

Reducing Risks of Central Line Access and Viability of Moving to The Periphery

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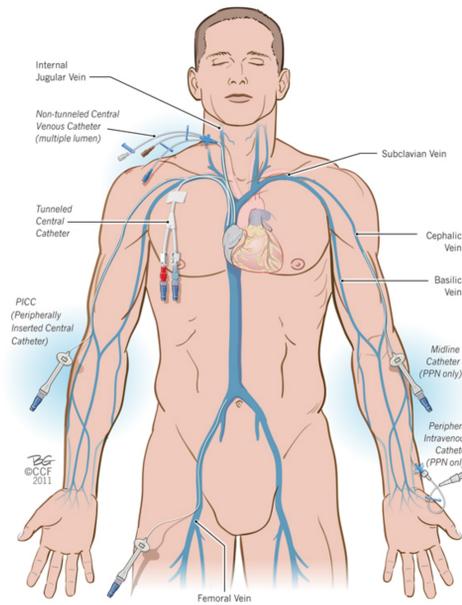
BACKGROUND

Central Lines refers to large lumen catheters which terminate in the heart. They are used in medical practice for:

- + High pressure / high volume treatment
- + Infusion of vesicant medication and antibiotics
- + Longer term treatment
- + Blood collections for difficult venous access patients
- + Monitoring (venous pressure / cardiac output)

Peripheral Intravenous Catheters refer to the most commonly used intravenous device. They are used for therapeutic purposes such as:

- + Administration of medications, fluids and/or blood products
- + Blood collection on insertion, but not reliable over time due to venous obstructions, occlusions, collapsing/kinking, etc.

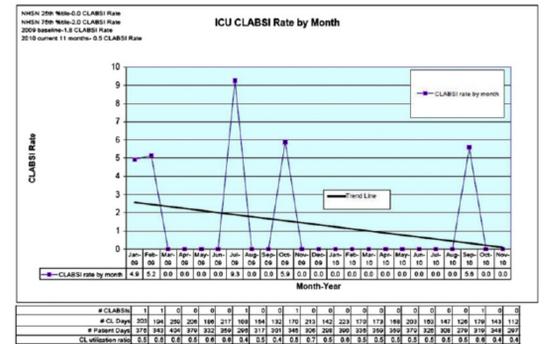


Proven Methods to Reduce CLABSI

1. Eliminate bacterial Ingress
 - + Minimize utilization of the line
 - + Use alcohol caps
 - + Utilize bacteria limiting connectors
2. Maintain sterile insertion site
 - + Sterile insertion technique
 - + Chlorohexidine bath
 - + Biopatch dressings
3. Reduce central line utilization
 - + Remove lines when no longer needed
 - + Limit line "escalation"

Instructive Example

- + Riddle Hospital Media PA (242 bed) eliminated blood collections from central lines with a policy requiring MD authorization for line draws
- + Biggest push-back was the need for additional venipunctures [ref Hughes]



Challenges

- + Central lines are a necessary for critically ill patients, but can become infected causing associated blood stream infections (CLABSI)
- + CLABSI are too common (>90,000 /year, CDC) and have a high mortality rate (attributable 9% increase) [ref Olaechea], are very costly (up to \$30,000, SHEA)
- + Draws from peripheral IVs are avoided because they are associated with dilution effects and significantly higher risk of hemolyzed /rejected samples, which are very costly (\$208 for rejected inpatient; \$337 for rejected ED)

Instructive Example

- + Griffin Hospital Derby, CT (180 bed) began using needle-free technology to draw blood from PIV lines
- + Nurses rated the product overall to be less painful, reduce needle sticks, and reduce rejected samples
- + Nurses rated the likelihood that the device would reduce overall reliance on central line draws as a 4 out of 5
- + The most common limitation noted was hesitance to use the device with superficially placed or poorly secured PIVs [ref Chaisson]

PROJECT AIM

Phase I:

- + Describe common usage of central lines
- + Identify differences by unit (CICU, MICU, SICU)
- + Categorize line accesses

Phase II:

- + Assess the ability of the new PIVO™ device to obtain a good quality blood sample from Peripheral IV
- + Determine whether the use of PIVO shortens overall IV dwell time.
- + Evaluate patient's pain level associated with use of PIVO and overall satisfaction

PROJECT DESIGN /STRATEGY

Phase I—Observational count and type of line access documented

- for 12-hour shift:
 - + ICU settings (MICU, SICU, CICU),
 - + 5 nurses per setting
 - + 10 shifts per nurse
 - + Total expected = 150 shifts of data

