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Evaluating the Use of a Topical Vapocoolant to Reduce Pain during Intravenous Insertions: The Patients' and Nurses' Perspectives

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E 06 Pain Reduction and Management
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Learning objectives

- Describe and discuss the literature on topical vapocoolant and how it is related to evidence-based practice
- Evaluate and discuss the use of a vapocoolant during intravenous (IV) insertions in terms of patient's pain experience and nurse's perspective related to patient safety and application procedure

Disclosure

- There was no conflict of interest or financial gain for this project

Quick Poll:

1) How many of you **use** a topical vapocoolant for intravenous insertions in your current practice?

2) How many of you are **familiar** with topical vapocoolant?

Background

- Intravenous catheter insertion, a common procedure performed by health-care providers, can cause pain, anxiety, and stress for the patient resulting in dissatisfaction
- From a nursing perspective stress and anxiety may increase the unsuccessful attempts necessary to gain peripheral venous access (Page & Taylor, 2010)
- A topical vapocoolant, when applied to a procedure site, evaporates rapidly, decreasing the skin temperature, resulting in temporary interruption of the pain sensation (Page & Taylor, 2010).

Overview of the Literature

Table 1. Appraisal of the available literature and Level/Strength of Evidence

Author	Setting and sample size	Study design	Intervention	Results	Usefulness to practice	Strength of Evidence*
Celik *et al.* (2011) International Journal of Medical Sciences	41 adult patients Age >18 Hemodialysis center	RCT	1) Vapocoolant topical spray 2) Lidocaine/ Prilocaine (EMLA cream) 3) Placebo cream 4) Control	Group 2 sig decreased pain compared to groups 1,3, and 4 Group 1 and 2 sig decreased pain compared to groups 3 and 4 • Comparable effectiveness between group 1 and 2 in preventing mild to moderate pain	Strengths: Placebo-controlled Weaknesses: Wide variability between group 3 and 4 pain scores	II
Page & Taylor (2010) British Journal of Anesthesia	220 adults Age >18 Metropolitan emergency department	RCT	1) Vapocoolent topical spray 2) Lidocaine SC	Vapocoolent compared to lidocaine subcutaneously resulted in: • Sig improved IV start success rate • Sig < administration pain scores • Group 2 sig < cannulation pain • Group 2 administration pain comparable to group 1 cannulation pain • No difference in patient satisfaction	Strengths: Power analysis (110 per group) Weaknesses: Unblinded? bias Variable application techniques	II
Armstrong, Young, & McKeown (1990) Canadian Journal of Anesthesia	120 adults Gynecological day-surgical center	RCT	1) Vapocoolent spray 2) No treatment 3) Lidocaine SC	• Group 3 sig decrease in vein visibility compared to groups 1 and 2 • Group 1 and 2 sig ease of cannulating IV compared to group 3 • Group 1 and 3 sig decreased cannulation pain compared to group 2	Strengths: Cannulation and assessment by one administrator Weaknesses: No power analysis Unblinded	II

*Fineout-Overholt, Melnyk, & Schultz (2005)

Appraisal and Gaps in the Literature

- When compared to EMLA and Lidocaine, vapocoolants were significantly inferior in reducing pain on IV insertion
- Vapocoolant spray significantly reduces mild to moderate pain when compared to no treatment
- Clinical indications that the vapocoolent's easy application and no administration pain is a product advantage.
- Strengths & Weakness: Randomized control studies; unblinded
- Insufficient evidence supporting the use of topical vapocoolants in the adult population
- Nursing perspective of using a topical vapocoolant absent from literature

Purpose

- Compare the patient's perception of pain and the nurse's experience during the IV insertion process, with and with out the use of a topical vapocoolant

Methods

Study Design and Data collection

- De-identified adult patient and nurse surveys were collected between March and September 2014
- Patients' and nurses' perceptions of the IV catheter insertion process were compared with (n=51) and without (N=50) application of a topical vapocoolant
- Data collection tools were created to describe and compare:
    - Patient perceptions related to pain level, nurse's skill level, satisfaction of IV insertion process
    - Nurse perceptions of patient's pain level and satisfaction with IV catheter insertion process

Data Analysis

- Descriptive statistical analysis was used to analyze data

Methods

Intervention

- Institutional protocol for initiating an IV insertion was followed.
- Nursing education was provided to:
    - Ensure proper application of the vapocoolant
    - Address safety considerations that were implemented during the application process
    - Ensure objectivity and clear criteria were applied to data collection tools

Results: Patient Demographics

Table 2. Patients' Demographic Variable

		No Vapocoolant (N=51)	Vapocoolant (N=50)
Patient Age	Mean	66.16	62.70
	Std. Deviation	10.783	9.919
	Minimum	41	35
	Maximum	89	87

- The age of patients in the Vapocoolant group were (Mean 62.70, SD 9.92) not significantly different compared to patients in the control group (Mean 66.16, SD 10.78, $p<0.068$)

Results: Nursing Practice

Regardless of an administration of a topical vapocoolant patients rated:

- The nurses skill level as very high

  Q: "How skillful was a nurse performing the IV insertion?"
  No vapocoolant (Mean 9.12, SD 1.83) vs. Vapocoolant (Mean 9.7, SD 0.61)

- An overall satisfaction with the IV insertion process.

