

Use of a Long Peripheral IV Catheter to Reduce the Number of Intravenous Starts



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Introduction

- More than 150 million short peripheral IV (PIV) catheters are inserted each year in the US (Ansel et al., 2017) and more than 2 billion worldwide (Bahl et al., 2020)
- Loss of IV access results in delays to treat and admit, interrupted medical therapy, increased length of stay, decreased patient satisfaction, and increased utilization of more invasive procedures
- Mean dwell time for short PIV catheters at Mather Hospital is 2.0 days
- 10-30 % of ED patients have difficult vascular access (Elia-16%)
- Difficult IV access (DIVA) patients often endure multiple, painful, cannulation attempts. Improved first attempt success rates (Alexandrou, 2018)
- Early failure of USGP IVs is a common complication (Bahl et al., 2018)
- Extended dwell catheters (EDCs) and long peripheral catheters (LPCs) are superior to short peripheral catheters (SPCs) for extended IV therapy, particularly in regard to complication rates” (Qin E 2021)

Device	Length of Catheter	Insertion Point	Tip Location
Short Peripheral Catheter (SPC), PIV	3-6cm	Visible/palpable peripheral vein	Peripheral vein
Long Peripheral Catheter (LPC), Extended Dwell	6-15cm	Deep arm veins	Basilic, brachial, cephalic vein
Midline Catheter	15-25cm	Deep arm veins	Below the axilla

Background

- A systematic review of extended dwell catheters by Badger (2019) showed that EDCs were less expensive than midlines and easier to place, and a safe alternative means of peripheral venous access in acute patients with DIVA
- EDCs were found to be a successful alternative in children (Anderson, 2018; Bureck, 2022) and neonates (Chenoweth et al., 2018)
- EDCs are useful in palliative care (Magnani, 2018)
- Fabiani (2016) The long lifetime of an EDC may reduce the need for frequent catheter replacements, decreasing patient discomfort and nursing workload.
- Alexandrou (2018) found EDCs had a low phlebitis rate
- Bahl (2020) found that 68% of EDCs completed therapy due to improved catheter survival
- Zarbiv (2018) showed a reduction in central venous catheter (CVC) utilization and reduced rate and severity of insertion-related complications

Methods

- This project was conducted in a suburban 235 bed hospital. All devices were placed by experienced inserters on the Vascular Access Service upon receiving request for IV placement for a patient with DIVA.
- After approval from the Value Analysis committee for purchase of the device, the Vascular Access Team began inserting the Endurance (Teleflex/Morrisville, NC) Extended Dwell peripheral catheter in patients with difficult IV access. This catheter is a 20-gauge catheter that is 8 cm in length.
- This catheter has an integrated guidewire and is placed using ultrasound guidance via Accelerated Seldinger technique. The needle device was inserted into the target vein under ultrasound guidance. .
- After insertion, catheters were evaluated daily for patency, and presence of complications. Surveillance of the line continued until the line was removed and reasons for removal were evaluated.
- A total of 191 catheters were evaluated for this study.

Predicted Outcomes

- Dwell time in days
- Reasons for removal
- Patency days
- Reduction in the total number of IV catheters placed during a six-month period before and after introducing the device.

