

Unit Based Interventions To Improve Peripheral Intravenous Catheter Best Practices in Acute Care

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Introduction

- Short peripheral catheters (SPC) are commonly used in acute care; The Infusion Nurses Society (INS) publishes standards to guide infusion therapy including SCP care (Gorski, et al. 2016).
- SPCs rarely cause infection (Maki, et al., 2006) but are reported to fail (35-50%) prematurely causing patient discomfort and adverse effects (Helm, et al. 2015).
- SCP outcomes tracking is often manual and time intensive making it difficult to monitor the impact of practice change.

Purpose

- Describe baseline unit-level SPC care based on survey and data extracted from the electronic health record.
- Evaluate the impact of unit-level electronic health record (EHR)-based feedback to guide interventions to improve outcomes.

Theoretical Framework

An implementation science framework was used with the premise that providing feedback helps leaders to make/sustain practice changes.

Sample and Setting

- 919 bed, urban, quaternary Magnet, medical center in Midwest

Subjects:

- Nursing Units: Inpatient (n=24) & outpatient (n=4)
 Bed size (X=25.5), RN Count (X=42.9/unit (R: 20-110) - 1200 Total;
 BSN (X=75%), Certified (X=17.6%), Ultrasound trained (X=32%, 0-88%)
- Patients with SPCs: Time 1 (Q1-2 2017) & Time 2 (Q1 2018)



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Methods

- A pre/post mixed methods study with IRB oversight
- Baseline unit-level practice survey
- Pre/post EHR-based retrospective patient-level data extraction

Preliminary Findings:

- Opportunity to increase implementation of INS best practices
- Removal rates for adverse outcomes were lower than published with routine removal at 96 hours
- Units were challenged to implement one practice change



Unit Interventions to Reduce Adverse Outcomes over 3 months

Goals: Reduce Infiltration/Occlusions

- Improve dressing Integrity (n=19)
- Improve securement for high risk (n=3)
- Increase ultrasound inserts (n=2)
- Increase Insert Training (n = 1)
- Change to StatLock securement (n=1)
- PACU & SDAS did not participate

Patient Characteristics	Time 1 (N= 12,031) – 6 months					Time 2 (N= 6,272) – 3 months					Diff
	M	SD	Range	Count	%	M	SD	Range	Count	%	
Age (years)	63.7	16.8	14 - 105			64.1	16.3	16-108			0.10
Gender/Female				6,172	51.3				3,326	51.4	0.86
Race - White				9,820	82				5,100	81	0.10
Black/AA				1,709	14				942	15	
Other/Unknown				502	4				230	4	
BMI	30.3	8.2	9.8 – 126			30.7	8.3	11.3– 100.3			0.002
LOS (days)	5.1	6.5	0 – 158			4.7	5.7	0 – 60			0.059
SPC Insert = 1				4,556	38				2,378	38	0.73

SPC Care Processes	Time 1 (N= 30,772) – 6 months					Time 2 (N= 14,317) – 3 months					Diff
	M	SD	Range	Count	%	M	SD	Range	Count	%	
ED Insert				8,659	28				4,042	28	0.84
OR/CVOR Insert				2,238	7				1,124	8	0.03
Location: AC				10,642	35				4,846	34	NS
Forearm				10,416	34				5,067	35	
Hand				2,139	7				858	6	
Upper Arm				2,961	10				1,552	11	
Securement: Transparent Drsg				27,537	89.5				12,609	88.1	0.0003
Other				2,808	9.2				1,483	10.4	
Site Assmts / Day	3.7	1.4	2.2-5.3	30,059	97.7	3.7	1.4	2.1-5.1	14,117	98.6	NS

SPC Outcomes	T1 (N= 30,772) – 6 months					T2 (N= 14,317) – 3 months					p
	M	SD	Range	Count	%	M	SD	Range	Count	%	
Dwell Time (Policy= removal at 96 hours)	2.289	1.50	0.1-18.6	30,772		2.279	1.56	0.1–18.2	14,317		0.56
Removal – Planned				23,338	75.8				10,918	76.3	
Removals for Adverse Reasons*				7,434	24.1				3,399	23.7	0.33
Occlusion (18.8%)				1,252	4.1				556	3.9	0.35
Infiltration (23.9%)				4,083	13.3				1946	13.6	0.35
Extravasation				227	0.7				89	0.6	0.17
Pt Dislodgment (7%)				1,951	6.3				834	5.8	0.03
Suspected Infection (0.2%)				17	0.05				5	0.03	0.36

*Helm, et al., 2015 – the overall PIVC failure rate is estimated at 35-50%

Findings – Implementation Results

- Patient characteristics similar (T2) –differences in BMI & OR inserts
- Statistical improvement achieved by one (1) unit with use of multiple strategies and limited barriers
- Clinical improvement was achieved by six (n=6) units with improved dressing integrity; Remaining units (n=18)with mixed results
- Report received high ratings for usability & accuracy with some use
- Units reported that “what worked well” was doing the intervention and seeing improvement with resistance to change as main barrier.

Electronic Report Development:

NUR1094 Peripheral IV (PIV) Summary Rpt			
PIV Insertions	November 2018	December 2018	January 2019
Insertions at Hospital	10,414	9,602	10,429
Insertions on Unit / % Insertions at Hospital	147 1%	142 1%	128 1%

Unique Patients with Insertions on Unit
 Average Insertions Per Patient
 Prior to Admission (PTA) based on Property Row
Documented Insertion Properties:
 Prep=Ultrasound
 Prep=Local Anesthetic
 Prep=Chlorhexidine
 Multiple Attempts Documented
 Location=Lower Extremity Site
 Catheter Length (>= 1.5in)
Insertions Missing Documentation
 Placement Date
 Placement Time
Removal Reasons Documented
Expected Outcomes:
 Site Change
 Per Order or Treatment Completed
 Removed By Physician
 Per Patient/Family Request
 No Removal Reason / Removal Date/Time < 8hrs of D/C
Unexpected Outcomes:
 Infiltration
 Extravasation
 Occluded
 Suspected Phlebitis
 Suspected Infection
 Removed By Patient
 Accidental Dislodgement
 Other
 No Removal Reason - Patient Expired
 No Removal Reason - Removals > 8hrs of D/C

Monthly Summary Report by Unit

- Insertion data over 3 months
 - Missing documentation
 - Removal data including Adverse Outcomes
- Note:
- Monthly report displays information about the SPC inserts and removals when patient location is known (unable to track individual SPC)
 - Supports unit leaders to monitor impact of interventions on outcomes over time

Limitations

- Large and diverse sample from a single institution
- Retrospective data extraction based on the accuracy of data entry (suggests that documentation reflects practice; Verification needed)

Conclusions / Implications

- SPC insertions are common but rarely evaluated
- Several units reduced adverse outcomes in T2
- T2 showed improvements with higher policy adherence
- Adverse outcomes remain lower than published rates
- Report provides units with way to monitor practice changes and associated outcomes over time.
- Study supported change in EHR build (e.g. catheter length).

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