Central line catheters are invasive and leave patients prone to infection. Careful attention to their management and infection prevention minimises their risks.

Minimising risk in the use of central lines

In this article...

- Why central lines are used
- The risks associated with their use
- Suggestions to improve central line management

Central lines are catheters placed directly into the large veins (jugular, subclavian or femoral) with the tip placed in a central vein (the superior or inferior vena cava). They are inserted for a range of reasons:

- To measure central venous pressure, administer fluids and/or toxic drugs, in patients with limited peripheral access;
- For short-term haemodialysis;
- To administer intravenous (IV) drugs, such as chemotherapy and antibiotics, IV fluids and blood products, and total parenteral nutrition;
- To obtain blood samples (Bishop et al, 2007; Key et al, 2000).

Risks associated with central lines

Despite their advantages, central lines pose a number of risks to patients including infection, pneumothorax, haemothorax, arterial haemorrhage, air embolism, thrombosis and malfunction of the central line itself (Kusminsky, 2007). These are leading causes of device-related bloodstream infections, which are a major cause of morbidity, increased severity of illness and prolonged hospital stays (Health Protection Agency, 2012; Health Protection Scotland, 2012a; Public Health Agency, 2012; Public Health Wales, 2012).

Patients who require central lines tend to be prone to infection due to the nature of their illness. Central lines are generally used in inpatient settings such as intensive care units, or for patients undergoing cancer therapy or long-term treatment such as renal dialysis (Morales et al, 2004). The line itself provides a direct portal for microorganisms to enter the bloodstream and this, combined with patients’ vulnerability, means staff must take precautions to reduce this significant infection risk.

There are a number of ways in which infection can occur. For instance, microorganisms can enter the bloodstream through contamination of the hub, from the patient’s skin at the insertion site, from the hands of healthcare workers during dressing changes or from contamination of an infusate solution (Curran, 2011).

Minimising risk

Health Protection Scotland reviewed evidence to update quality improvement tools that aim to prevent infections associated with central lines (Health Protection Scotland, 2012b). The resulting key recommendations are presented below.

Is the line needed?

- Remove the line as soon as possible;
- Ensure the need for the central line is reviewed and recorded daily.

Keywords: Central line/Hand hygiene/Infection prevention

- This article has been double-blind peer reviewed

5 key points

1. Central lines are catheters placed into a large vein with the tip in one of the central veins
2. They allow several treatments to be given simultaneously
3. Central lines are used to measure central venous pressure, administer fluids or toxic drugs, or when a patient requires intravenous drugs regularly
4. Staff should prioritise infection prevention, including hand hygiene, as there is a high risk of infection
5. Patients should be reassessed daily and central lines left in situ only while there is a clinical benefit/need
One of the most effective ways to reduce the risk of bloodstream infections from central lines is to have only one line in place and ensure this is clinically necessary [Department of Health, 2011; O’Grady et al, 2011]. To do this, the need for the line should be reviewed daily to ensure it is removed as soon clinically possible (Weber and Rutala, 2011; Pratt et al, 2007).

One approach is to document each day in the patient’s records the decision whether to remove a central line, the reasons behind the decision and the name of the health worker who made it. This is effective and is good practice in keeping accurate patient records.

**The importance of hand hygiene**
- Ensure hands are washed immediately before accessing the central line/site.

The World Health Organization describes the hand hygiene steps health professionals must follow in its *Five Moments for Hand Hygiene* guidance. This emphasises the importance of thorough hand hygiene before any aseptic procedures to prevent healthcare-associated infections. A patient with a central line is most at risk of infection when the line is accessed, so health professionals should use alcohol-based handrub or wash their hands immediately before putting on gloves to perform a central line procedure, which is WHO moment 2, before clean/aseptic procedure (WHO, 2009).

**How to safely access a central line**
- Use an antiseptic containing 70% isopropyl alcohol to clean the access hub before accessing the central line – rub the hub for at least 15 seconds (“scrub the hub”).

It is crucial to access a central line safely to protect the patient at this vulnerable time (DH, 2011). This has been emphasised by studies showing that access ports and hubs tend to be contaminated and must therefore be disinfected before they are accessed by health workers (O’Grady et al, 2011; Mermel, 2000).

Cleaning with 70% isopropyl alcohol for 15 seconds using a scrubbing action has been shown to reduce contamination (Lockman et al, 2011; Kaler, 2007). The phrase “scrub the hub” is used to remind staff to do this (Kaler, 2007).

**Administration of medicines**
To reduce the risk of infection, consideration must be given to the preparation of drugs and/or infusions administered through central lines.

A planned, scheduled programme for changing administration sets, with a minimum of 72 hours and maximum of 96 hours (or 24 hours if administering lipids or blood transfusions) between changes, will also help reduce infection risks while the guidance on this subject is not so defined (DH, 2011).

**Complications and removal**
Central lines must be closely observed for complications. Infection should be suspected if the surrounding skin is red, tender and there is a discharge on occasions; or in a tunneled central line, if there is pain and hardening along the track of the line.

Blood culture samples are used to detect bloodstream infections from central lines, which are known as a catheter-related bloodstream infections. If central lines need to be removed due to complications, this should be done by staff competent in the procedure who are practised in preventing an air embolus (Bishop et al, 2007).

**Dressing the site**
- Regularly check that the central line dressing is intact and has been changed in the last seven days;
- Ensure that 2% chlorhexidine gluconate in 70% isopropyl alcohol is used for cleaning the insertion site during dressing changes.

The use of a transparent dressing makes it easier to view the insertion site and check for complications and allows the patient to bathe and shower without soaking the site (DH, 2011; Bishop et al, 2007). However, the choice of dressing depends on patient preference and comfort.

Ideally, the site should remain covered with a sterile dressing at all times, but skin tunnelled central lines may not require a dressing once the skin has healed (O’Grady et al, 2011; Bishop et al, 2007). Medical and nursing staff should ensure the patient is not sensitive to chlorhexidine.

**Conclusion**
Central lines are an important part of patient care but their invasive nature and the vulnerability of patients who need them mean staff must be mindful of the risk of infection.

There are a number of evidence-based ways in which staff can keep patients safe while using central lines. NT

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**References**
Health Protection Scotland (2012b) Evidence for Care Bundles and other Quality Improvement Tools. Glasgow: HPS, tinyurl.com/HPA-bundle-evidence