MRSA, in general, remains susceptible to at least some antibiotics.

Eradication of colonisation/carriage (not infection) of MRSA may be considered for selected patients only e.g. in **outbreaks of infection** (this is uncommon), **recurrence** of infections, **some pre op procedures, antibiotic resistant patterns of particular concern** (e.g. more resistant strain than those strains already endemic), and in **some hospital situations**.

Decolonisation eradication is not required or beneficial for most people carrying MRSA – it will go of its own accord generally over a few weeks to months without any interventions.

The use of antibiotics (appropriate and inappropriate) has selectively bred MDRO's including MRSA as an unintended consequence.

A Clinical Microbiologist or Infectious Diseases physician can be contacted for advice if required.

Introduction

10- 40% of the population carry the bacteria *Staphylococcus aureus* (*S. aureus*) as part of their normal skin flora, especially in the nose, axillae and groin/perineal area.

Most healthy people are unaffected by MRSA and many people in the community are transient carriers of it.

S. aureus (whether MRSA or not) may cause skin infections (impetigo and folliculitis) or more serious infections such as abscesses, pneumonia, osteomyelitis, sepsis, endocarditis and meningitis.

MRSA (Methicillin Resistant *Staphylococcus aureus*) is a more antibiotic resistant strain of *S. aureus*. It is always resistant to at least methicillin/flucloxacillin, other penicillins and the cephalosporins. Depending on the strain of MRSA it may additionally be resistant to other antibiotics as well so the range of effective antibiotics available to treat MRSA infection is limited to different extents. It is transmitted in the same way, and causes the same range of infections as other strains of *S. aureus*.

MRSA is becoming increasingly endemic in the community as part of many people's normal flora. However, MRSA can pose a greater risk to some patients undergoing care in acute hospitals than to people cared for in the community or in long term care facilities (LTCF), unless they are in a LTCF hospital facility. This is because patients undergoing care in acute hospitals may be more susceptible to infection because they have a wound or undergo invasive procedures and/or surgery.

When our natural infection defence mechanisms are breached, the risk of infection with bacteria such as MRSA increases. This can occur where there is a break in the skin (e.g. through a surgical wound, gastric feeding tube, tracheostomy, urinary catheter or wound drain). When the skin is broken, any *S. aureus* including MRSA may colonise from the adjacent flora or the hands of a carer, then increase in numbers until an infection results. Generally we catch these infections from ourselves – our own flora.

To help reduce the increasing spread of MRSA additional precautions such as Contact (e.g. gloves), barrier nursing, screening and eradication regimens **may** be used in hospitals **especially when the**

particular strain is known to be relatively aggressive and/or resistant. Similar measures are not usually indicated in community care settings where the risk of MRSA infection is substantially lower.

People affected by MRSA do not present a risk to the community at large and should continue their normal lives without restriction. Often patients are discharged into long term care facilities or use day care facilities - this should not pose a problem to their ongoing care or that of the other residents as long as **Standard Precautions, especially good hand hygiene and wound containment are implemented.** However if the MRSA strain is an **outbreak strain causing multiple infections in others, then a much more aggressive isolation/eradication approach is required.** This is uncommon.

MRSA Colonisation/Carriage and Infection

The majority of people with MRSA are **'colonised'** which is when the bacteria live or are carried harmlessly on the body with no ill effects as opposed to when they are **'infected'** which is when the organism enters compromised tissues, increasing in numbers until causing clinical signs of infection e.g. inflammation, redness, swelling, pain, pus and fever. For every known colonised person there are likely 10-20 others also. In the absence of infection and antibiotic use, MRSA carriage is generally transient over months to a year and will usually go of its own accord. Healthcare workers may be transiently colonised with MDRO(s) several times over a 10 year period. Generally isolation is not effective and can be counterproductive – implement Standard Precaution procedures for all, all the time is safest/best.

Risk Groups

MRSA is more likely to cause infection in acute care facilities such as hospitals.

Generally, people in the community are at lower risk of infection.

Residents in long term care facilities can be at increased risk of becoming colonised with MRSA and may become a source of MRSA carriage and spread when transferred to or from an acute hospital.

Transmission/Spread

MRSA is spread from person to person mainly by the hands e.g. of healthcare workers. The bacteria can easily be picked up on the hands after direct patient contact or contact with wounds or contaminated equipment or objects (e.g. door handles, stethoscopes, bed rails, phones, pens, etc).

Prevention of Spread

Standard infection control precautions are recommended for preventing the spread of MRSA in the community. Good hand hygiene and containment of infected wounds are important for all wounds. MRSA colonised dermatitis on patients or healthcare workers can be an additional source.

