

Simple & Efficient: Standardizing Ultrasound-Guided Peripheral Insertions with Barrier Dressing Cuts Waste, Saves Time, Costs Less, Improves Patient Safety

By Pam Pressnall, RN, VA-BC, Vero Beach, FL, Nancy Moureau, RN, PhD, CRNI, CPUI, VA-BC, CEO, PICC Excellence, Hartwell, GA

Contact: Nancy@piccexcellence.com Ofc: +1-706-377-3360

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Purpose

Like everywhere else, our medium-sized regional hospital (245 beds; ICU, 24 beds; emergency department sees ~160 patients/day) has witnessed an increase in the use of ultrasound guided peripheral access (UGPIV) due to changing demographics. During routine observations, we recognized much supply variation in usage and waste amongst departments during UGPIV procedures. Concerns were present over inefficiencies of supply usage and time spent performing procedures. As more and more patients with difficult access required UGPIV insertions, it was necessary to take a closer look at inefficiencies and safety in the performance of the procedure. We noted in a previously published prospective in-vivo quantitative performance survey of 210 procedures, 97% of respondents strongly agreed that the sterile barrier dressing provided gel and probe separation from the skin; 98% preferred using the sterile barrier dressing versus a sterile transducer cover; and 87% agreed that the sterile barrier dressing improved patient care by facilitating aseptic technique.¹² Respondents also found that the product's window was large enough and allowed for a good ultrasound image through the dressing, and that the product

provided sufficient barrier, securement, and adherence. In addition, 99% strongly agreed that it is easy to apply. These findings lead us to consider the evaluation of this method of probe protection and establish a quality improvement initiative for UGPIV insertions.

(See 1-2-3 Method for Sterile Barrier Dressing).

Background

The objectives of the quality improvement process were to evaluate current procedural practices and supplies used with UGPIV insertions in comparison to standardized supplies incorporating the transparent barrier dressing used for probe protection. Our goals were to improve aseptic practices, provide probe protection, eliminate waste, and establish a standardized process.

The research question was: Can standardization of supplies and the procedure for UGPIV insertion using a sterile transparent barrier dressing for probe protection lead to less waste with added value of time and cost savings?

1-2-3 Method for Sterile Barrier Dressing



1. Mark the selected site and adjust the gain brighter. Peel and fold off flap #1.



2. Position fold edge of UltraDrape on mark and stick to skin. Apply gel to #2 back area.



3. Insert, peel gel layer off and pull down dressing #3. FINISHED!

Methods

In 2021 we standardized the UGPIV process using an intravenous Start Kit with a transparent barrier dressing, instead of a probe cover. The barrier dressing (UltraDrape™, Parker Laboratories, Fairfield, NJ) performs three functions: 1) sterile probe protection; 2) gel separation from insertion site; and 3) transparent dressing cover. As a quality improvement initiative, we evaluated the impact of changing to the new kit for efficiency and procedure standardization while incorporating aseptic non touch technique (ANTT) for UGPIV insertions. Procedures with probe protection utilizing a full cover and current supplies versus the IV start kit and transparent barrier dressing were compared with procedure time and cost of supplies. Cost of supplies were extracted from materials management records.

Results & Discussion

The quality improvement evaluation of current practice demonstrated much supply variation and waste associated with UGPIV insertions. The UGPIV procedure used a Central Line Dressing Kit including an antimicrobial sponge, sterile gloves, sterile probe cover, sterile gel, drape, gauze, skin antiseptic, and a securement device, with unused items discarded. Despite all inserters being trained on the procedure using this kit, observers saw that inserters were wasting some of the more expensive components in the Central Line Dressing Kit. Furthermore, there was significant variation in departments among which products were used and which steps of the aseptic procedure were followed. Observations revealed practice variability for supply usage with sterile and non-sterile gloves, nonsterile gel, needles inserted through non-sterile gel, and frequent procedural contamination. More importantly, patient dissatisfaction was noted with certain inserters, with patients asking for “the certified nurses” to do these insertions.

The new standardized procedure eliminated the Central Line Dressing Kit and used only exam gloves, multi-use gel, an IV Start Kit and sterile transparent barrier dressing for probe protection. No gel was placed at the insertion site, reducing risk of contamination. Cost analysis compared supply items used and quantified the before (\$25.32) and after the sterile barrier dressing standardization (\$6.88) (see Table of Results). The results demonstrated an overall savings of \$18.44 per UGPIV insertion. Incorporating the sterile barrier dressing resulted in a 73% supply cost reduction post-intervention and fewer wasted products. With 90+ catheters placed per month, savings equated to >\$20,000 per year (\$18.44x90x12=\$19,914.20).

Time savings of the 1-2-3 method for the sterile barrier dressing application with UGPIV insertions demonstrated 50% reduced time with ranges of 3.2 - 4.25 minutes compared to 6.51 - 12.14 minutes for the full probe cover and Central Line Dressing Kit. This translates to a nurse time efficiency gain of 8.4 hours/month.

References

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Calculations in Supply Costs and Time for UGPIV Insertion			
... with a Sterile Probe Cover		... with Sterile Barrier Dressing	
Supplies Required			
Saline Syringe	\$0.20	Saline Syringe	\$0.20
IV Catheter	\$1.24	IV Catheter	\$1.24
J-Loop	\$2.34	J-Loop	\$2.34
Dressing Tray w/CHG & TSMP Dressing	\$9.58	IV Start Kit	\$0.74
		UltraDrape	\$1.89
Sterile Gloves	\$1.41	Exam Gloves	\$0.00*
Statlock Ultra	\$3.06	Marking Pen	\$0.30
Sterile Probe cover with Sterile Gel	\$7.49	Multi-use Gel	\$0.17
Total	\$25.32	Total	\$6.88
Cost savings of \$18.44 per UGPIV insertion reflecting a cost savings of 73%			
Median Time Required (minutes)			
Time required	9.3	Time required	3.7
Time savings of 5.6 minutes per UGPIV insertion reflecting a 50% reduction in nurse time.			

* Exam glove cost incorporated into room charges

While data was not directly collected for staff and patient responses of the change to a more standardized procedure, more available time for UGPIV insertions translated into more patients receiving skilled and successful insertions. Questions that remain focus on whether the standardized UGPIV procedure can be maintained in all departments. Next steps will require intermittent checks and continued education for current and new inserters.

Clinical Relevance: Our change to best practice for UGPIV insertions using an IV Start Kit with transparent barrier dressing for probe protection achieved our goals of standardizing procedure, reducing waste, while providing effective probe protection, improved aseptic technique, and reduced procedure time and cost. Team time efficiency was achieved with the barrier dressing allowing more procedures and safer UGPIV insertions with fewer attempts, happier patients and nursing staff.

Limitation: This quality improvement initiative was limited to a single hospital facility in a relatively affluent area. The data collection sample size was small and requires future research to verify results.

Conclusion

These findings for UGPIV standardization with reduced waste, time and cost savings support the integration of a standardized UGPIV protocol using probe protection of a sterile transparent barrier dressing that minimized supplies and improved procedural efficiency. We proved the research question that standardization of supplies and the procedure for ultrasound guided peripheral catheter insertion using a sterile transparent barrier dressing for probe protection can lead to less waste with added value of time and cost savings.