Royal Devon and Exeter NHS Foundation Trust

# GUIDELINES FOR THE MANAGEMENT OF PVL – ASSOCIATED *STAPHYLOCOCCUS AUREUS* INFECTIONS IN THE HOSPITAL ENVIRONMENT

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**This policy etc. covers:** (Please tick ✓ relevant box below)

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| Care Quality Commission Outcome No: | 8 | Monitor | |
| | | Finance | |
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| Assurance Framework | | Complaints | |
| **Other** (Please specify): Hygiene Code (Health & Social Care Act 2008) | | | |
| Note: This policy has been assessed for any equality, diversity or human rights implications. | | | |

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## 1. Introduction

The following guidelines are based on the advice given in the Guidance on the diagnosis and management of PVL-associated *Staphylococcus aureus* infections (PVL-SA) England (2008) a report prepared by the PVL sub-group of the Steering Group on Healthcare Associated Infection.

## 2. Background

Panton-Valentine Leukocidin (PVL) is a toxin that destroys white blood cells and is excreted by some strains of *Staphylococcus aureus* (SA). Strains of PVL-SA producing a new pattern of infection have emerged in the UK and worldwide. In the UK, PVL-SA account for less than 2% of clinical SA isolates submitted to the national Reference Laboratory whether meticillin sensitive (MSSA) or meticillin resistant (MRSA). However PVL has been strongly associated epidemiologically with virulent transmissible strains of *S. aureus*, including Community Associated (CA) MRSA and is a valuable marker and target for screening for virulence in some strains of *S. aureus.*

Panton and Valentine first identified the exotoxin, which they classified as leukocidin back in 1932 (Panton and Valentine, 1932). In the 1950's and 60's, the phage type 80/81 strain of PVL-MSSA successfully spread in the UK and abroad resulting in widespread disease. This presented most commonly as boils and abscesses in previously healthy individuals, either in the community, hospitalised patients or healthcare workers. The increase in morbidity and mortality associated with PVL-MRSA has caused public health concerns worldwide. At present most PVL-SA strains in the UK have been MSSA. However in North America a major problem has emerged with most community acquired (CA) MRSA's producing PVL. One particular community strain is now spreading in hospitals.

In recent years there has been an increase in the number of PVL-SA isolates referred to the Reference Laboratory from invasive infections. It is unclear whether this was a reflection of increased prevalence or improved case ascertainment, but there is now a programme whereby any suspicious isolate should be submitted for testing for PVL production, hence PVL-SA are increasingly recognised. Data suggests that infections caused by PVL-SA are still currently uncommon in England.

## 3. Clinical features

As with other strains of *S. aureus,* PVL-SA predominantly cause Skin and Soft Tissue Infections (SSTI), usually recurrent due to the overproduction of white cells to compensate for the destruction by the leukocidin. PVL-SA can also cause severe invasive infections such as septicaemia, osteomyelitis and pneumonia. Necrotising haemorrhagic pneumonia is the most serious clinical feature with a high mortality rate (> 62%). This often follows a "flu-like" illness

which may be a genuine viral infection or reflect the bacteraemia, and tends to affect otherwise healthy young people in the community.

Skin and soft tissue infections are often recurrent and include:

- Boils (furunculosis), carbuncles, folliculitis, purulent eyelid infections
- Cutaneous lesions
- Pain and erythema out of proportion to severity of cutaneous findings
- Necrosis

Invasive infections

- Necrotising pneumonia
- Necrotising fasciitis
- Osteomyelitis, septic arthritis, and pyomyositis
- Purpura fulminans (clinical picture reminiscent of meningococcal septicaemia)

## 4. Transmission

### 4.1 Contact:

The main route of transmission in healthcare settings is by contact via the unwashed hands of healthcare workers. Inadequately decontaminated shared equipment is also a vehicle for transmission.

### 4.2 Airborne:

As with MRSA this is a much less important mode of transmission. PVL-SA may be transmitted via the airborne route on skin scales but this is only a significant risk if the patient has an excessive exfoliating skin condition such as eczema or psoriasis. However, the organism may remain viable in the environment for a long period of time (i.e. months) – thus keeping dust to a minimum is crucial. The risk of spread also exists in patients with PVL pneumonia who are ventilated or requiring airway suctioning. Transmission of PVL–SA to staff has been documented following contact with respiratory secretions during intubation of a patient with necrotising pneumonia, where PPE was not worn(Chalumeau et al, 2005). Therefore the need for appropriate PPE is paramount. Staff who fail to wear PPE when dealing with respiratory secretions in a suspected case, should be screened 3-7days post exposure for PVL.

## 5. Risk factors

The risk factors for PVL-SA seen the UK are similar to those for CA-MRSA in North America. These include compromised skin integrity, skin to skin contact and the sharing of contaminated items such as towels. The worldwide picture suggests that closed communities with people in close contact result in higher transmission risks of staphylococcal infection.

