Implementation of a peripheral intravenous catheter care bundle in a paediatric hospital setting

SUCCESS PIVCs

Tricia Kleidon

Nurse Practitioner

Queensland Children's Hospital

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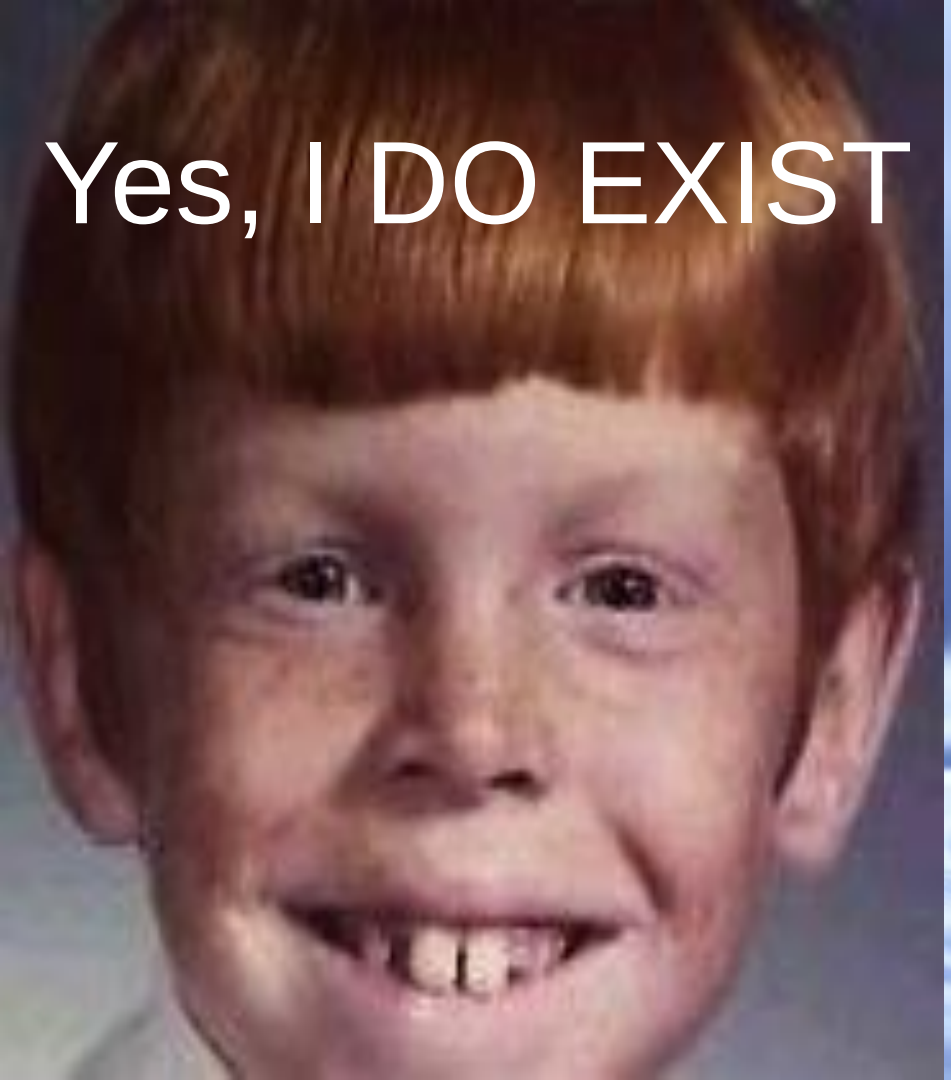
Queensland Government


Yes, I DO EXIST


It’s just a drip…

EMA Emergency Medicine Australasia

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PAEDIATRIC EMERGENCY MEDICINE

Peripheral intravenous catheter duration and failure in paediatric acute care: A prospective cohort study

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Abstract

Objective: Children admitted to hospital commonly require peripheral intravenous catheters (PIVCs) for treatment. This study sought to address a gap in the literature about current practice in the securement and dressing of PIVCs in paediatric acute care, and to ascertain the duration and failure of these devices.

