



Standard for the Management of Intravascular Device-related Bloodstream Infections

*Protocol for Management
and Insertion of
Peripherally Inserted
Central Venous Catheters
(PICC) Part I*

About this presentation

- Designed to assist with training of staff on the insertion and management of peripherally inserted central venous catheters (PICCs)
- Relates to prevention of intravascular device-related infections
- Read in conjunction with the **Protocol for the Insertion and Management of Peripherally Inserted Central Venous Catheters**

About this presentation

- The training module is presented in two parts
 - Part I: Infection prevention strategies for insertion of a PICC
 - Part II: Infection prevention strategies related to management of the PICC and associated components
- An optional test is included to assess staff knowledge

Outcome

- Upon completion of this presentation the learner will have a theoretical knowledge of strategies to prevent intravascular device-related infection

What is a PICC?

- A polyurethane or silicone uncuffed catheter peripherally inserted into the veins of the antecubital fossa or the proximal portion of the upper extremity of adults, entering the superior vena cava
- Usually >30cm (50 – 70cm in length) depending on patient size

Indications

- PICCs are used in inpatient and outpatient settings for intermediate to long-term central venous access; typically 6-8 weeks
- A PICC should be considered in inpatients who:
 - have limited peripheral access **OR**
 - frequent peripheral site changes **OR**
 - require intermediate- to long-term access (i.e. >7 days to 4-6 weeks), frequent or continuous vascular access **OR**
 - are prescribed therapies requiring central venous access, including parenteral nutrition with dextrose concentrations >10%, IV administration of vesicant medications, extreme variations in tonicity and pH

Indications

- Consideration should be given to using tunnelled, cuffed central venous catheters if projected treatment duration > 6 weeks

Indications

Outpatient Recommendations

- A PICC should be considered in out patients who:
 - Require intermediate- to long-term (i.e. > 7 days), frequent or continuous vascular access
 - Prescribed therapies that require central venous access, including parenteral nutrition with dextrose concentrations >10%, IV administration of vesicant medications, extreme variations in tonicity and pH

PICC-related Infections

- Although PICCs provide necessary vascular access, their use puts patients at risk for local and systemic infectious complications and are an important cause of morbidity and mortality, as well as increased hospitalisation and healthcare costs

PICC-related Infections

- Risk factors for PICC-related bloodstream infections include:
 - Inexperience of the operator
 - Catheter insertion with less than maximal barrier precautions
 - Heavy colonisation of the insertion site
 - Contamination of the catheter hub
 - Increased frequency of catheter manipulation
 - Nurse to patient ratio
 - Type of device
 - Use of total parenteral nutrition
 - Patient characteristics
 - Contaminated equipment
 - Poor catheter management including lack of compliance with written Standard and Protocols

PICC-related Infection

PICC-related infection is caused by:

1. Colonisation of the external surfaces of the PICC by microorganisms from the patient's skin.
 - This can occur through:
 - contamination of the catheter tip at the time of insertion
 - migration of skin organisms at the insertion site into the cutaneous catheter tract after insertion.²