The following setting can be assumed to increase the risk of PVL-SA based on their increased risk of CA-MRSA spread in North America

- Households
- Close contact sports
- Military training camps
- Gyms
- Prisons

## 6. When to suspect a PVL-SA infection

PVL associated SA infection should be suspected if the patient has a necrotising SSTI, recurrent furunculosis or abscesses, or there is a clustering of SSTI's within a household or social group; also in invasive infections in immunocompetent people, particularly community acquired necrotising /haemorrhagic pneumonia in young, previously fit people.

## 7. Decolonisation

Topical decolonisation is often used to interrupt transmission and should commence after the acute infection has resolved. In the hospital environment, decolonisation can be used to promote clearance of the organism from a specific individual and also minimise the infection risks to other patients by reducing bacterial loading. Preoperative patients should commence decolonisation prior to surgery. Topical decolonisation without prior screening should be offered to primary cases. The five day decolonisation regimen is similar to that undertaken for MRSA decolonisation but with hair washing occurring on the 1st, 3rd and 5th day of treatment (See Guidelines for the control and management of MRSA, section 5.2). Advice should be sought from a dermatologist where any pre-existing skin conditions are present.

Decolonisation of neonates, especially premature neonates is difficult. Where decolonisation is required, nasal mupirocin may be used. Antiseptic skin wash preparations must be aqueous and not alcohol based to avoid the risk of burn injuries.

## 8. Screening

### 8.1 Patients

If screening is required the method is the same as that for MRSA and involves swabbing:

- Both anterior nares (one swab will do for both – first moisten the swab with sterile saline)
- Throat
- Perineum (first moisten swab with sterile saline)
- Any wound, ulcer or other area of broken skin/skin lesion
- Manipulated sites (e.g. intravascular catheters, tracheostomies)

In addition, obtain:
- CSU - if catheterised
- Sputum - if expectorating

Make sure the swabs are labelled with the patient's details and sent to the laboratory with a completed microbiology request form - the investigation required is 'PVL screen'. It is important to remember that in the case of a potentially infected wound, a swab for culture and sensitivity should be sent to determine the identity of any causative organism.

### 8.2 Contacts
A decision will be made as to the appropriateness of contact screening. Close contacts that are infected or likely to be colonised because of a history of past infection should undergo decolonisation without prior screening. Repeat screening of positive contacts is not recommended unless they are particularly vulnerable to infection, pose a special risk to others (e.g. healthcare workers) or have evidence of ongoing suspected PVL infection. If required, repeat screens should be performed at least 7 days post decolonisation.

## 9. Source isolation precautions

Source isolation precautions must apply to all known or suspected cases of PVL-SA. Patients must be isolated and PPE should be worn for direct patient contact and environmental cleaning. If isolation in a single room is not possible, spatial isolation in a bay should be implemented. A risk assessment will need to be performed before this can take place. PVL-SA positive patients must not be situated in a bay with other patients who are immunosuppressed, have urinary catheters in situ, intravascular devices or open wounds.

## 10. Maintaining standards of care

It is important to remember that control measures should not compromise standards of care or the need for urgent specialist care. The patient's overall needs must take precedence.

### 10.1 Clinical investigations
Patients can undergo investigations in all departments, provided the department has been informed in advance. It is recommended that patients are dealt with promptly to minimise delay in returning to the ward. Standard infection control precautions should be practised by staff within the department. Equipment should be decontaminated, in accordance with the decontamination policy, before use on the next patient.

### 10.2 Transfers to other wards
Patients can be transferred from one ward to another ward or unit, if clinical need dictates. The receiving area must be informed in advance of the PVL-SA status to ensure that the appropriate facilities are available and the required

precautions are applied. Movement for non clinical reasons, e.g. outlying PVL-SA positive medical patients to surgical wards to increase bed availability in medicine, should be avoided (See Patient Placement and Movement Policy).

### 10.3 Mobilisation

If mobilisation is required when a patient is isolated in a single room, the patient can leave the room to allow mobilisation in an area away from the ward, e.g. main corridor. This does not mean that the patient can wander freely around the ward where close contact with other patients is inevitable. The distinction must be explained carefully to patients who may find it confusing.

### 10.4 Personal Hygiene

If *en suite* facilities are not available, patients may use communal facilities but these must be cleaned thoroughly after use. If patients are leaving an isolation room for this purpose, they must be advised this does not mean they can move freely around the ward.

### 10.5 Physiotherapy/Occupational Therapy

Please refer to Appendix 2 of the guidelines for the management and control of MRSA as this is also applicable for PVL-SA.

## 11. Management of hospital staff colonised/infected with PVL-SA

Staff found to be colonised or infected with PVL-SA will be treated in collaboration with Occupational Health and Infection Control.

Exclusion from work may be necessary depending on the level of risk.

## 12. References

Guidance on the diagnosis and management of PVL- associated *Staphylococcus aureus* infections (PVL-SA) in England (2008). Report prepared by the PVL sub-group of the Steering Group on healthcare

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