Methods: A prospective cohort study conducted at the Royal Children's Hospital in Queensland, Australia. All patients aged 0–15 years, who presented to the ED between 16 July and 16 October 2012, and had a PIVC inserted prior to emergent admission to the hospital were included.

Results: Of 458 participants, median device duration was 29 h (IQR 13–58 h), and ranged from less than 1 h to 16 days. One quarter (113/456, 24.8%) of PIVCs were removed due to device failure, presenting as: infiltration (65/456, 14.3%); accidental securement and dressings were predominantly bordered polyurethane dressings and splints (n = 457/458, 99.8%). PIVC placement in the antecubital fossa, in comparison to the hand, was significantly associated with an increased risk for failure (P = 0.03). No other patient and device characteristics had a significant association with device failure (P > 0.05). The median dwell time of PIVCs that failed was significantly longer than the PIVCs that did not fail (44.0 *vs* 25.5 h; P = 0.002). Less than half (53/113, 46.9%) of failed catheters were replaced with a new PIVC.

Conclusions: Observed failure rates were high for a clinically essential device; however, there is no established rate of acceptability against which the results can be benchmarked against to facilitate effectiveness of practice. Many PIVCs appeared to remain in place longer than needed. Dressing and securement practice was homogenous. PIVC placement in the

Key findings

- A quarter (24.8%) of peripheral intravenous catheters (PIVCs) inserted in the paediatric emergency department failed due to infiltration, accidental dislodgement, blockage, phlebitis or other causes.
- PIVC placement in the antecubital fossa, in comparison to the hand, was significantly associated with an increased risk for failure (P = 0.03).
- Redundant PIVC within paediatric acute care is of concern, with 53% of failed PIVC not requiring a new PIVC to be inserted.

Key words: *clinical audit, emergency medicine, medical device failure, paediatric, peripheral venous catheterisation, securement practice.*

2-3 insertion attempts
50% failure
50% redundant PIVCs

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But,
I got it in!!!!

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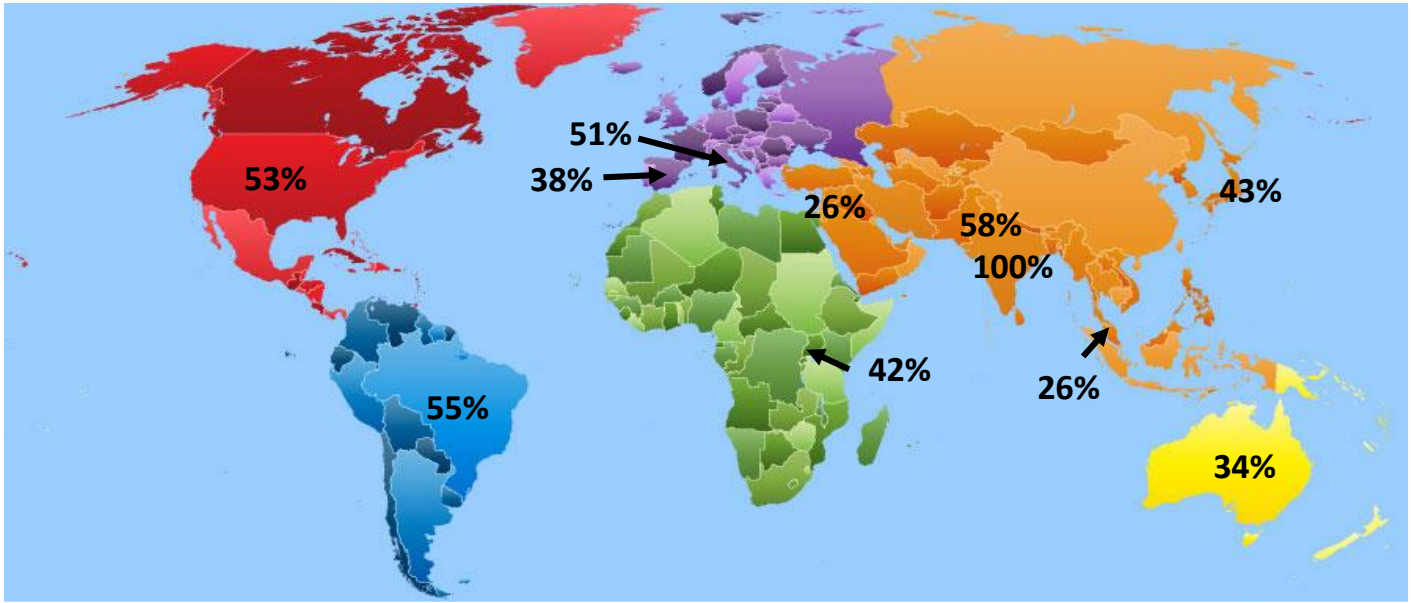
Midaz

