Poster # 13

Ultrasound-guided Peripheral Intravenous Catheter Placement in an Oncologic Emergency Department: Interim Analysis of Randomized Controlled Trial

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Background

Ultrasound-guided intravenous catheters (USIVs) are frequently used in oncologic emergency settings but have failure rates of approximately 40%, partly due to the use of short peripheral IV catheters. While standard landmark-based IV insertion typically use 1.09-1.25” long catheters, it has long been recommended that USIVs be performed using longer catheters such as 1.88-2.5” to reduce failure rates.[1] A randomized controlled trial (RCT) from Bahl et al in 2020 additionally established superiority of 2.5” catheter over the 1.88” in terms of catheter dwell time without increase in adverse events or any changes to insertion characteristics.[2] Malik et al achieved an USIV failure rate of 7% in their study utilizing primarily 2.5” catheters.[3] This study evaluates whether standardized use of longer catheters reduces USIV failure rates without increasing adverse events in an oncologic emergency department (ED).

Methods

A single-center randomized study was conducted in the ED of a comprehensive cancer center, comparing usual-care USIV placement with standardized long-catheter insertion, using electronic health records documented outcomes. The primary endpoint is the fraction of catheter failures by day 10. Other demographic, and clinical were collected from the patient’s electronic health records. Descriptive statistics were used to summarize clinical presentations and outcomes.

Results

To date, a total of 72 patients were enrolled in the study; one was excluded due to screen failure. The median patients age was 67 years (interquartile range [IQR], 52–74), with the majority being female (59.2%), White race (70.4%), and of non-Hispanic ethnicity (77.5%). Baseline demographics did not differ significantly between the control and intervention arm.

Characteristics	Study arm		P
	Control	Intervention	
Total	35	36	
Age, median (IQR), years	67 [51, 72]	67 (53, 75)	0.778
Sex			
Female	18 (51.4)	24 (66.7)	0.192
Male	17 (48.6)	12 (33.3)	
Race			
Black or African American	6 (17.1)	7 (19.4)	0.304
White or Caucasian	27 (77.1)	23 (63.9)	
Other	2 (5.7)	6 (16.7)	
Ethnicity			0.412
Hispanic or Latino	7 (20.0)	5 (13.9)	
Not Hispanic or Latino	25 (71.4)	30 (83.3)	
Unknown	3 (8.6)	1 (2.8)	
Time to catheter removal, median (IQR), days	2 (1-4)	3 (1-5)	0.106
Failure by day 10	17 (50)	10 (28)	0.056

Table 1. Participant demographics and clinical outcomes by study arm

Median time to catheter removal was 2 days (IQR:1–4) in the control arm and 3 days (IQR:1–5) in the intervention arm (P=0.106). Although not significant (P=0.056) (Figure 2), the rate of catheter failures by day 10 was higher in the control arm (50%) compared to the intervention arm (28%).

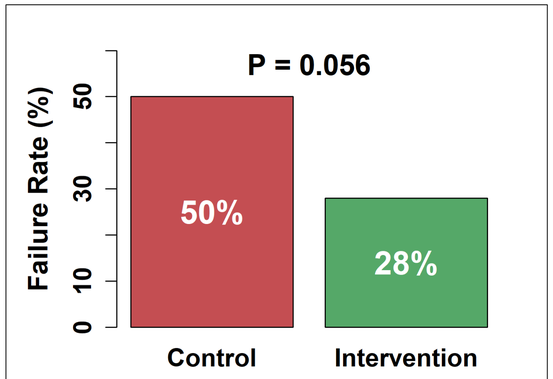

Figure 1. Catheter failure rate by day 10

Conclusions

The interim analysis suggests a lower rate of catheter failures by day 10 in the intervention arm compared to control, although this difference did not reach statistical significance. The trial will advance with further enrollment, with ongoing monitoring for efficacy and adverse events to further evaluate the intervention’s safety and potential benefit.

References

1) Moore CL. Ultrasound first, second, and last for vascular access. J Ultrasound Med. 2014;33(7):1135-1142. doi:10.7863/ultra.33.7.1135
2) Bahl A, Hijazi M, Chen NW, Lachapelle-Clavette L, Price J. Ultralong Versus Standard Long Peripheral Intravenous Catheters: A Randomized Controlled Trial of Ultrasonographically Guided Catheter Survival. Ann Emerg Med. 2020;76(2):134-142. doi:10.1016/j.annemergmed.2019.11.013
3) Malik A, Dewald O, Gallien J, et al. Outcomes of Ultrasound Guided Peripheral Intravenous Catheters Placed in the Emergency Department and Factors Associated with Survival. Open Access Emerg Med. 2023;15:177-187. doi:10.2147/OAEM.S405692

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