PICC-related Infection

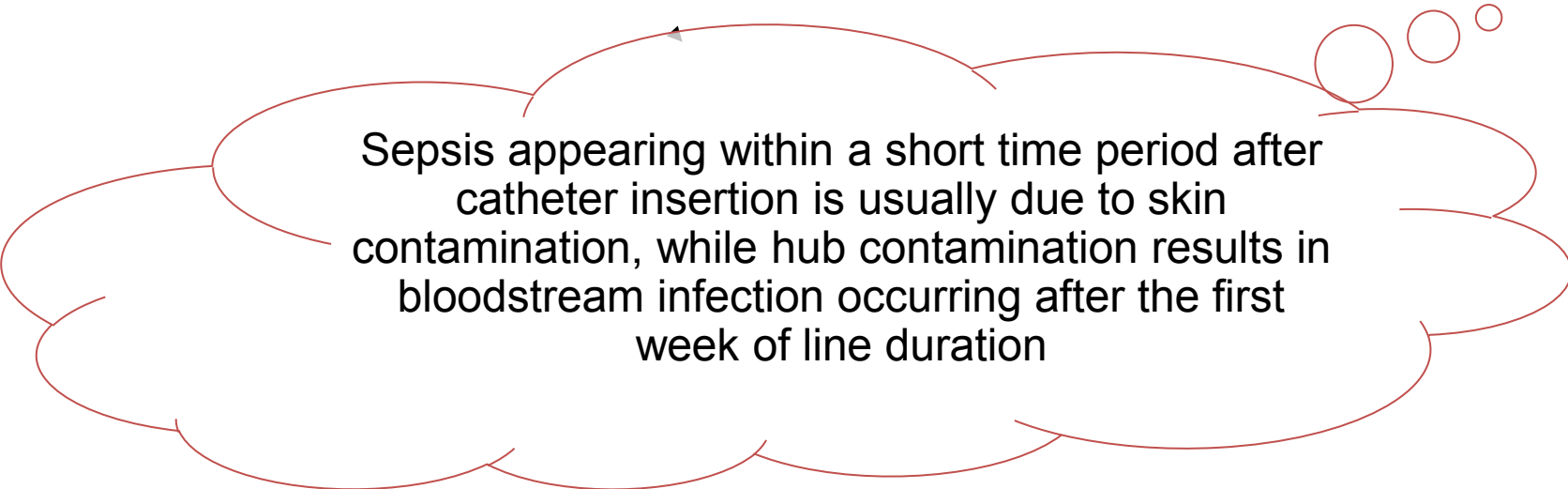
PICC-related infection is caused by:

2. Contamination of the catheter hub with distal spread of the organisms down the intraluminal surface.
 - This is largely thought to occur during handling of the connections at catheter junctions.²

PICC-related Infection

PICC-related infection is caused by:

3. Occasionally, the catheter might become haematogenously seeded from another focus of infection.²
4. Rarely, by contamination of the fluid infusate.²



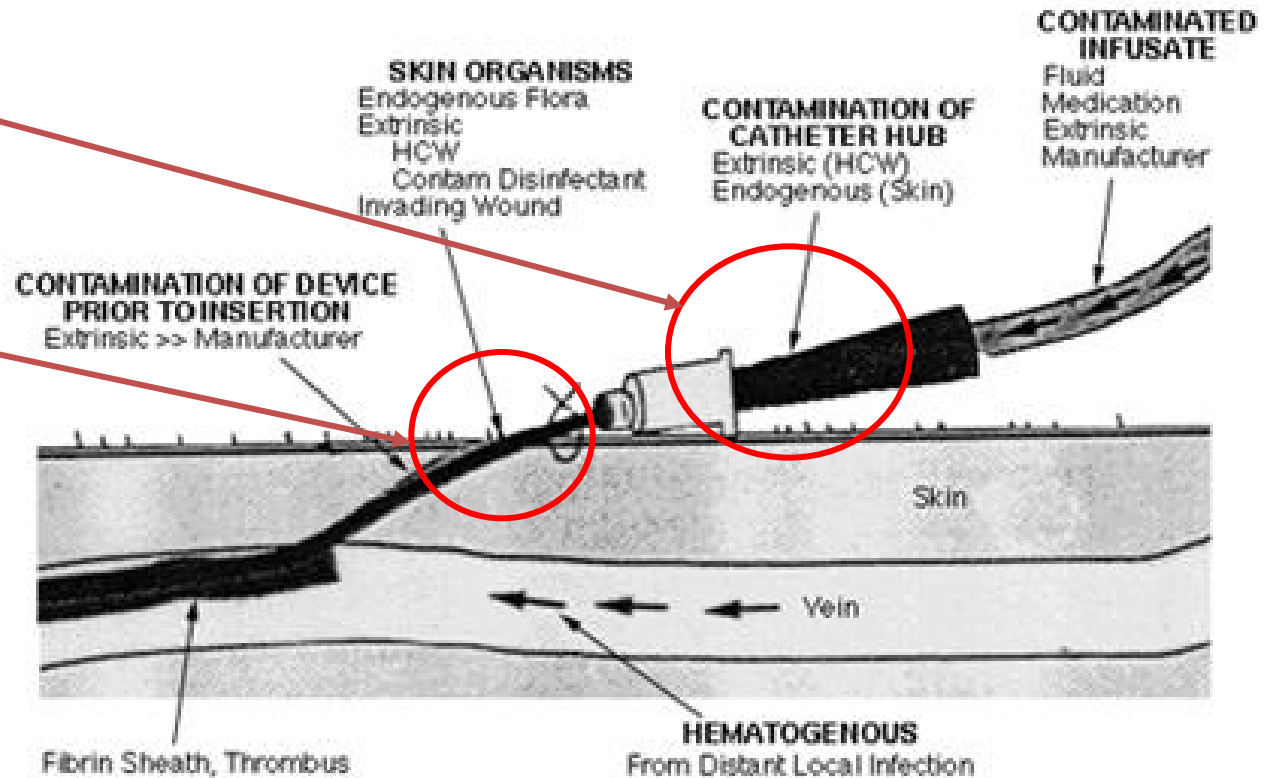
Sepsis appearing within a short time period after catheter insertion is usually due to skin contamination, while hub contamination results in bloodstream infection occurring after the first week of line duration