PICOT

P = Patients in need of IV access

I = Long peripheral catheter placement

C = Short peripheral catheter placement

O = Catheter dwell time, decreased number of IV restarts

T = 2 years

Results

Dwell time • 5.76 days

Percent that complete therapy • 81%

2418 less unplanned IV restarts per year

Data Analysis

Dwell Time in Days

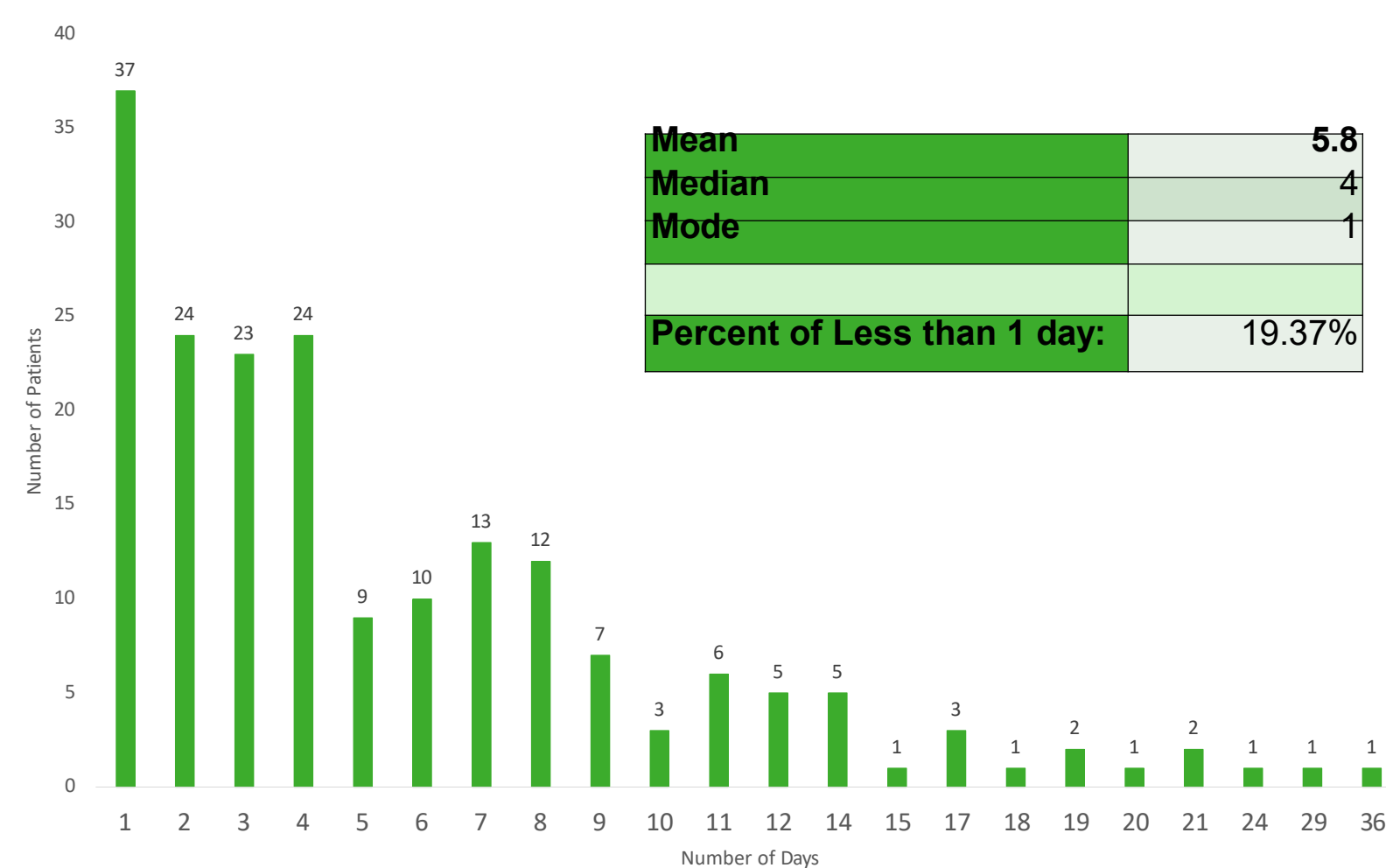


Figure #1

