Efforts Toward Standardization of UGPIV Insertion through Quantitative Clinical Product Evaluation

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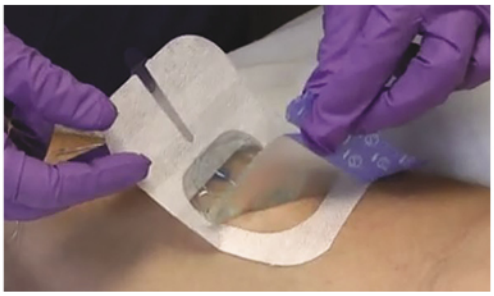
Purpose and Background

The purpose of this study was to establish a standard and cost-effective procedure across three hospitals through the application of a transparent barrier dressing to facilitate aseptic insertion of ultrasound-guided peripheral catheters (UGPIV). Gap analysis under the planning stage reflected variability and inconsistency in UGPIV practices within three hospital medical centers with probe cover, no probe cover, transparent dressing only, no gel, gel non-sterile, and gel sterile used in current procedures. According to plan-do-study-act processes, before the implementation of a new product, the 'do' stage of evaluation of a product should be included with a final 'study' analysis of outcomes; both are represented in this study. Establishing a consistent procedure that facilitates separation of probe and gel from the skin ensures adherence to aseptic techniques and greater safety for patients.



Methods

This was a multi-center prospective in-vivo quantitative performance survey (IRB # MCHS 190307-1) to promote standardization of the aseptic technique of UGPIV insertion with a transparent barrier dressing (UltraDrape™ barrier and securement dressing, Parker Laboratories, Fairfield, NJ) used to provide separation of the ultrasound probe and gel from the insertion site. Methods for data collection were a validated five-scale Likert survey tool accessed by UGPIV clinical staff through an online link/application.

Economic Analysis

Supplies with Current Practice

- US Probe Cover
- Gel Single-Use Packet – non-sterile (assessment)
- Gel Sterile
- IV Start Kit with Alcoholic Chlorhexidine 1ml
- Alcoholic Chlorhexidine 3ml
- Sterile Gauze 4x4
- Sodium Chloride Flush

Total $10.38

Supplies with Full Sterile Insertion

1. Sterile Probe Cover
2. Gel Single-Use Packet – non-sterile (assessment)
3. Gel Sterile
4. IV Start Kit or UGPIV Kit with Alcoholic Chlorhexidine 1ml
5. Alcoholic Chlorhexidine 3ml
6. Sterile Gauze 4x4
7. Sterile Gloves
8. Sterile Drape
9. Sodium Chloride Sterile Peel Packet

Total $13.54

Supplies with Sterile Barrier Dressing

- UltraDrape Sterile Barrier and Securement Dressing
- Gel Single Use Packet – non-sterile
- Skin Marker
- Disposable Tourniquet
- Alcoholic Chlorhexidine 3ml
- Sterile Gauze 2x2
- Sodium Chloride Flush

Total $4.67

Results

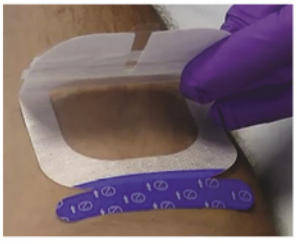
Of the data reported for 210 procedures (see below):

- 97% strongly agreed that the barrier dressing provided separation of gel from the skin
- 84% agreed/strongly agreed there was a good ultrasound image through dressing
- 99% agreed/strongly agreed the window was large enough
- 99% agreed/strongly agreed it easy to apply
- 87% strongly agreed it improved aseptic technique
- 99% strongly agreed/agreed that it provided sufficient barrier against insertion site contamination from the probe
- 98% strongly agreed/agreed it provided sufficient barrier, securement, and adherence
- 96% strongly agreed/agreed it was easier to use than sterile probe cover
- 98% preferred to the sterile probe cover
- 97% said it resulted in successful UGPIV insertion.
- Within all respondents, 99.5% recommended the use of the barrier dressing.

Economic analysis and comparison of hospital materials used for current UGPIV procedure ($10.38) demonstrated a 55% reduction in cost versus barrier dressing cost ($4.67), and 67% reduction over the cost of a full sterile UGPIV kit ($13.54). Supplies (see Methods for list) evaluated included gel, probe cover, barrier dressing, transparent dressing, IV start kit, alcoholic chlorhexidine, gauze, saline, sterile drape, sterile gloves, skin protection wipe, tourniquet, and marker.

*Additional savings of time and labor costs were not considered in this survey.

Discussion



The procedure for insertion of a peripheral catheter with ultrasound guidance requires aseptic supplies, gel and ultrasound covers, and a process that safeguards the patient. In this study reporting 210 procedures, all parameters were met by using a transparent barrier dressing that separated the gel and ultrasound probe away from the insertion thus avoiding some of the risk associated with contamination at the insertion site. The results of the study reflected agreement with the level of separation and asepsis achieved, the adequate image resolution through the dressing, ease of use and a strong preference for the barrier dressing over a sterile probe cover.

Issues of patient protection and reduction of contamination have led to the need to adopt standardized practices for probe protection by using either a sterile probe cover or a barrier dressing, such as the one studied in this project. Consistency of practice is of utmost importance for clinicians performing procedures in a hospital setting.

Standardizing the Procedure

Results of the quantitative clinical product evaluation demonstrated 99% (n=206) strong recommendation of adoption by respondents of the new standardized procedure. Levels of agreement exceeded 80% for all evaluation parameters reflecting the high performance of the aseptic technique with the transparent barrier dressing. Prior to any product implementation, a value analysis review of a product performance should involve a quantitative clinical trial with economic impact assessment as represented in the results of this study.

Limitations: Responses associated with observational performance research are subjective, based on the opinion and judgment of the individual. Clinical user data collection is not without bidirectional bias. Survey results are limited by participation and, despite this multi-center data collection, may not be representative of the whole. Likert scales contain multiple items and are therefore likely to be more reliable than a single item. Economic savings will vary by institution.

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