Critically Appraised Topic
PERIPHERAL INTRAVENOUS CATHETER DURATION AND INFECTION RISK

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Clinical Scenario

Mrs. Y is a difficult 'stick', and peripheral intravenous access was achieved initially after five unsuccessful attempts. She has had this access in place for three days, and policy mandates that the site be changed to decrease infection risk. Mrs. Y pleads with you, her provider, to allow the access to stay in place for the remainder of her in-patient therapy, estimated at an additional two days.

Clinical Question

Does routine replacement of peripheral intravenous catheters in the adult population decrease infection rates when changed between 36-72 hours versus changing only when clinically indicated?

Articles

Webster, J., Osborne, S., Rickard, C., & Hall, J. (2010). Clinically-indicated replacement versus routine replacement of peripheral venous catheters (Review*). Cochrane Database of Systemic Reviews.* doi: 10.1002/14651858.CD007798.pub2.

Blot, F., Estphan, G., Boughaba, A.,Soltani, D., Edé, C., & Chachaty, E. (2008). Is routine changing of peripheral arterial catheters justified?. *Clinical Microbiology & Infection.* pp. 813-815. doi:10.1111/j.1469-0691.2008.02001.x.

Critical Review of Study/Summary of Key Evidence

Randomized controlled trials comparing routine removal of peripheral intravenous (IV) catheters with removal only when clinically indicated in hospitalized or community-dwelling adult patients receiving continuous or intermittent infusions were reviewed. Performed via the Cochrane Peripheral Vascular Diseases Group, results demonstrated that no evidence of benefit to patients exists from routine changing of catheters every three to four days.

Five trials including 3,408 patients demonstrated 44% reduction (0.2 versus 0.4%) in suspected bacteraemia related to IV catheters in the clinically-indicated change group (odds ratio (OR) 0.57; 95% confidence interval (CI) 0.17 to 1.94; P= 0.37). Assessment of phlebitis in six trials of 3,455 patients demonstrated a non-significant increase in phlebitis in clinically-indicated group (9 versus 7.2%) (OR 1.24; 95% CI 0.97 to 1.32; P= 0.777). A measurement of phlebitis using device days totaling 8779 from five trials demonstrated no statistical difference in the clinically-indicated versus routine replacement groups (OR 1.04 combined; 95% CI 0.81 to 1.32; P=0.777).

Cost measurements obtained analyzing two trials of 961 patients demonstrated that cannulation costs were significantly reduced in clinically-indicated group (mean difference (MD) -6.21; CI -9.32 to -3.11; P= <0.000). The level of evidence determined a 1a recommendation per Cochrane Review.

In the Blot, et. al. study, cancer patients admitted to medical-surgical intensive care unit (ICU) services were diagnostically case-control studied during a continuous nosocomial infections surveillance program. 217 peripheral IV catheter sites among 189 patients yielded a mean of 4.0 + 5.3 days indwelling time; quantitative cultures performed at time of removal revealed a negative result 93.1% (202 instances) rate of infection. 8.6% (7 episodes) of peripheral IV catheters demonstrated colonization and bacteraemia; 1.2% (1 episode) of coagulase-negative *Staphylococcus* strain on day 8, out of 1000 days of catheter use. Rates of colonization were tested at 5-day intervals; 4.3% days 1-5, 5.3% days 6-10, and 12.7% greater than 10 days per 1000 days of catheter use observed. Level of evidence in this study determined at 1b recommendation.

Clinical Bottom Line

A review of the evidence per the Cochrane Peripheral Vascular Diseases group (2010) using RCTs demonstrated that it is acceptable for peripheral IV catheters to remain in place beyond three to four days when there are no clinically indicated signs of compromise, including phlebitis. No duration of use was indicated as statistically significant for infection to occur. Blot, et. al., (2008) demonstrates that there is no increased risk of infection in peripheral IV catheters residing greater than three to four days but less than ten, among patients who are immune-compromised when appropriate techniques are utilized during placement.

Implications for Practice

It is essential to ensure that placement of IV catheters utilizes proper technique, and once this is accomplished no greater risk of infection is present in patients who have an existing peripheral IV site beyond three to four days. Policies can be changed for dwelling times to reduce costs related to placement and distress for patients during placement without a significant increase in infection rates when proper techniques are maintained prior to initializing and during use of peripheral IV access. Clinical monitoring of IV sites should continue to be performed routinely for signs of clinically indicated discontinuation.