New Research: Change Peripheral Intravenous Catheters as Clinically Indicated, Not Routinely

by Samantha Keogh, PhD, RN

The results of a nurse-led and nationally funded multicenter, randomized equivalence trial were published in *The Lancet* during September 2012. 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 that overturns 40 years of accepted practice involving routine replacement every 3 days. Introducing a policy reflecting this new knowledge 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. Naturally, it remains important that all catheters are assessed at least once daily, and removed at any sign of malfunction, irritation, or infection, as well as when treatment is complete.

Currently the Centers for Disease Control and Prevention (CDC) maintain that peripheral catheters do not need to be replaced more frequently than every 72 to 96 hours to reduce the risk of infection and phlebitis in adults. Researchers estimate that up to 70% of patients in acute care hospitals require a peripheral intravenous catheter, with approximately 330 million sold in the United States annually. If even 15% are needed for more than 3 days, then a change to clinically indicated replacement would prevent up to 6 million unnecessary intravenous catheter insertions, and would save about 2 million hours of staff time, and up to $60 million in health costs each year for the United States alone.

In the *Lancet* study, 3,283 adult patients expected to require a catheter for longer than 3 days were enrolled from 3 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 intravenous access team that 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 intravenous lines inserted by the general medical or nursing staff.

The mean catheter dwell time was 99 ± 54 hours in the clinically indicated group and 70 ± 13 hours in the routine replacement group. Research nurses visited patients each day and assessed for phlebitis, which was defined as the simultaneous presentation of 2 or more of the following symptoms: patient-reported pain or tenderness, with severity ≥2 points on a 10-point scale; erythema extending ≥1 cm from insertion site; swelling extending ≥1 cm from the insertion site; purulent discharge; or palpable venous cord beyond the catheter tip. The results were that phlebitis occurred in 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 2 study groups, regardless of if 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 1 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 third-day 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 because 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 implication for cost, reduction of unnecessary invasive procedures, and staff workloads as do the findings presented in *The Lancet*. 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 70% of hospitalized 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 randomized controlled trials,9-12 and the Cochrane systematic review3 that showed no benefit of routine replacement for phlebitis or catheter-related blood stream infections. 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; that is, to monitor and immediately remove intravenous catheters at signs of complications or as soon as treatment is complete. Future practice and research should focus on appropriate education and resources to ensure the highest level of care related to insertion, management, and assessment of intravenous catheters in patients in hospital settings.

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