PICC-related BSI Prevention Strategies

- Maximal sterile barrier precautions
- Meticulous aseptic technique including hand hygiene prior to insertion or any manipulation
- Experience and knowledgeable personnel to insert
- Removal of the catheter when no longer needed
- Maintenance by IV Team or highly educated personnel
- Routine site care including type of dressing
- Routine replacement of IV administration sets and infusate
- Secure anchoring of the catheter
- Regular feedback of surveillance data

Consistent implementation of preventative strategies can reduce IVD-related BSI by 40%

Focus of prevention strategies



General

- Only competent staff (or training staff supervised by competent staff) are to insert PICCs
- Insert PICC in an area where asepsis can be maintained
- A trolley/cart including all supplies necessary for inserting or rewiring a PICC including barrier precautions shall be dedicated for PICC insertion
- Set up the sterile field immediately prior to the procedure

Hand Hygiene

- Perform hand hygiene with an appropriate product such as antiseptic-containing soap solution or alcohol-based waterless cleanser:
 - Before and after palpating catheter insertion sites
 - Before and after inserting an intravascular catheter
 - Before and after accessing, repairing, or dressing an intravascular catheter; this includes associated components such as administration sets and access ports
- Use of gloves does not obviate the need for hand hygiene

Maximal Barrier Precautions

- The operator and any person who enters the sterile field to assist in the procedure, must don a mask, sterile long-sleeved gown, sterile gloves and protective eyewear
 - A surgical cap should be used to contain hair that may fall across the operator's face during the procedure

Maximal Barrier Precautions

1. Don protective eyewear and surgical mask
 - The mask should cover the nose and mouth tightly
2. Wash hands and forearms for at least three minutes using an antiseptic soap solution
 - Dry thoroughly with a sterile towel

Maximal Barrier Precautions

3. Aseptically don sterile gown
4. Aseptically don sterile gloves
 - Ensure gloves cover cuff of gown

Maximal Barrier Precautions

- A solution containing 2% chlorhexidine gluconate (CHG) in $\geq 70\%$ ethyl or isopropyl alcohol is recommended for preparation of the insertion site (unless contraindicated)

