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Optimal timing for peripheral IV replacement?

There's no downside to switching from routine to clinically indicated replacement of peripheral IV catheters. And your patients will appreciate having fewer needlesticks.

PRACTICE CHANGER

Replace peripheral IV catheters as needed, rather than on a routine basis.[1]

STRENGTH OF RECOMMENDATION

A: Based on a randomized equivalence trial.

Rickard CM, Webster J, Wallis MC, et al. Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial. *Lancet*. 2012;380:1066-1074.

ILLUSTRATIVE CASE

On Day 4 of her hospitalization for a wound infection requiring IV antibiotics, a 45-year-old patient is told by her nurse that her IV catheter must be replaced. It's hospital policy, the RN says, to replace the catheter every 96 hours. The patient is afraid of needles and is not eager to have her catheter replaced every few days. Is it really necessary to replace the IV, she wants to know.

Each year, nearly 200 million peripheral IV catheters are placed in patients in hospitals throughout the United States.[2] Many of the catheters need to be replaced due to phlebitis, infiltration, pain, or swelling at the IV site, but the rate of bloodstream infections associated with peripheral IVs is just 0.5 per 1000 catheter days.[2]

Timing of replacement is "unresolved"

The Centers for Disease Control and Prevention (CDC)'s 2011 guidelines state that it is not necessary to replace peripheral IV catheters in adults more than every 72 to 96 hours,[3] but the CDC does not specify when the catheters *should* be replaced. For adult patients, the recommendation that a catheter be replaced only for clinical indications is an "unresolved issue," according to the guidelines. For children, however, replacement only when clinically indicated is recommended by the CDC. Many hospitals have protocols that require replacement of IV catheters every 72 to 96 hours, regardless of clinical indication.

▮**A 2008 study** of 755 inpatients compared clinically indicated replacement of IV catheters with routine replacement and found no significant differences in phlebitis and infiltration rates between the 2 groups (38% vs 33%, respectively; relative risk [RR]=1.15; 95% confidence interval [CI], 0.95-1.40).[4]

▮**A 2010 trial** randomized 362 hospitalized patients to routine or clinically indicated replacement of peripheral IV lines, with median dwell times of 71 and 85 hours, respectively. There was no significant difference in rates of phlebitis between the routine replacement (7%) and clinically indicated (10%) groups (RR=1.44; 95% CI, 0.71-2.89; *P*=.34). No local infections or IV-related bloodstream infections occurred in either group.[5]

▮**A 2010 Cochrane review** included 5 randomized controlled trials (with a total of 3408 patients) that compared rates of suspected catheter-related phlebitis in patients

whose catheters were routinely replaced with those in the clinically indicated group. The reviewers found no significant increase in phlebitis in the clinically indicated group (9%) vs the routine replacement group (7.2%) (odds ratio=1.24; 95% CI, 0.97-1.60; *P*=.09).[6]

Each of these studies had either a relatively small sample size or wide confidence intervals, raising the possibility of missing a real increase in infection due to inadequate statistical power. The study summarized here addressed these concerns.

STUDY SUMMARY

Forgoing routine replacement does not increase risk

Rickard et al[1] conducted a multicenter, non-blinded randomized equivalence trial to determine whether routine or clinically indicated removal reduced rates of infection. In the routine group, catheters were replaced every 72 to 96 hours. In the clinically indicated group, catheters were replaced in instances of phlebitis, infiltration, occlusion, accidental removal, or suspected infection related to the catheter.

Participants (N=3283) were inpatients on medical and surgical units who had IV catheters in place and were expected to need treatment for at least 4 days. Individuals whose IV catheters had been placed in an emergency were excluded, as were those who had a known bloodstream infection or who were not expected to have the IV in place for at least 24 hours. Follow-up data were available for all participants.

The primary outcome was phlebitis, with a prespecified equivalence margin of 3%. In both groups, phlebitis occurred in 7% of patients (RR=1.06; 95% CI, 0.83-1.36; *P*=.64). The absolute risk difference was 0.41% (95% CI, -1.33 to 2.15), which was within the equivalence margin.

The mean IV catheter dwell time was 70 hours in the routine replacement group and 99 hours in the clinically indicated group. Nine patients in the routine replacement group developed bloodstream infections, vs 4 patients in the clinically indicated group (hazard ratio=0.46; 95% CI, 0.14-1.48; *P*=.19). One patient in the routine placement group

had a catheter-related bloodstream infection; no one in the clinically indicated group did. The mortality rate for each group was <1%.

WHAT'S NEW

We can order clinically indicated IV replacement with confidence

The findings of this equivalence trial support prior studies and add greater statistical power. The results suggest that we can recommend clinically indicated replacement of peripheral IV catheters without increasing the rate of phlebitis. Implementing clinically indicated replacement of IVs could decrease hospital costs and improve patient satisfaction.

CAVEATS

Findings do not apply to patients with bacteremia

Patients with known bacteremia were excluded from this study, and the results are therefore not generalizable to this population.

The nonblinded nature of this trial raises the possibility of observer and reporting bias. However, measures were taken to minimize the potential for bias. A structured outcome assessment was used to standardize reporting of signs of phlebitis. Both patients' pain scores and nurses' assessments of the IV sites were used to determine whether an infection was present, and the investigators and research nurses were not involved in the removal of the IV catheters.

This study did not report on the daily maintenance protocols the investigators used for the peripheral IVs. The study was conducted in hospitals in Australia, and we don't know whether the protocols used in that country are similar to standard protocols in US hospitals.

CHALLENGES TO IMPLEMENTATION

Changing hospital protocols won't be easy

Implementing the findings of this study will require that physicians work with the nursing staff and administrators to create and implement new protocols for assessing peripheral IV catheters in hospitals with routine IV replacement policies already in place. It would

> **Nine patients in the routine replacement group developed bloodstream infections, vs 4 patients in the clinically indicated group.**

be necessary to ensure that all clinicians who place peripheral IV catheters are taught the clinical signs of phlebitis and are using a standardized protocol. That said, we think that this is a worthwhile change to achieve the long-term benefits of fewer unnecessary IV catheter replacements.   **JFP**

References
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