The Use of Vapocoolant in the Adult Population to Improve Patient Perception of Pain with Peripheral Intravascular Access

Alexander Yau, Jacob Tausiani, David Serrano, Tyler Youngman, Scott Knepper MD, Christina Noah MSN RN CEN, Courtney Edwards MSN/MPH RN CCRN-CEN, Linda Hynan PhD, John P. Pease MD

The University of Texas Southwestern Medical Center 5353 Harry Hines Blvd Dallas, TX 75390

Introduction

Establishing vascular access via peripheral intravenous (PIV) catheter insertion is often necessary for patient stabilization and treatment, but also induces an appreciable level of anxiety and pain for the patient. This may negatively impact both the patient and the efficiency of the healthcare provider. Given the high frequency of intravenous cannulation, it would be practical to utilize a vapocoolant epidermal spray to quickly and effectively mitigate these unfavorable consequences. Vapocoolant sprays, also known as cryoanesthetics, cause a rapid decrease in skin temperature that temporarily desensitizes pain receptors or pain transmission activation channels. This response is almost instantaneous, and could be an effective analgesic and anxiolytic in the emergent setting.

Study Objective

To investigate whether the use of a topical vapocoolant anesthetic spray at the site of intravenous access reduces pain and anxiety in an adult population.

Methods

Setting: large county hospital emergency department with > 100,000 adult visits annually
Study population: adult patients with orders for peripheral IV placement
Intervention: patients were randomized into “A” or “B” groups with the former receiving control (placebo) spray and the latter receiving vapocoolant spray at the injection site. The spray was allowed to evaporate prior to cleansing and needle insertion.
Primary Outcome: the primary outcome was patient perception of pain and anxiety with PIV needle insertion using a 0-10 Likert Scale.
Secondary outcomes: patient/staff preference for the use of the topical anesthetic for future procedures and staff perception of the procedure and patient anxiety.

Results

Study population: A total of 72 patients were enrolled in the study. 38 were randomly assigned to the vapocoolant group, while 34 received a placebo spray. Patient groups did not vary significantly with regards to previous history of IV placement ($p>0.999$) nor anxiety pre-procedure ($p=0.785$).

Study Outcome: Median scores for patient perception of pain did not vary significantly between vapocoolant and placebo populations. Scores also did not vary significantly for patient-forecasted anxiety regarding the procedure if the same procedure were repeated. When asked if they desired the spray for future procedures, 89% of nurses and patients expressed desire for vapocoolant, while 74% desired placebo; the difference was not significant. Neither placebo nor vapocoolant affected ability to obtain IV access, and no skin blanching or lesions due to the spray were noted.

	Vapocoolant	Placebo	p value
Patient perception of pain (0-10)	2.0	2.5	>0.05
Patient-forecasted anxiety if given same procedure (0-10)	0.5	0.0	>0.05
Patient desire for use in future procedures	34 (89%)	25 (74%)	>0.05
Staff desire for use in future procedures	34 (89%)	25 (74%)	>0.05

Table 1. Effects of vapocoolant and placebo treatments on patient anxiety and perception of pain during peripheral intravascular access.

Conclusions

No significant difference was found between vapocoolant and placebo for pain relief or alleviation of anxiety regarding peripheral IV insertion.

Limitations

The major limitations were due to the natural consequences of clinical research in a county hospital setting:
Because of the volume of patients entering the ER and urgency in establishing peripheral intravascular access, research assistants were often unable to consent patients for the study, resulting in a reduced number of patients enrolled in the study.

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