PIVCs are failing around the globe



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Mechanical complications			Infective complications	
Occlusion	Infiltration Extravasation	Dislodge	Pressure Area	Infection
				

PIVC failure

Phase 1:
Identify current practice and outcomes

Phase 2:
Bundle development and implementation

Phase 3:
Evaluate

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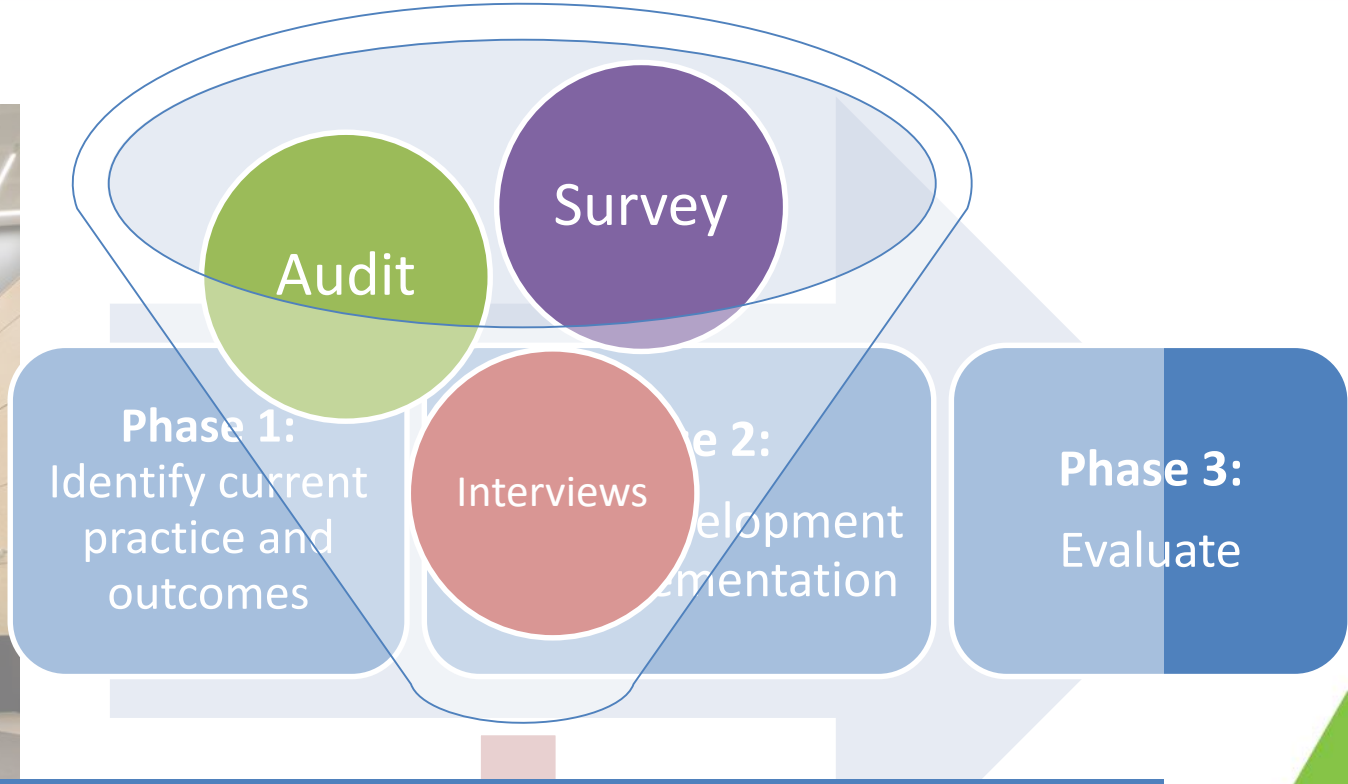

