Ethyl Chloride Use for Pain Reduction during Pediatric Venipuncture

Kristin Conforti BSN, RN; Brendan Dougherty BSN, RN, PHRN & Hannah Reed BSN, RN

Emergency Department

Introduction

For pediatric patients, venipuncture can be a painful and frightening experience. Several methods for topical pain control are currently being implemented in clinical settings including EMLA, LMX, “Buzzy” and ethyl chloride. The purpose of this project is to determine the effectiveness of ethyl chloride for pain reduction during venipuncture in children. Methods include a literature review of several evidence-based nursing research articles that discuss the results of applying ethyl chloride prior to catheter insertion.

PICOT Question

P: Pediatric patients (ages birth to 21 years)
I: Application of ethyl chloride spray during venipuncture
C: Patients not receiving ethyl chloride during venipuncture (placebo or other product)
O: Pain level during venipuncture (scales dependent upon age of patient)
T: Moment of venipuncture

Literature Review

Davies and Molloy performed a randomized noninferiority cross-over trial comparing ethyl chloride with Ametop. They discuss the general disadvantages of local anesthetics including length of time between application and cannulation, increased anxiety levels in the pediatric patient, delays in procedure time, distress related to removal of occlusive dressing, allergies, and the lack of time for use in emergent situations. Davies and Molloy also provide step-by-step procedure guidelines for application of ethyl chloride as canisters are not manufactured with appropriate instructions for venipuncture. They concluded that ethyl chloride provides equal pain reduction in comparison to Ametop and can be used as an effective alternative in clinical practice.

Kleiber, Schutte, McCarthy, Florea-Santos, Murray, and Hanrahan discuss the variability of topical anesthetic effectiveness and predictors of children’s pain during IV insertion. These predictors included temperament, anxiety, age, gender, history of previous painful procedures, and genotype. They concluded that all pediatric patients requiring non-emergent invasive procedures on intact skin should be pre-treated with topical anesthetics. Parents and children should be informed by healthcare providers that, because pain is influenced by several variables, venipuncture may still cause discomfort even after anesthetic has been applied.

Ramsook, Kozinetz, and Moro-Sutherland performed a randomized placebo-controlled trial comparing administration of ethyl chloride to the placebo during venipuncture. According to their findings, using ethyl chloride as topical anesthetic did not produce an improvement in pain control when compared to application of isopropyl alcohol as a placebo.

Selby and Bowles performed a controlled trial comparing three commonly applied local anesthetics: lidocaine, ethyl chloride, and EMLA. Pain was measured during three stages of venipuncture: anesthetic application, cannulation, and recovery. Results of the study revealed that EMLA is the least effective for pain management and that both lidocaine and ethyl chloride were very effective. Overall, Selby and Bowles concluded that venipuncture is a painful experience that can be managed with all three methods listed above.

How Does Ethyl Chloride Work?

Ethyl chloride is a topical aerosol anesthetic skin refrigerant that creates a cooling effect on the surface of the epidermis followed by immediate evaporation. The coldness created by the spray decreases nerve conduction delaying the body’s normal respond to pain.

Application: Skin should be cleaned prior use. Spray is to be applied to venipuncture site continuously for 3-7 seconds from a distance of 3-9 inches. Effects last for up to one minute.

Conclusions

Many different factors contribute to pediatric patients’ response to venipuncture. However, in nonemergent cases, several topical anesthetic agents have been successful for pain management. The use of ethyl chloride is a convenient and effective method to reduce pain in children during IV insertion. Although further research is needed to determine whether or not ethyl chloride is the most effective product, it is imperative that healthcare providers offer topical pain control for their pediatric patients requiring IV’s.

References