Advice for Healthcare Workers

- There is **little risk of infection** for normal healthy members of staff
- Standard Infection Control Precautions should be implemented with **all patients anyway**
- Staff members should **cover any cuts or abrasions** on their skin
- Routine screening of staff for MRSA carriage is generally not recommended, **unless there are outbreak or cross infection concerns, or they are in a higher risk category**

Wound Management

- Wound swabs for bacterial culture and susceptibility should be considered if there are clinical signs of infection and definitely advised if not responding to standard treatment
- Clinical wound assessment should be performed to differentiate between colonisation and infection. Most chronic wounds are **colonised** with bacteria, the identification of MRSA in a wound swab does not necessarily indicate that the wound is **infected** (clinical signs)
- Antibiotic treatment is generally not recommended for **colonised** wounds
- Wound management should be carried out as per standard procedures to promote wound healing. There are no specifically recommended dressings or topical solutions for MRSA colonised/infected wounds

- Specialist wound management advice should be considered if a wound remains infected or if healing is delayed
- **Remember we collectively have and continue to create MRSA and other MDRO's by our every use of antibiotics – which selects out the resistant bacteria only for their survival**

Advice for Patients with MRSA living in their Own Home

People with MRSA do not present a risk to the community and should continue their normal lives without restriction (unless an outbreak strain)

- Isolation is not required
- Normal social interaction with relatives and friends both inside and outside the home is recommended
- The use of specific disinfectants for environmental surfaces is not required. Household cleaning should be performed in the usual manner. Skin scales help us share our microbial microbiome.
- Clothing and linen should be dealt with in the usual manner, there are no specific measures required.
- **Those with a recent/past history of MRSA should inform their hospital, LTCF or day surgery unit if they are being admitted.**

MRSA in Residential Care Homes (LTCF's)

Admission and Accommodation

- **Isolation rooms with isolation signs are not usually required and can have unintended negative clinical consequences** unless the MRSA strain is known to be particularly aggressive and/or particularly resistant. Decolonisation (e.g. chlorhexidine and mupirocin) success rates are very debateable for a resistant bacteria that will generally spontaneously clear anyway. Why use even more antimicrobials for an organism e.g. MRSA, that is only there because of our excess use of antimicrobials in the first place
- It is preferable although not essential for residents who have MRSA to have a single room or be cohort nursed with other MRSA affected residents, especially if they are likely high shedders of MRSA e.g. extensive colonised dermatitis or near more vulnerable, debilitated/hospitalised patients
- MRSA is not a contraindication to admission to a long-term care facility
- Residents with MRSA should not be placed in rooms with debilitated, non ambulatory residents with wounds/invasive devices if single rooms are available or if cohorting is possible
- The receiving healthcare facility should be informed in advance that a resident has MRSA
- Residents may share a room with another resident with MRSA
- Residents with MRSA should be allowed to join other residents in communal areas for group or therapeutic activities, meals, etc - any wounds should be covered as per Standard Precautions

Hand Hygiene

- As per Standard Precautions and very important (liquid soap and water or alcohol gel)
- Appropriate hand hygiene facilities should be readily accessible and their use encouraged i.e. clinical hand wash basins, liquid soap dispensers, paper towels, alcohol hand gels (if hands not visibly soiled) are effective

Personal Protective Equipment (PPE)

- Gloves and aprons are not routinely required when caring for people with MRSA. Gloves should be worn for anticipated contact with blood, body fluids, invasive devices, non-intact skin, mucous membranes, and contaminated waste/linen/equipment in line with Standard

Precautions. However, gloves and aprons should be worn if MRSA eradication is being attempted (e.g. outbreak strain or very resistant strain)

- Aprons should be worn where there is a risk of splashing the clothing with blood or body fluids in line with Standard Precautions
- Facemasks are not required for routine care of a person with MRSA

Transportation, Transfer and Discharge of Patients

- Ambulance personnel and general transport staff should use Standard Precautions for all patients. Additional measures are not required in the community for MRSA cases
- If a patient is to be admitted to hospital the receiving ward/unit should be made aware that the patient (or facility) has had MRSA in the past. This will ensure that the hospital can implement appropriate infection control precautions for their particular facility/area as required
- If a client is being transferred to another LTCF, the receiving care facility should be made aware of the residents MRSA status if known

Education

- Patients found to be colonised or infected with MRSA should be informed of this. The person or 'patient', their carer and their visitors should have MRSA explained to them. Preferably supply them with written material. **They must not be made to feel 'abnormal' or 'pariahs', which can be very emotionally distressing.** Just good, sensible hand washing, extra care of any wounds and letting their medical practitioner know that they have been MRSA positive before if seeking treatment for an infection because a different antibiotic may need to be considered

Environmental Hygiene

- Damp dusting, especially of horizontal surfaces, and vacuuming should be carried out daily as normal - to remove settled skin scales, more likely to have *S. aureus* including MRSA if present
- Showers should be cleaned after use (between residents) as normal. If shared showers, ideally cohort any known MRSA or other MDRO residents/patients
- Cleaning should be carried out using warm water and detergent, disinfection of surfaces is generally not required