Phase I - Identification of current state

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Insertion (n=102)

- 55% PIVCs needing multiple attempts (Median 2 [1-3])
- 24% no pain relief
- 84% blind puncture

Management

- Poor standardisation of PIVC securement and immobilisation

Performance

- 40 hours median PIVC dwell (IQR 22-60)
- 49% PIVC failure

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Communication

Apprehension & fear

Role of care giver

Skilled technicians & technology

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Communication

Apprehension & fear

“My initial reaction when she needs to be re-cannulated is dread”

“Most stressful inpatient experiences”

“How long will this one last”

technology

Healthcare Practitioner Survey

- Equipment
- Lack of basic PIVC training
- Lack of specialist paediatric training
- Pressure to attempt insertion
- Unaware of escalation process for DIVA

Implementation

50%

SUCCESS PIVCS

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Children's Health Queensland Hospital and Health Service
Lady Cilento Children's Hospital

Peripheral Intravenous Cannula **Care bundle**

At the Lady Cilento Children's Hospital (LCCH) 48% of Peripheral Intravenous Cannulas (PIVC) fail prior to completion of treatment. Our aim is to reduce the incidence of PIVC complications. A *Care bundle* is a structured way of improving processes of care and patient outcomes. It is a straightforward set of practices that, when performed collectively, reliably and continuously will help improve patient outcomes.

Action: Improve PIVC insertion

S — **Skills of the inserter**
- Consider the location and condition of veins
- Start upper limb and avoid Antecubital Fossa
- Smallest cannula gauge that allows flow rate

U — **Understand and prepare** for patient needs (site assessment). Consider:
- what is the intended use?
- alternative route – are oral medications an option?
- duration and type of therapy – is PIVC appropriate?
- ***Access Device Decision Tree CHQ-PROC-03450***
- pain relief – use Topical Anaesthetics and Sucrose
- availability of necessary equipment, environment and staff support – involve parents and carers in holding and supporting – refer to ***CHQ-NS-62111***

C — **Consent**
Obtain verbal consent – involve patients and parents in decision making – refer to ***Caring for an Intravenous (IV) Cannula*** brochure on CHQ website

C — **Clean site**
- 20 second scrub with friction and allow to air dry completely
- If re-palpation is necessary, use sterile gloves

E — **Escalate**
- After two attempts seek assistance
- Consider vein quality and use of ultrasound guided technology
- Consult ***Difficult Intravenous Access Guidelines***

S — **Secure**
- Ensure the skin is clean and dry before tapes are applied
- Secure as per ***CHQ-PROC-03456***
- Ensure adequate pressure area prevention from PIVC hub and tapes

S — **Sign and document**
- Ensure ieMR, Care Pathways and Daily Record forms are updated daily – date, time, site, cannula gauge, number of attempts, cannulator
- Document insertions, re-sites and removals – include reason for removal

Action: Improve PIVC management

P — **Prompt removal**
- Evaluate clinical indication daily in consultation with medical/surgical team
- Remove under aseptic conditions
- Document removal and reason for removal

