Saving the world, one patient at a time, by doing the right thing first.

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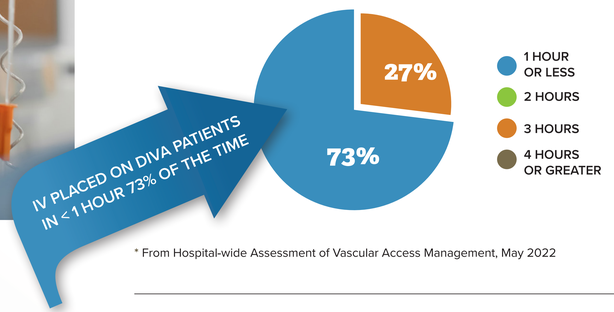
Introduction

Approximately 90% of hospitalized patients receive a peripheral intravenous catheter (PIVC). The average number of placement attempts is 2.18-2.35[1]. PIVC failure requires early catheter removal and replacement before completion of therapy[2]. With every additional placement attempt, the likelihood of peripheral vein depletion, complications and advancement to a more invasive line increases. The annual cost of premature PIVC removal in the US is estimated at $1.5 billion[3]. The true cost of PIVC failure, especially to patients, remains elusive.

A proactive approach to vascular access utilizing evidence-based practice (EBP) is needed to prevent complications and improve patient outcomes. The answer: 24/7 availability of advanced-skilled nurses with vein-visualization equipment and technologically advanced PIVCs at the bedside, the moment access is needed.

Select the Right Device
Difficult Intravenous Access Patients*

Average amount of time before access is obtained on a patient with DiVA



* From Hospital-wide Assessment of Vascular Access Management, May 2022

27%
OF CLINICIANS REPORTED THEY WERE TRAINED IN ULTRASOUND FOR PIVC INSERTIONS

100%
OF CLINICIANS REPORTED THEY HAD ACCESS TO AN ULTRASOUND MACHINE IN THE UNIT VISITED

Method

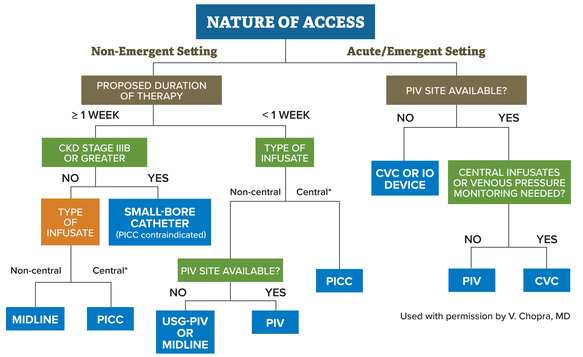
In 2017 a 263-bed California hospital piloted an evidence-based protocol for identification of difficult intravenous access (DiVA) patients. The protocol included training nurses in advanced-skills, performing ultrasound-guided PIVC insertion with guidewire assisted PIVCs (GA-PIVC).

Workflow to Identify and Place Vascular Access in Difficult Intravenous Access (DiVA) Patients

STEP 1: Identification of DiVA Patients	STEP 2: Summon a Nurse with Advanced Skills in Vascular Access Placement	STEP 3: Advance to Central Venous Catheter (CVC) insertion
• Any of the following can be considered to identify a DiVA patient (advance to step 2): - Peripheral vein neither palpable nor visible - History of difficult intravenous access (obesity, IV drug abuse, dialysis, sickle cell disease, chemotherapy or other chronic medical condition) • Make no more than two peripheral IV attempts	• Enter DiVA patient referral in the electronic medical record (EMR) for advanced-skilled nurse to evaluate patient • When necessary, use vein enhancing equipment/specialty catheters (transillumination or ultrasound to place GA-PIVC) • If advanced-skilled nurse not available, contact Administrative Supervisor	• Contact physician if more invasive line (CVC) is needed (e.g., patient requires invasive monitoring and PICC cannot be placed, or patient is becoming unstable and the vascular access nurse is unable to start a PIVC)

Created by Cheryl Campos, DNP, NPD-BC, CPHQ, CEN, VA-BC™ (Updated December 2021). 1. Gorski LA, Hadaway L, Hagle ME, et al. (2021) Infusion therapy standards of practice. *J Infus Nurs*, 44(suppl 1):S1-S224. doi: 10.1097/NAN.0000000000000396

Algorithm for Selection of Vascular Access Device



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PIV: Peripheral IV
CVC: Central Venous Catheter
IO: Intraosseous
USG-PIV: Ultrasound Guided PIV
CKD: Chronic Kidney Disease

*Central infusates commonly used in PICC lines:
- Total parenteral nutrition >10% dextrose, >5% protein
- Vesicants or irritants
- PH<5 or pH>9
- >500mOsm

The pilot demonstrated higher first-time attempt success, shorter time from call for assistance to successful placement, increased dwell times and reduced number of devices/supplies needed.

Clinically Significant Findings

	RESULTS	CHANGE
First-attempt success rate for GA-PIVCs over standard PIVCs	Average attempts: 1.5 vs. 1.7	↓ 0.2 attempts
Dwell times when GA-PIVC placed by a vascular access nurse (vs. standard PIVC)	Days: 3.87 vs. 2.01	↑ 1.86 days
Time from the call for assistance to successful placement of difficult PIVC (Monday-Friday 0700-1830)	Hours: 1.41 vs. 1.66 (15 minutes less)	↓ 0.25 hours
Number of PIVCs to complete therapy for DiVA patients	Reduced from: 4 to 1	↓ 3 devices

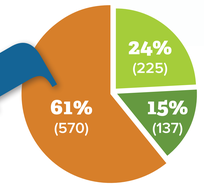
Campos CL. Improving Patient Outcomes in Nurse-Placed Vascular Access Devices. https://sigma.nursingrepository.org/handle/10755/17236. Published 2019

Results

After five years, the program success continues: 44% of emergency department nurses and 12% of registered nurses hospital-wide, across all shifts, have received training in ultrasound and insertion of guidewire-assisted PIVCs.

PIVCs Placed by RN by Department from DiVA Referrals
(January-June 2022)

OF THE 570 USGIVs PLACED BY PCR, **64%** OF THOSE WERE PLACED AFTER HOURS (17:30-7:00)



DIAGNOSTIC IMAGING RN
EMERGENCY DEPARTMENT RN
PATIENT CARE RESOURCES RN

Discussion & Conclusion

Healthcare providers must demand a higher standard of care for PIVC insertion. This can be achieved through the adoption of an EBP nurse-driven protocol for early identification of DiVA patients, use of a vascular access device selection algorithm and training clinicians in advanced PIVC placement, focusing on the nurses who work at the point of patient entry. We must change the way it has always been done and do the right thing first.

References:

1. Kokotis K. (2005). Cost containment and infusion services. *Journal of infusion nursing: the official publication of the Infusion Nurses Society, 28*(3 Suppl), S22–S36. https://doi.org/10.1097/00129804-200505001-00005

2. Kache, S., Patel, S., Chen, N. W., Qu, L., & Bahl, A. (2022). Doomed peripheral intravenous catheters: Bad Outcomes are similar for emergency department and inpatient placed catheters: A retrospective medical record review. *The journal of vascular access, 23*(1), 50-56. https://doi.org/10.1177/1129729820974259

3. Keleekai N et al., Improving Nurses' Peripheral Intravenous Catheter Insertion Knowledge, Confidence, and Skills Using a Simulation-Based Blended Learning Program: A Randomized Trial. *Simulation in Healthcare*, 2016, Dec, 14. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5345884/ accessed 03.06.2022

4. Campos, C.L. Improving Patient Outcomes in Nurse-Placed Vascular Access Devices. Published 2019. https://sigma.nursingrepository.org/handle/10755/17236.