  Q: "How would you rate your satisfaction with IV insertion?"
  No vapocoolant (Mean 8.43, SD 2.59) vs. Vapocoolant (Mean 8.68, SD 2.31)

Results were unaffected by the:

- Size of the IV cannula (Mean=20.7, SD 1.0 vs. 20.5, SD 1.0)
- Number of attempts to establish IV access (Mean=1.7, SD 1.3 vs. 1.4, SD 0.8)
- Number of nurses attempting IV insertion (Mean=1.3, SD 1.0 vs. 1.2, SD 0.7)

Results: Patient Perception

Table 3. Comparison of Patients' Perceptions of Pain/Discomfort

		No Vapocoolant (N=51)	Vapocoolant (N=50)	Test Statistics
Pain/discomfort (0-10 rating scale with 0 = very comfortable, 10 = not comfortable)	Mean	3.8	2.21	P < 0.024
	Std. Deviation	3.203	2.123	
	Minimum	0	0	
	Maximum	10	9	

- Patients who did not receive the vapocoolant prior to the IV insertion reported higher levels of pain/discomfort compared to patients who received the vapocoolant

Nursing Considerations

- The nurses experiences and feedback included:
  - Application and safety concerns:
    - Stream unexpectedly diverts from intended site causing potential risk getting into a patient's and/or nurse's eye(s)
    - Non-localized spray unnecessarily numbs wide area of skin
    - Flammability of product in presence of oxygen
  - Nurses reported that IV insertions were generally successful (96% to 98%) in both groups
  - Therapy was delayed 20% of the time in the no vapocoolant group and 4% of the time in the vapocoolant group

Conclusions/Implications

- This project demonstrates the importance of clinical experts' perspectives and feedback from a safety and satisfaction standpoint when implementing evidence-based practice.
- The learnings from this initiative are also demonstrating how staff nurses can make evidence-based decisions and practice changes by integrating evidence from literature with patient experience, and their own expertise.

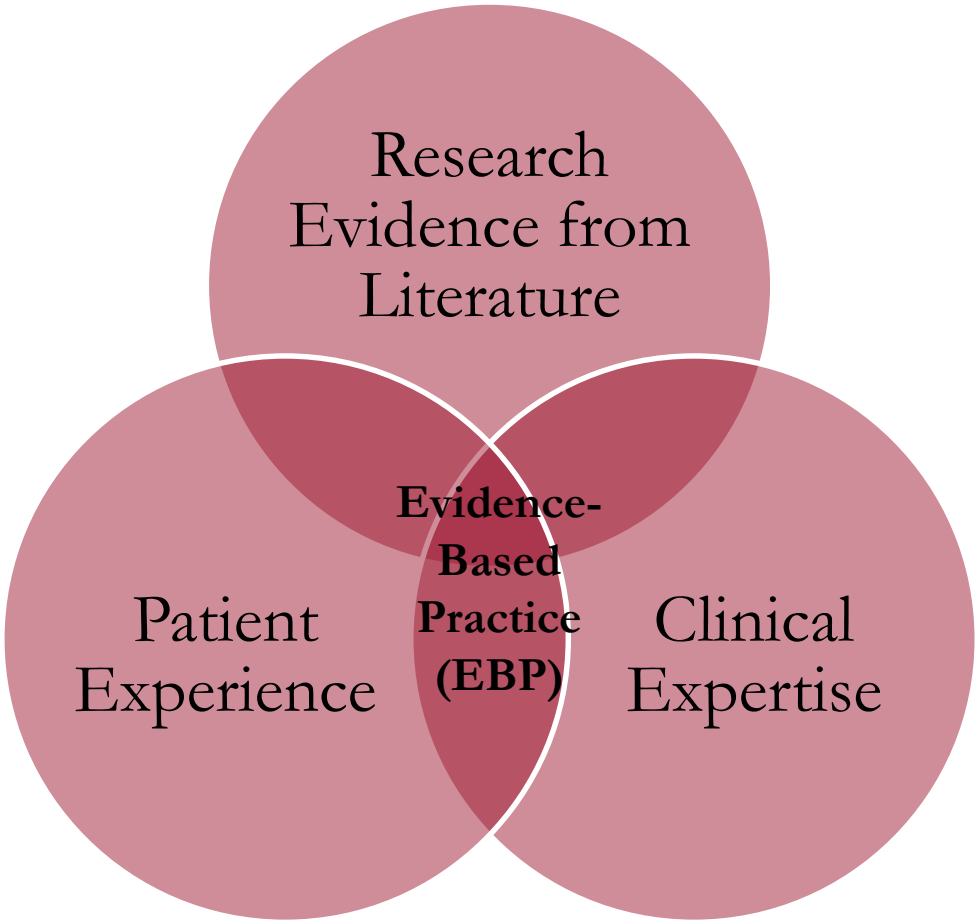

Figure 1. Evidence-based practice in clinical settings (Fineout-Overholt, Melynk, & Schultz, 2005)

Conclusions/Implications *(cont.)*

- The findings of this project are confirming the benefits of a topical vapocoolent for IV insertions in adult patients
- The next steps include a re-assessment of use of this vapocoolant product and exploration of alternative solutions to resolve identified nursing concerns
- We continue using the tools for patients and nurses; collecting and analyzing data; comparing the findings, and strengthening our practices based on the evidence.

Reference

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Questions?

Thank You!