Maximal Barrier Precautions

Remove hair at the insertion site using clippers

Physically clean the skin if necessary

Do not defat the skin using alcohol, acetone or ether

Vigorously apply skin disinfectant to an area of skin approximately 15 cm in diameter, in a circular motion beginning in the centre of the proposed site and moving outward, for at least 30 seconds

- Repeat this step three times using a new swab for each application
- Allow to air dry completely prior to inserting the catheter; do not wipe or blot

Maximal Barrier Precautions

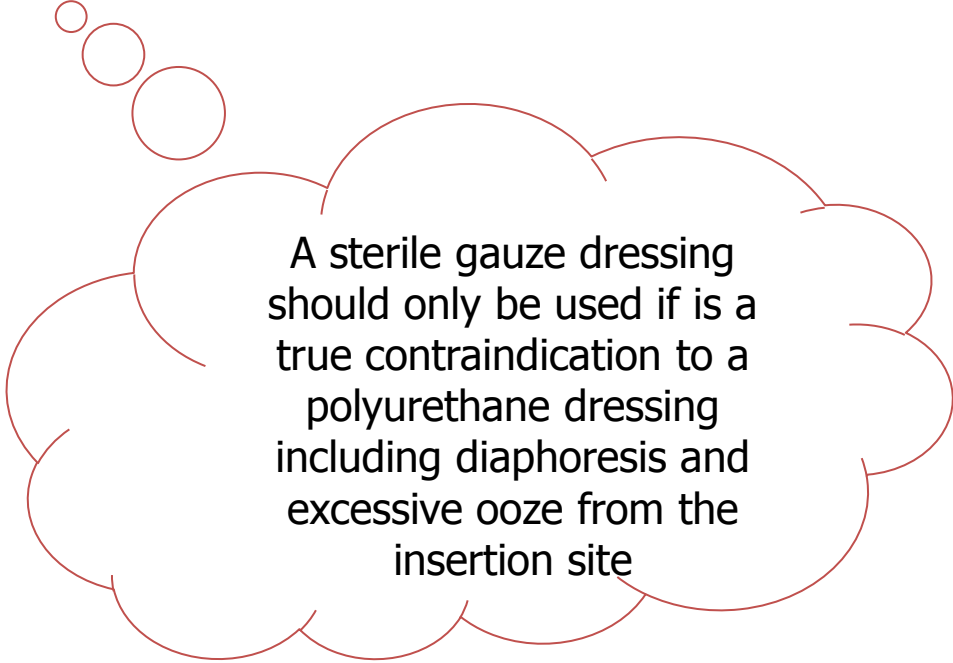
- Drape the entire upper body and arm of the patient (while maintaining a sterile field) leaving only a small opening at the insertion site

Catheter Fixation

- Secure the catheter to minimise to-and-fro pistoning of the catheter and subsequent catheter tract invasion by cutaneous microorganisms

Dressing Type

- Sterile, transparent, semi-permeable, self-adhesive, polyurethane dressings are recommended



A sterile gauze dressing should only be used if is a true contraindication to a polyurethane dressing including diaphoresis and excessive ooze from the insertion site

Documentation

- Accurate documentation and record keeping must be maintained to ensure patient safety, to allow for audits, and to track any outbreaks of infection.
- Documentation should include:
 - Date and time of insertion
 - Type of IVD and gauge
 - Anatomical/insertion site
 - Name of operator
 - When device removed/replaced

References

1. Sansivero G. Venous Anatomy and Physiology: Considerations for vascular Access Device Placement and Function. Journal of Infusion Nursing, 1998 Sep/Oct; 21(5S): S107-S114.
2. Canadian Government Infection Control Guidelines, December 1997 http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/97vol23/23s8/iiadb_e.html#A (Internet access required)



You have now completed Part I
of this module

Please [click here](#)
to proceed to the
Part II

I-Care is an initiative of the Centre for Healthcare Related
Infection Surveillance and Prevention (CHRISP)
Copyright © The State of Queensland, Queensland Health, CHRISP, 2007