Reasons for removal

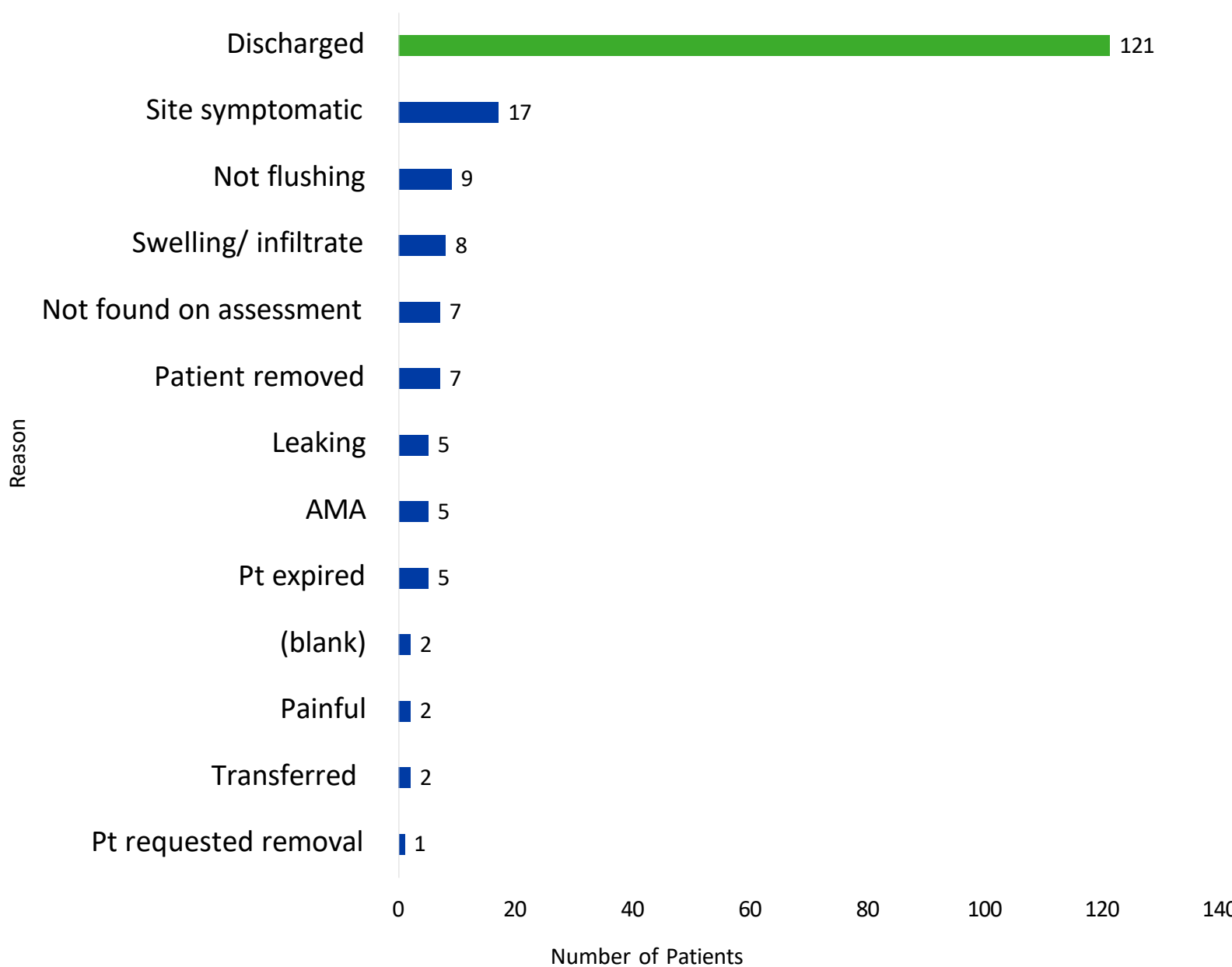


Figure #2

IV Starts in 6-Month Period

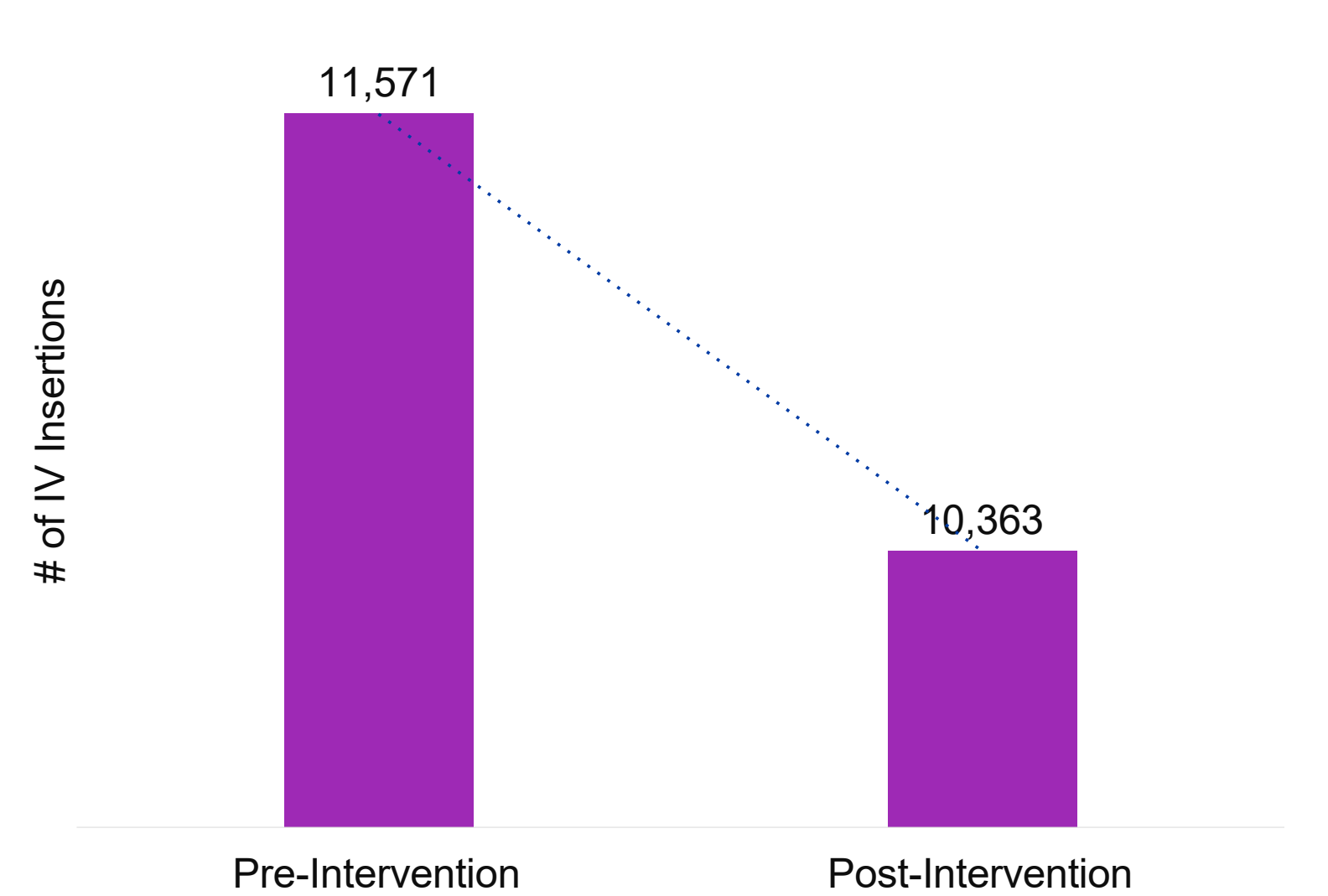


Figure #3

Conclusions

- Extended Dwell catheters reduce the incidence of catheter failure
- Reliable , longer-term access than PIV with fewer complications, easy to insert
- Patients with difficult IV access are fearful of needlesticks so extended dwell=less needlesticks=increased patient satisfaction
- Increased staff satisfaction with device

Implications for Practice

Extended Dwell catheters should be used early in the patient's stay to reduce the number of IV starts that are needed in patients with DIVA, as well as reducing the occurrence of complications from IV therapy

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