I — **Inspect HOURLY**
- Hourly site checks during infusion – refer to ***CHQ-PROC-03450***
- Be aware of possible extravasation injury – refer to ***CHQ-PROC-60579*** for guidelines
- Touch, look, compare "TLC"

V — **Vein patency**
- Ensure medication order for continuous infusion or intermittent flush is prescribed
- Visualise site whilst administering flush and consider the rate of delivery
- Should be pain free – pain is indicative of cannula failure

C — **Clean hands**
Use Aseptic Non-Touch Techniques (ANTT) and remember hand hygiene

S — **SCRUB THE HUB!!!**
- Technique is important – use ANTT
- Treat PIVCs with as much respect as CVADs

Lady Cilento Children's Hospital

Contact Vascular Assessment and Management Service (VAMS) for more information

Clinical Nurse
t 07 3068 3440

Nurse Practitioner
t 0407 175 301

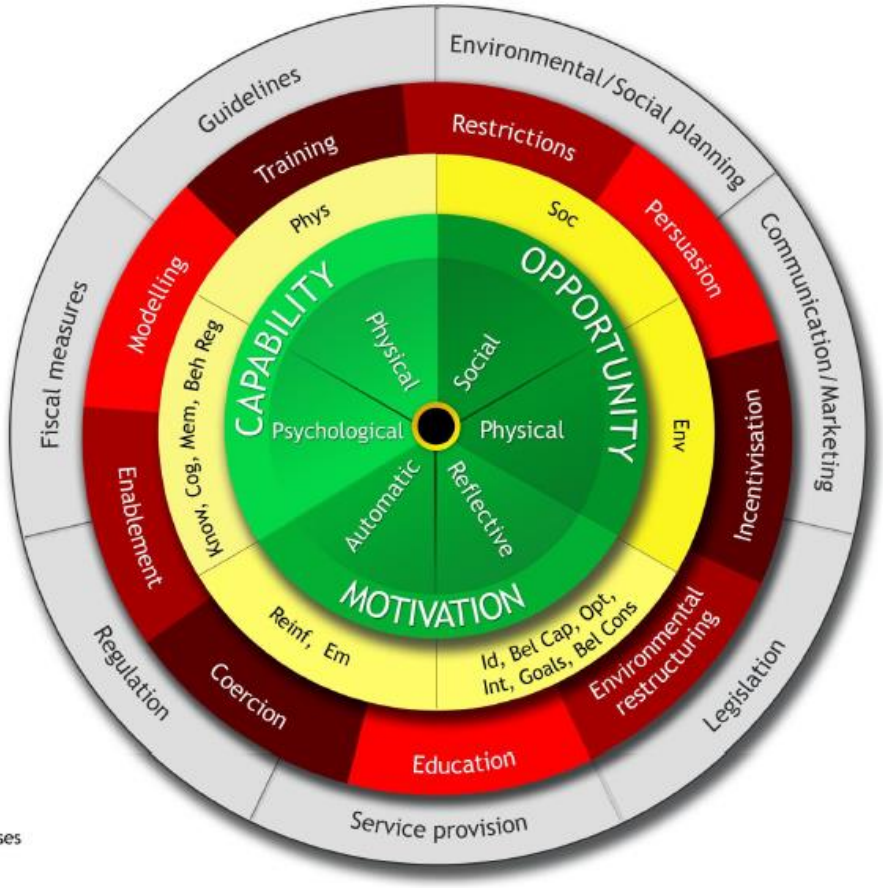
Queensland Government

Sources of behaviour

TDF Domains

Intervention functions

Policy categories



RESEARCH Open Access

The behaviour change wheel: A new method for characterising and designing behaviour change interventions

Susan Michie[1*], Maartje M van Stralen[2] and Robert West[3]