Phase II—Prospective, randomized control study:

- + GI Surgical Unit
- + 160 patients undergoing gastrointestinal surgery

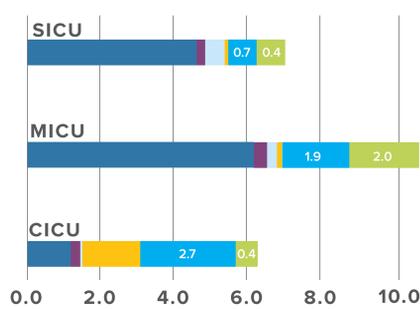
FINDINGS

Phase I:

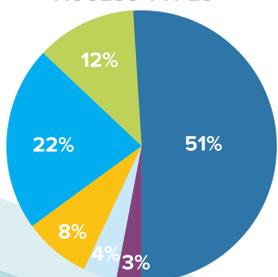
- + Over 22% of all accesses of a line are due to blood collections
- + Flushes delivered independent of medications or monitoring make up 12% of all accesses
- + The blood collection rate was similar for CVC and PICC line. This rate was expected for CVC lines, but higher than expected for PICC lines
- + Lines are accessed 7-11 times per 12 hour shift
- + MICU accessed lines most frequently
- + CICU was more likely to use line for monitoring and blood collection

	AVERAGE DAILY CENSUS	LINE DAYS (1ST QTR '17)	APPROX. % OF PTS W/ LINES
MICU	19	370	22%
CICU	15	196	15%
SICU	17	427	28%

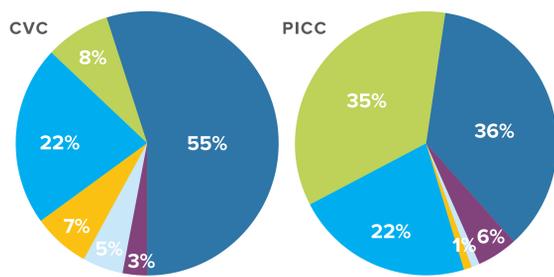
COUNT AND TYPE OF ACCESS IN AVERAGE SHIFT



OVERALL RATES OF ACCESS TYPES

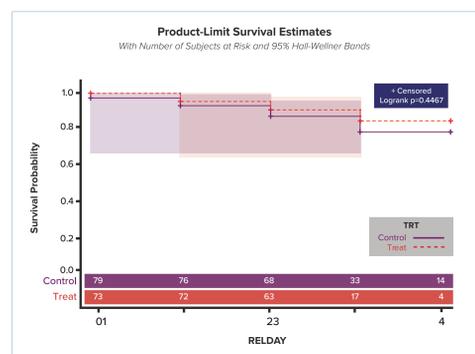


ANALYSIS OF CVC VS PICC LINES



Phase II:

- + PIVO successfully collected a sample 81% of the draws (95% CI 74.0% - 88.0%)
- + 100% of the samples were non-hemolyzed
- + PIVO success was constrained by the condition of the peripheral IV; those in good condition were more likely to produce specimen than PIV;s rated "fair" or "needs to be changed" (p<001)
- + Patients' weight, location of the IV, use of continuous versus intermittent IV fluids, medication, comorbidities, and use of irritant IV fluids did not affect the likelihood that the PIVO would obtain a good sample of blood



- + The daily use of the PIVO did not adversely affect the dwell time of the IV catheter
- + On a scale of 0 (no pain) to 10 (worst imaginable pain), patients rated the pain associated with PIVO as 0.7/10 (SD 1.2)
- + On a scale of 0 (strongly prefer needle) to 10 (strongly prefer PIVO), patients preferred the PIVO 9.1/10

IMPLICATIONS AND SUGGESTED CHANGES IN PRACTICE

- + Almost 1/4 of daily CVC access can be reduced if blood collections were redirected to peripheral IV's
- + Blood draws are painful dissatisfiers from the perspective of patients
- + Inpatients could avoid a significant portion of needle-based blood draws and improve the patient experience without increasing the peripheral IV replacement rate
- + A new hospital policy redirecting blood collections from CVCs to peripheral IVs

FINANCIAL DISCLOSURES

- + None

REFERENCES

- Olaechea PM, Morbidity and mortality associated with primary and catheter-related bloodstream infections in critically ill patients, Rev Esp Quimioter 2013;26(1):21-29
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- Hughes et al. AJIC. Presentation Number 13-163. Reducing CLABSI by Prohibiting Routine Blood Draws through Central Lines
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