

Inpatient Notes: The Other Catheter—the Mighty Peripheral IV

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Peripheral intravenous catheters (PIVCs) are among the most important and prevalent medical devices in the hospital. However, they have received limited attention in the context of patient safety and health care quality. The attention garnered by central venous catheters (CVCs) is tremendous, despite the fact that only 3 million CVCs are placed in the United States each year compared with 350 million PIVCs.

Why have we paid so little attention to these devices? There are 3 main reasons. First, PIVCs are often assumed to be required for all hospitalized patients and to confer no appreciable risk. However, neither assumption is true. The decision to order a PIVC is often made without critical assessment of appropriate alternatives. Thus, as many as half of all PIVCs are never used or remain in place for many days after treatment is complete, conferring risk for infection and discomfort. In addition, PIVCs are often inserted when a different device would have been more appropriate. For example, patients who need long-term, complex, irritant, or vesicant therapy should receive a CVC or midline early, not after having multiple failed PIVCs.

Second, the skill and training necessary for successful PIVC insertion are often underestimated. In fact, approximately 30% to 50% of insertions require multiple attempts (1, 2). This reflects problems related to both patients (for example, veins that are difficult to access) and inserters (for example, inexperience). In any case, failed insertion attempts lead to waste, as well as pain and anxiety for patients.

Third, there is a lack of awareness of the high failure rate of PIVCs and the associated costs—40% to 70% of PIVCs fail prematurely due to occlusion, infiltration, phlebitis, or dislodgement. With the exception of bloodstream infections and toxic extravasations, these complications do not usually have severe health consequences. However, they do interrupt treatment and cause patient discomfort and need for reinsertions. The number of PIVC reinsertions is staggering: The average patient will have 2 replacements over a 5-day course of therapy (2). Although PIVCs are licensed for 29 days' use, they rarely last that long, suggesting the need for improvements in the durability and use of these devices.

The high prevalence of PIVCs makes them a perfect target for improvement efforts. Successfully increasing their durability will require advancements in both technology and practice, as well as the development of appropriate metrics to monitor success.

From a technology perspective, manufacturers must continue to enhance PIVC engineering and improve the quality of associated equipment, such as dressings, securements, and connectors. A research agenda that prioritizes randomized trials of new technology is necessary (1, 3).

Clinicians inserting PIVCs should consistently use techniques that reduce risk for complications and in-

crease odds of success. Such strategies include vigorous hand hygiene, skin preparation, optimal PIVC size and vein choice, and effective securement (2). These approaches require not just initial training but also annual assessment of competence and professional development to ensure that practice evolves with emerging evidence. Patients' advice about their level of difficulty and "best vein" should be taken seriously. Preinsertion "time-outs" to question the need for vascular access and the best device for the patient's needs, as well as regular prompts to consider removal, can be helpful.

Hospitals should develop practice standards and policies to ensure that more than 90% of these catheters are successfully placed on the first attempt. For example, beginners (fewer than 100 PIVC insertions) and intermediate inserters (100 to 800 insertions) should attempt placement only when the inserter's own predicted likelihood of first-time success is 90% or more for beginners or 80% or more for intermediate inserters (4). For the remaining patients, advanced inserters (more than 800 insertions) with additional ultrasound capability should make the first attempt.

Hospitals should also minimize the volume of reinsertions. Meticulous maintenance, such as regular low-pressure flushing and use of securement and dressings that minimize micromotion and dislodgement from the vein, is key. Of note, some hospitals routinely remove PIVCs after 72 to 96 hours, despite strong evidence that this increases cost and workload, not safety. The PIVC should be removed only if treatment is complete, it does not work, it is not tolerated, it has dislodged, or it is suspected to be infected (5).

To improve PIVC quality and safety, it will be necessary to develop reliable metrics for outcomes, including first-time insertion success, unnecessary placement, and post-insertion failure. This information will not only define current problems, it will also identify improvement targets. Only then will we move closer to the goal of placing PIVCs that are truly necessary, on the first attempt, with each one lasting for the duration of prescribed therapy.

Efforts to improve quality and safety of care for patients with CVCs have been laudable. But, in this intense focus, we have neglected the smallest, most valuable member of the vascular device family. Improvements in CVC care must now be translated to PIVCs: the importance of highly skilled inserters; sterile technique; ultrasound-guided insertion; aseptic access; effective securement; avoiding unnecessary devices; and perhaps most important, the need for quality metrics and benchmarks.

It's time to improve the other catheter.

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Disclosures: Disclosures can be viewed at www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M17-2771.

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Ann Intern Med. 2017;167:HO2-HO3. doi:10.7326/M17-2771

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