Soc - Social influences
Env - Environmental Context and Resources
Id - Social/Professional Role and Identity
Bel Cap - Beliefs about Capabilities
Opt - Optimism
Int - Intentions
Goals - Goals
Bel Cons - Beliefs about Consequences
Reinf - Reinforcement
Em - Emotion
Know - Knowledge
Cog - Cognitive and interpersonal skills
Mem - Memory, Attention and Decision Processes
Beh Reg - Behavioural Regulation
Phys - Physical skills

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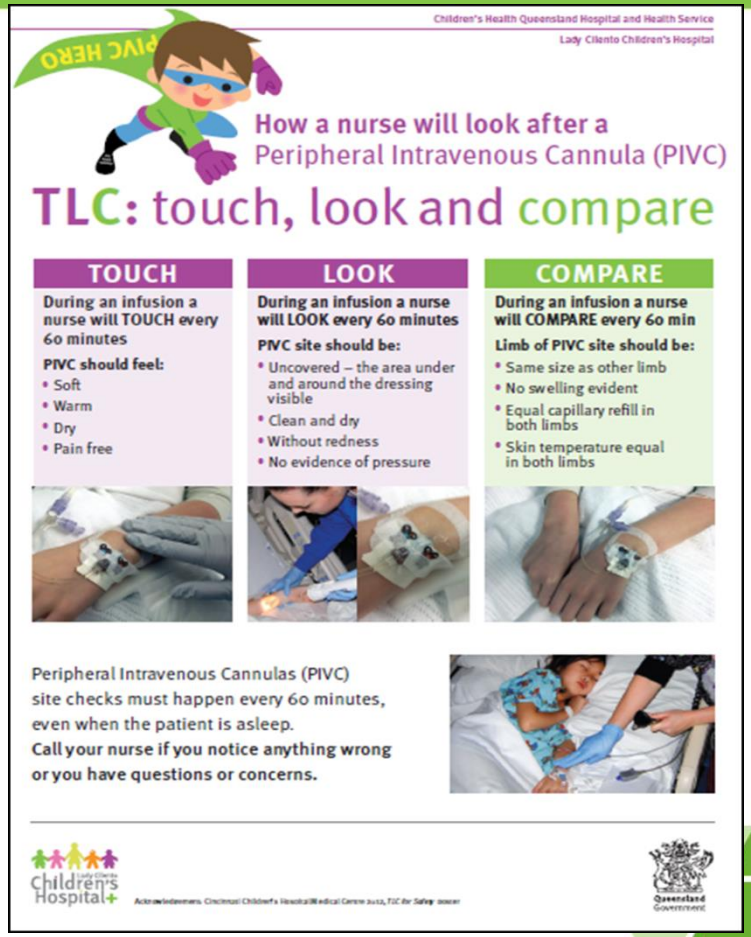

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Insertion (n=102 pre and 102 post)

- Reduced from 55% to 38% of PIVCs needing multiple attempts (Median reduced from 2 [1-3]; to 1 [1-2] p=0.022)
- 24% to 22% no pain relief (no change)
- Reduced from 84% to 75% blind puncture

Management

- Improved standardisation of PIVC securement and immobilisation

Performance

- Increased median PIVC dwell from 40 hours(22-60) to 52 hours (25-78; p=0.021)
- 49% PIVC failure; no change (50%)

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Person attempting PIVC insertion		RMO	Registrar	Consultant	Nurse Practitioner	Anaesthetist	TOTAL	P value
1st	Pre	73 (72%)	25 (25%)	0	4 (4%)	1 (1%)	102	<0.0001
	Post	42 (41%)	45 (44%)	1 (1%)	11 (11%)	3 (3%)	102	
2nd	Pre	3 (9%)	21 (62%)	0	6 (17%)	4 (12%)	34	0.721
	Post	1 (4%)	16 (67%)	1 (4%)	4 (17%)	2 (8%)	24	
3rd	Pre	0	2 (25%)	2 (25%)	4 (50%)	0	8	0.216
	Post	0	2 (18%)	0	7 (64%)	2 (18%)	11	
4th	Pre	0	0	0	1 (33%)	2 (67%)	3	1.0
	Post	0	0	0	1 (33%)	2 (67%)	3	