Linen

- Individuals with MRSA do not need to have their laundry washed separately. If possible a biological pre-wash or detergent should be used with the hottest temperature suitable for the fabric. Chlorine in the wash powder, dilution and heat drying will also inactivate/kill MRSA
- Clothing or bedding unsuitable for machine washing can be dry cleaned
- The process of washing, tumble-drying and ironing will generally be sufficient to destroy *S. aureus* including MRSA (*S. aureus* including MRSA killed at 62^o C for 12.5 minutes)

Cutlery and Crockery

- Cutlery and crockery should be washed in a dishwasher – this is a form of thermal disinfection. Additional measures are not required. If a dishwasher is temporarily unavailable these items may be washed with hot water and washing up liquid
- Disposable crockery/cutlery is not required
- Chemical disinfection with bleach is not required

Patient Care Equipment

- Equipment should be cleaned well with detergent and hot water between residents anyway and when soiled. Disinfection may be required in some specific circumstances

- Disinfection is generally not required. Disinfect if outbreak strain or other particular concern, otherwise standard procedures to be followed
- Residents requiring hoists or slings for moving and handling should have designated equipment for the duration of their stay. Fabric hoists should be laundered when soiled and prior to reuse by another resident, and ideally between all residents anyway

Waste

- Waste should be in line with standard medical waste procedures. Additional measures are not required, containment being key (i.e. no leakages)

Clinical Practice

- **Many residents and healthcare workers may be carriers of MRSA (or other MDRO) and not be identified or be unaware of this. Standard infection control precautions should be implemented for all residents and by all health care workers all the time**
- Staff should be educated regarding the appropriate management of invasive devices e.g. urinary catheters, tracheostomies, feeding tubes etc. Do not use them longer than necessary
- Residents should be encouraged to practice good personal hygiene and be assisted as required

Screening for MRSA

- **Routine screening for MRSA is not usually indicated except in specific circumstances**
- Screening of hospitalised clients prior to discharge to a long-term care facility is not usually indicated
- **Routine screening of healthcare workers/carers is not routinely recommended but may be indicated if an outbreak, cross infection or high risk category situation has arisen**
- Normal microbiological testing should be performed on clients in whom infection is suspected

Visitors

- Visitor restrictions are not required (unless an outbreak situation)

Eradication (decolonisation) of MRSA Carriage/Colonisation

- Eradication of MRSA in the community is generally not required (or possible). However, if a person is discharged from hospital with a prescribed MRSA eradication regimen, this treatment should be completed
- MRSA decolonisation refers to the attempt to remove the MRSA bacteria from a person by using body washes and shampoo for 5 days (e.g. chlorhexidine or triclosan), or dilute bleach baths, plus if MRSA nasal carriage present, also using nasal ointment (e.g. mupirocin antibiotic ointment – apply twice per day intranasally 1cm with a swab or gloved finger, then squeeze nostrils to distribute better). One month apparent ‘clearance’ rates are often higher than 4 month clearance recheck though! Spontaneous clearance generally occurs in 1-12 months without any clearance treatments though – so consider carefully before implementing
- There are low incidence but some specific toxicity issues with decolonisation clearance treatments
- Any infections present (e.g. wound) may need additional systemic antibiotics to cover as well
- While this decolonisation approach may seem intuitively correct and desirable the literature is very divided on the longer term success outcomes, if any. Small numbers of any MRSA still present post decolonisation attempts, which may not be detected and so are reported as ‘negative clearance swabs for MRSA’, may be selected for on any subsequent use of antibiotics or the MRSA may not uncommonly re-emerge 4+ months later. On the other hand, **with time and no further antibiotic use**, MRSA carriage rates drop/disappear over several months to a year in an individual i.e. colonisation is generally only transient

- Repeat clearance treatments may be indicated if a person is awaiting elective surgery or if readmission to hospital is anticipated
- Indiscriminate use of MRSA eradication treatment (e.g. mupirocin antibiotic ointments) may in fact contribute to the development of further antimicrobial resistance. Prolonged use of skin antiseptics may cause skin irritation and discomfort with potential increased bacterial carriage and spread of any potential pathogens present (susceptible or resistant)

Advice for Healthcare Workers and Carers Attending Patients with MRSA

Living in their Own Home

- Standard infection control precautions should be followed for patient care activities
- Cuts or breaks in the skin of carers should be covered with an impermeable dressing
- Patients should be informed that there is little risk of transmitting MRSA to healthy people who are at low risk of developing infection
- Eradication attempts of MRSA carriage in the community is generally not required
- **Good hand hygiene practice is the most important infection control measure.** Hand hygiene should be performed at least **before and after physical contact** with the patient and before leaving the home
- Linen should be changed and washed if soiled, and on a routine basis
- The client's environment should be cleaned routinely using standard cleaners/detergents

Day Care Facilities and Healthcare Centres

- People with MRSA should not be excluded from local day care facilities or community health care centres unless there is a particular reason to do so e.g. outbreak strain ('school sores') or particularly resistant strain

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