INFECTION PREVENTION: PERIPHERAL INTRAVENOUS CATHETER ASSESSMENT AND CARE

By Gillian Ray-Barruel

Peripheral intravenous catheters are the most common device in hospital patients, but they do come with infection risks. Awareness of the complications and regular assessment can reduce risks and improve patient outcomes.

Around 10 million patients are admitted to Australian hospitals annually (AIHW, 2015), and 70% will need at least one peripheral intravenous catheter (PIVC) during their hospital stay (Zingg and Pittet, 2009). Despite the prevalence of PIVCs, they are not without risk. Unfortunately, one-third of PIVCs stop working or fall out before treatment is completed (Wallis et al. 2014). This means another PIVC often has to be inserted: a time-consuming and uncomfortable procedure.

A common problem with PIVCs is phlebitis, or inflammation of the vein, which can be mechanical, chemical or infective (Campbell, 1998). Mechanical phlebitis is caused by movement of the catheter within the vein. Chemical phlebitis results when the intravenous (IV) medication or fluid irritates the tunica intima, the internal lining of the vein. And infective phlebitis occurs when microorganisms colonise the catheter and begin an infective process. Clinical signs of phlebitis include pain, redness, swelling, hardness of tissues, palpable cord, or purulent discharge from the insertion site (Ray-Barruel et al. 2014). The PIVC should be removed if any signs of phlebitis are detected because local infection can lead to serious bloodstream infection.

There are four possible pathways to PIVC infection:

1. During catheter insertion microbes from the patient's skin, contaminated disinfectant or healthcare worker's hands may migrate down the catheter tract into the bloodstream;
2. Inadequate decontamination of the catheter hub prior to administering fluids or medications may facilitate microbial entry;
3. Bacteria already circulating in the bloodstream may attach to the PIVC and cause a local infection; and
4. Contaminated IV fluids or medications may introduce microbes into the bloodstream (Crnich and Maki, 2002).

The PIVC insertion site is a breach of skin integrity leading directly to the bloodstream. Therefore, asepsis principles must be applied during catheter insertion, dressing changes or whenever the catheter is accessed. Handwashing is essential before touching a patient and their lines and dressings, and when preparing medications and IV fluids (Morris and Heong Tay, 2008). Scrubbing the catheter hub and allowing it to air-dry before accessing will reduce the risk of microbial entry (Moureau and Flynn, 2015).

CLINICAL SIGNS OF PHLEBITIS INCLUDE PAIN, REDNESS, SWELLING, HARDNESS OF TISSUES, PALPABLE CORD, OR PURULENT DISCHARGE FROM THE INSERTION SITE (RAY-BARRUEL ET AL. 2014).

Ensuring the IV dressing is clean, dry and intact, and that IV lines are secured, will reduce micro-motion of the catheter within the vessel (Marsh et al 2015). It's also best to check that prescribed IV medications can be delivered via peripheral veins, as many medications are irritating to smaller veins and may need to be delivered via a central venous device.

Regular assessment is the key to prevention and early detection of IV complications. Phlebitis scales are not recommended (Ray-Barruel et al. 2014). Instead, nurses need to routinely ask, "Is the IV needed? Is the IV working? Is the IV tolerated?" If the answer to any of these is "No", or if there are any signs of infection, the PIVC should be removed. Prevalence studies have shown that 25–30% of PIVCs are left in situ when not in use, which greatly increases infection risk (Limm et al. 2013; New et al. 2014; Alexandrou et al. 2015). Overall catheter dwell time is a risk factor for PIVC infection (Zhang et al. 2016). However, routine changing of PIVCs does not reduce the risk of infection (Webster et al. 2013). Instead, daily consideration of the patient's continued need for IV access should be a priority, and catheters not in use should be promptly removed. Adherence to these principles can reduce risks of IV access and improve patient outcomes.

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