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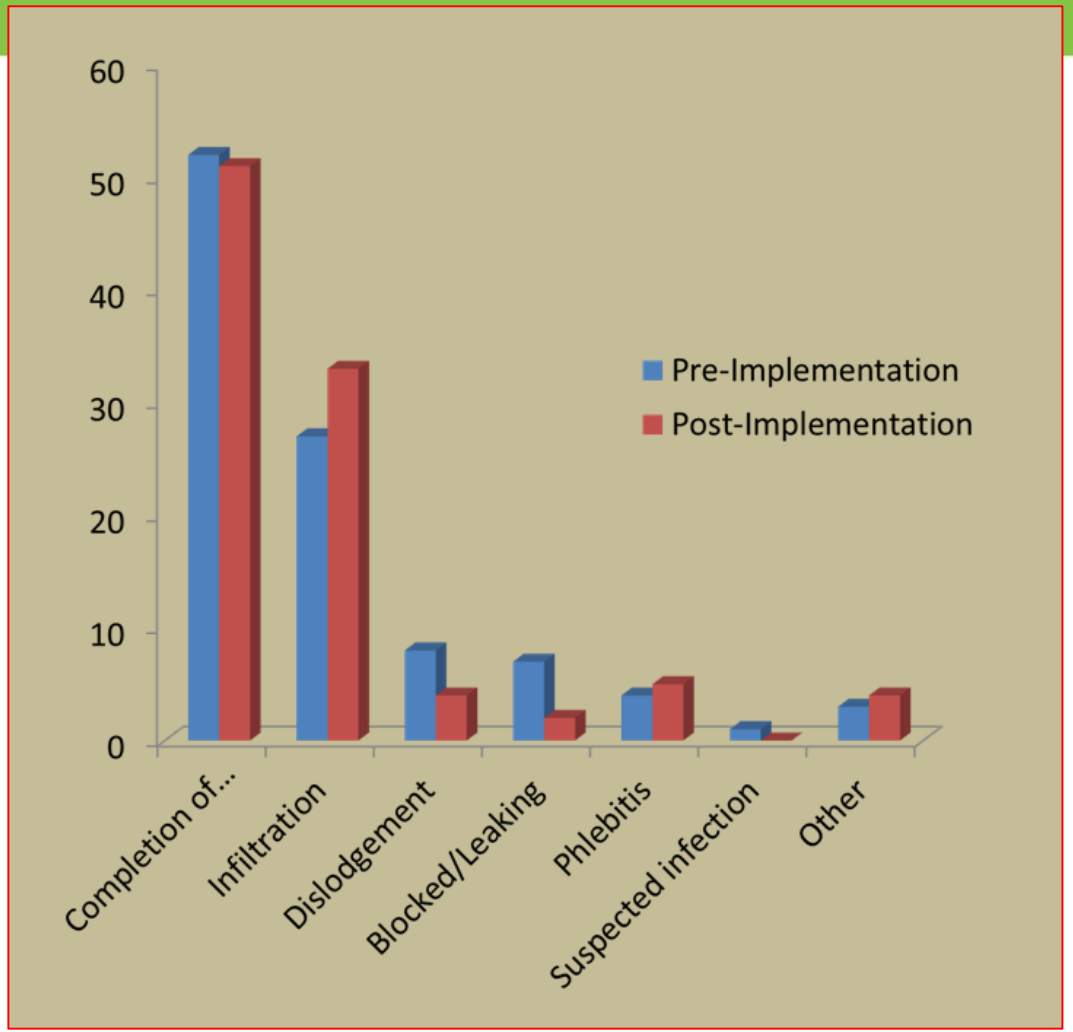

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