Peripheral Vascular Catheter (PVCs)

Cause and Effect Chart – to reduce local infections and secondary blood stream infections

Version 2008 - 2

Preventing PVC complications: phlebitis; insertion site sepsis; infusate sepsis and catheter-related blood stream infections (CR-BSI) caused in particular by Staphylococcus aureus

A literature search was performed and the identified papers underwent a rapid review. From this review, key points of information for optimal peripheral vascular catheter care have been summarised below. A formal scientific critique was not performed on the identified papers and therefore there may be limitations to this process.

Key points from the papers:

- The commonest cause of MRSA bacteraemias are vascular catheters [1, 2].
- Complications often arise because PVCs are left in situ for too long, or are inserted when they are not required [1, 3-5].
- Micro-organisms gaining entry to the catheters come from either: the skin of the patient, the hands of HCWs, the hubs or connection points, the infusate and sometimes, from a pre-existing site of infection in the patient via the blood [6-8].
- Peripheral vascular catheters cause Staphylococcus aureus bacteraemia more commonly than do central vascular catheters [9].
- The hubs and connection points of PVCs will be contaminated and these must be disinfected before they are accessed by HCWs using an aseptic technique [6-8].
- The longer a PVC is in situ the greater the risk of complication [6-8]. Therefore there should be a daily assessment of the continuing need for PVCs: they should be removed as soon as they are no longer required.
- PVCs become infected by organisms gaining entry, biofilm forming along the lumen surface, and then organisms being infused into the blood stream [6-8].
- Infusates (drugs made up in-house for infusion) can be easily contaminated during preparation and can cause bacteraemia and even outbreaks [10].
- There needs to be local risk assessment of the areas where drugs are compounded [11].
- Feedback of data on performance related to PVCs improves practice [5].
- To optimise care, PVCs should only be used if they are needed, they should be removed as soon as possible, and all PVC procedures should be performed aseptically [3-8, 10].
### How PVCs cause BSIs & Risk Factors

PVCs cause BSIs by enabling microorganisms to gain direct access to the blood stream. Microorganisms come from contaminated hubs/connections, hands of HCWs, the patient's skin at the insertion site and contaminated drugs/infusions. Once microorganisms enter, biofilm forms on the lumen surface and as a consequence the catheter becomes infected. Local abscess formation can also lead to CR-BSIs. Contaminated drugs/infusions can cause infection - microorganisms are infused directly into the vein. An existing site of infection can also infect the catheter by haematogenous spread.

**Risk factors for CR-BSI:** Use of a PVC. Use of a PVC for drugs that irritate the vein and causing phlebitis. Having a pre-existing infection. Excess duration of PVC use - longer than 72 hours.

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### Methods (Insertion)

- **Only use a PVC if it is necessary to do so.** Do not put in a PVC 'just in case'.
- **Perform hand hygiene before collecting sundries.** (Select if possible a small gauge PVC).
- **Gain the patient's verbal consent.**
- **Perform hand hygiene.**
- **Don gloves.**
- **Use alcohol wipe to clean the insertion site**
- **If possible, only site a PVC where it can be seen. Insert catheter**
- **Check/keep the insertion site covered with an intact sterile IV designated dressing.**
- **Discard sharps immediately/safely.**
- **Remove gloves and perform hand hygiene.**
- **Document PVC insertion, commence care plan.**

### Methods (Maintenance)

- **Review daily the continuing need for the PVC.**
- **Document any continuing need for the PVC.**
- **Remove the PVC as soon as the patient's clinical condition allows, or if there is insertion site swelling / extravasation / discharge.** (If PVC is needed >72 hrs, consider changing the PVC).
- **Ask the patient to report if there PVC insertion site pain, inflammation, swelling, discharge or leakage.**
- **Perform PVC procedures aseptically, with hand hygiene before & after all PVC procedures.** (Use single-use vials only once).
- **Consider the use of filters for long-term infusions made up in-house.**

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**Preventing CR-BSIs caused by PVCs**

HCWs must be aware of the patient safety risks as a consequence of PVC use and be committed to minimising them, by:
- Removing PVCs as soon as possible
- Performing all PVC procedures aseptically.
- Participating in programmes designed to optimise care, e.g. PVC bundle.

HCWs must be trained and deemed competent before undertaking any PVC procedure, e.g. insertion, maintenance, drug compounding or IV administration.

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### Environment

- There must be clinical nursing and medical leadership directed towards providing an optimal safe patient environment.
- There should be visible signs that the clinical team is committed to patient safety by the collection and display of performance data in the clinical area, on compliance with procedures and outcome rates, e.g. regular PVC bundle usage.
- The environment must be visibly clean.
- The areas where intravenous drugs are compounded (prepared) must be free from clutter and possible splash contamination and risk assessed as suitable.

### Equipment

- Use only single-use sterile equipment, with intact non-stained, non-wet packaging that is within its expiry date.
- Avoid the use of multi-dose vials.
- Ensure there is a selection of PVCs, gloves and IV dressings of suitable sizes.
- Keep the equipment in a clean dry area where it will not be subject to possible splash contamination. Do not put elastic bands around catheters pre storage.

### Health Care Workers (HCWs)

- HCWs must be trained and deemed competent before undertaking any PVC procedure, e.g. insertion, maintenance, drug compounding or IV administration.
References:


