Trans-illumination Devices: Improving IV Insertion Accuracy and Success Rates

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Introduction

Difficult Venous Access (DVA) patients are a frequent cause of increased preoperative pain scores, increased delays in Preop to OR times, and decreased patient satisfaction with their perioperative experience. Expert Vascular Access Nurses (EVANs) have had little effect changing these key issues. Use of Trans-Illumination Devices (**TID**s) has demonstrated promising results in alieving some of these issues without increased risk to the patient. In a study of 54 pediatric patients from 0 to 3 years of age, use of a TID demonstrated a decrease in patient sticks (Inal & Demir, 2021). In a quantitative study of 50 patients, > 18 years old, use of a vein finder device demonstrated a significant increase in successful first stick access of DVA patients (Rani & et al, 2021). In a Random Control Trial of 30 adult patients, use of an ACCU VEIN TID was found to have a 93.3% great first stick success rate, and a decreased time to locate vessel relating to factors such as skin characteristics, color, fluid overload, and BMI. (Patil,S.S., 2021) Based on the evidence, use of a TID (or Vein finder) could prevent multiple sticks in the preoperative DVA patient population. This will increase patient safety and satisfaction.

Objectives

The primary goal of the **TID** QI Pilot Project was to:

- Improve patient safety, comfort and satisfaction.
- Decrease delays in the preoperative area relating to DVA patients.
- Increase staff satisfaction with the use of TIDs.

The secondary goal was to evaluate the following:

- Collect data through feedback relating to orientation to device, convenience, ease of use, troubleshooting, and likeliness to use again.
- Collect data relating to patients' level of DVA , first stick success rates, and procedure type.

Implementation

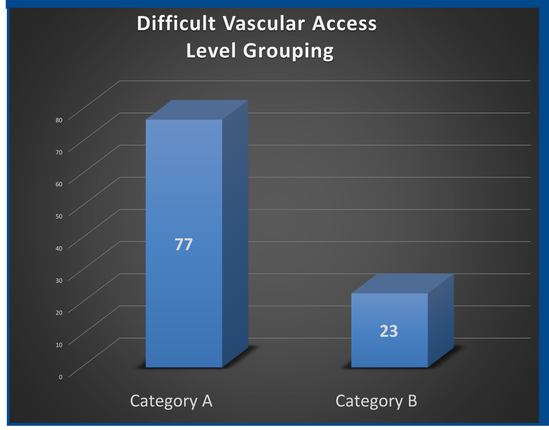
The pilot consisted of 100 patients and ran from June to Nov 2021. Implementation included:

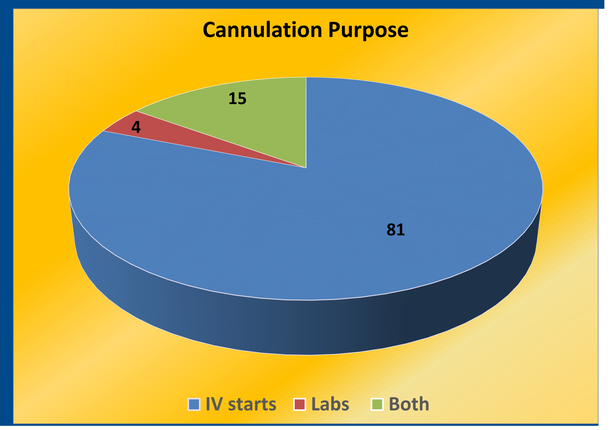
- Determining the parameters for assessing a patient's difficulty of access level.
- DVA patients were included in the quality improvement project.
- Assessed/Assigned level of difficulty were grouped into two levels. Vascular Access Difficulty Level (VADL), A (BMI > 40, Fluid overload, limited access, History of Difficult sticks, and Vascular sclerosis) & VADL Group B (IVDU, Chemotherapy patients, Multiple IVs present, and 1st unsuccessful manual stick) (Monteiro,& et al, 2020).
- Identified parameters for outcome, purpose, and staff acceptance.

Staff training was required for the use of the ACCU VEIN 500 red light LED **TID:**

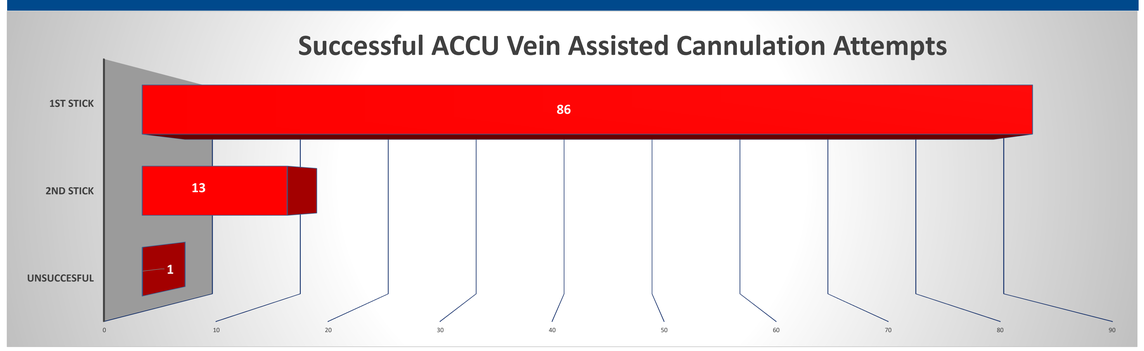
- Training included a review of the equipment, proper distancing, settings, and cleaning for patient safety.
- Real time training was performed on live patients with verbal consent in the Prep and PACU.
- Patient data collection included VADL patient group, number of insertion attempts, and the procedure performed.
- Post training satisfaction surveys were sent to nursing and clinical technicians to provide feedback on use of the TID. They included: Ease of use, Helpfulness, and Willingness to use again.

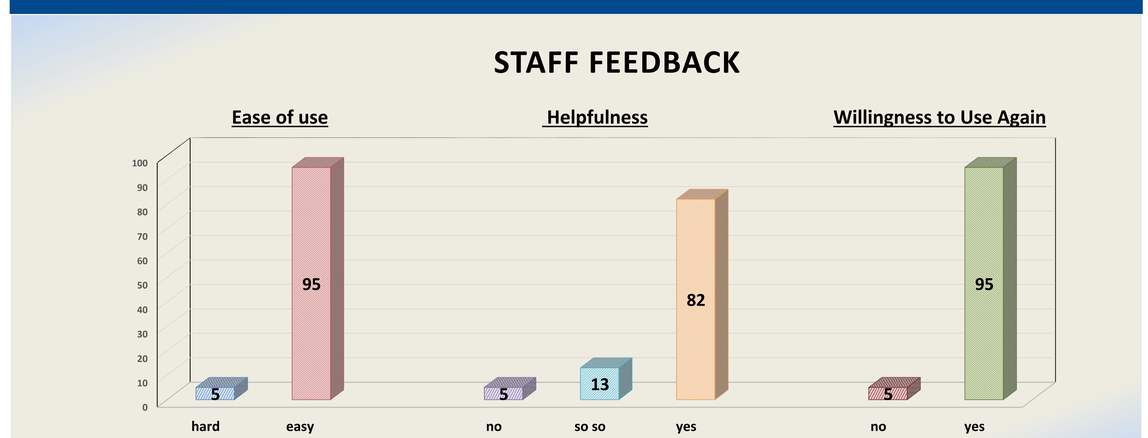
Patient Vascular Assessment & Access





Outcomes





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Results

In this Quality Improvement (QI) project, the ACCU VEIN 500 **TID** was used on 100 patients.

- VADL A (77) and VADL B (23).
- It successfully reduced the number of insertion attempts in the DVA population (1st attempt =86, 2nd attempt= 13, unsuccessful = 1).
- Calls for Anesthesia or EVANs was 1 out of 100 patients.
- The device gave real time information regarding the location and quality of veins being accessed.
- Reduction in number of insertion attempts decreased pain and improved patient satisfaction with IV starts.
- Staff graded the ACCU VEIN 500 for:
  - Ease of use (95%)
  - Helpfulness (90%)
  - Willingness to use the device again (95%)
- Post QI project, staff reported that they feel more confident in placing intravenous catheters than without the ACCU VEIN 500.

Lessons Learned

- In training staff, clear criteria for use, cleaning and data collection was needed to keep findings free of bias.
- Post surveys of staff showed that over 70% felt the TID made it easier for accessing patients with DVA.
- 94% of staff found the device straight forward and easy to learn.
- Constructive feedback indicated that while locating the vein was easy, there was some discrepancy in determining actual width of the vein.
- Keeping patient data private required close monitoring of data collection sheets and having a secure place to store them.
- Data from our QI project has encouraged other Prep PACUs in our facility to obtain a TID for their patient populations.
- Maintaining the device cleanliness was made easier with the use of full length ACCU VEIN device covers.
- Even with the TID, learning the proper techniques for IV insertion is crucial to guarantee successful outcomes.

Implication for Practice

- Studies have shown that vein finder devices are easier to use, more effective and safer, as they put patients at less of a risk for injury in comparison to an ultrasound guided access.(Al-Saadi, S.F. & et al, 2021)
- Use of **TID**s in areas where venous access is frequent will improve the quality of patient care and reduce the wait times associated with IV insertion of the DVA patient.
- Prep/PACUs, Infusion Centers, Emergency Departments, Phlebotomy, and IV therapy would all benefit having **TID**s as standard equipment.

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