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New research: Change peripheral intravenous catheters only as clinically indicated, not routinely.

The results of a nurse led and nationally funded multicentre, randomised equivalence trial were published in the third paper in *The Lancet* Series on Surgery in September 2012[1]. The findings show that the millions of peripheral intravenous catheters used each year can be safely changed only when clinically necessary. This is a 'game changing' study, overturning 40 years of accepted practice involving routine replacement every three days. Introducing such a policy would not only prevent unnecessary painful procedures in at least 20% of patients but also dramatically reduce equipment used, staff workloads and costs.

The results support the Infusion Nursing Standards of Practice published by the Infusion Nurses Society, the first international body to recommend clinically indicated replacement of peripheral venous catheters (in 2011) based on a Cochrane Review published by the same authors as *The Lancet* study.[2, 3] Naturally, it remains important that all catheters are assessed at least once daily, and removed for any sign of malfunction, irritation or infection, as well as immediately once treatment is complete.

Currently the US Centers for Disease Control and Prevention (CDC) state that peripheral catheters do not need to be replaced more frequently than every 72-96h to reduce the risk of infection and phlebitis in adults[4]. Researchers estimate that up to

90% of patients in acute care hospitals require a peripheral intravenous catheter, with approximately 330 million sold in the United States (USA) annually[5-8]. If even 15% are needed for more than three days, then a change to clinically indicated replacement would prevent up to six million unnecessary intravenous catheter insertions, and would save about two million hours of staff time, and up to US$60 million in health costs each year for the USA alone.

In the study, 3283 adult patients expected to require a catheter for longer than three days were enrolled from three hospitals in Queensland, Australia. Patients were randomly assigned to either clinically indicated or routine removal every third day to compare the effectiveness of each practice at reducing phlebitis and infection. Patients had a wide range of medical and surgical diagnoses. Two of the hospitals had an IV Team who inserted catheters in half of the patients studied in their hospital, but provided no follow up catheter care. Overall, 61% of study patients had their IVs inserted by the general medical or nursing staff.

The mean catheter dwell time was 99h (SD 54) in the clinically indicated group and 70h (SD13) in the routine replacement group. Research nurses visited patients each day and assessed for phlebitis which was defined as the simultaneous presentation of two or more symptoms: 1) patient-reported pain or tenderness, with severity ≥ 2 on a 10-point scale; 2) erythema extending ≥ 1 cm from insertion site; 3) swelling extending ≥ 1 cm from insertion site; 4) purulent discharge; or 5) palpable venous cord beyond the catheter tip. The results were that phlebitis occurred in an identical 7% of patients in both groups, either during catheter use or within 48 hours of catheter removal. Phlebitis was statistically confirmed as equivalent between the two study

groups, regardless of whether catheters were replaced every 3 days, or left in place as long as they remained asymptomatic and still required for treatment.

Bloodstream infections were rare in the study with only one laboratory confirmed catheter-related infection (matched tip and blood cultures), with this patient being in the routine replacement group. Overall, there were 9 patients in the routine 3rd daily replacement group and 4 patients in the clinical replacement group who had any bloodstream infection during the study. Bloodstream infections did not differ significantly between groups, and there were no local (site) infections in the study.

Other significant findings of the study include the high proportion of catheter failures in both groups, at nearly 30% . This failure of catheters far more frequently involved infiltration, occlusion, or accidental removal than either phlebitis or infection. This is important as these complications get far less emphasis from policy makers and researchers, yet they are clearly common. Therefore, future studies that identify means of prevention of such catheter failures might have just as great an implications for cost, reduction of unnecessary invasive procedures, and staff workloads as do the present findings. The research group are now moving on to dressing and securement studies, in addition to exploring flushing methods to avoid catheter failure.

Clinically relevant studies such as this are vital to improve evidence for clinical practice. Up to 90% of hospitalised adult patients need a peripheral intravenous catheter. Catheter replacement is costly, time consuming, and causes distress to patients. The results of the study are consistent with previous smaller randomised controlled trials[9-12], and the Cochrane systematic review which showed no benefit of

routine replacement for phlebitis or catheter-related blood stream infections[3]. The CDC guidelines already recommend clinically indicated treatment in children[4]. Thus much evidence now exists that clinically indicated replacement of peripheral intravenous catheters is safe. Updated intravenous catheter policies (including CDC guidelines for adult patients) should advocate clinically indicated removal – i.e. to monitor and immediately remove intravenous catheters for complications or as soon as treatment is complete. Future practice and research should focus on appropriate education and resources needed to ensure the highest level of care related to insertion, management and assessment of intravenous catheters in patients in the hospital setting.

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