

Epidermal lidocaine safely reduced pain in children having venipuncture at the antecubital fossa

Migdal M, Chudzynska-Pomianowska E, Vause E, *et al.* Rapid, needle-free delivery of lidocaine for reducing the pain of venipuncture among pediatric subjects. *Pediatrics* 2005;111:e393–8.

Clinical impact ratings Paediatrics ★★★★★☆

Q In children having venipuncture at the antecubital fossa, what is the optimal configuration of a single use, needle free, drug system (ALGRX 3268) that delivers powdered lidocaine into the epidermis for rapid production of local anaesthesia?

METHODS

	Design: randomised, placebo controlled trial.
	Allocation: unclear.*
	Blinding: blinded (patients, healthcare providers, data collectors, and outcome assessors).*
	Follow up period: pain was measured immediately after treatment with lidocaine or placebo and again after venipuncture.
	Setting: a single centre (country not stated).
	Patients: 145 children 3–18 years of age (median age 10 y, 50% boys) having venipuncture at the antecubital fossa who had sufficient cognitive skills to identify faces representing the extremes of pain. Exclusion criteria included a history of allergic reactions to local anaesthetic, active local infections, other pathological skin conditions at the antecubital fossa, and skin conditions that might interfere with treatment or skin site assessments.
	Intervention: lidocaine, 0.5 mg (n = 48), lidocaine, 0.25 mg (n = 48), or placebo (n = 49) delivered by helium gas pressurised at 20 bar. Doses were given at the antecubital fossa 2–3 minutes before venipuncture.
	Outcomes: pain (Faces Pain Scale-Revised [FPS-R], score 0 [no pain] to 10 [most severe pain] in young children and a 10 cm visual analogue scale [VAS], score 0 [no pain] to 10 [extreme pain] in older children) and adverse events.
	Patient follow up: 99%.

*See glossary.

MAIN RESULTS

In the analysis using the FPS-R for children 3–7 years of age and the VAS for children 8–18 years of age, lidocaine led to reduced pain scores compared with placebo. This difference was statistically

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significant for 0.5 mg but not for 0.25 mg (table). Treatments were well tolerated and did not differ for adverse events.

CONCLUSION

In children having venipuncture at the antecubital fossa, lidocaine given 2–3 minutes before venipuncture to the epidermis using a rapid, needle free, drug system safely reduced pain.

Commentary

Clinical practice guidelines on acute pain management from 1 of the many national bodies (Agency for Healthcare Research and Quality—formerly the Agency for Policy and Healthcare Research) stipulate that appropriate relief for painful paediatric procedures should address both pain and anxiety using pharmacological and non-pharmacological methods.¹ Clinical practice and medical literature indicate that pain, especially in children, remains under-recognised and inadequately treated. Demands for efficiency and cost savings in the outpatient setting often take priority over appropriate pain management. Therefore, techniques for reducing pain must be cost effective, have a rapid onset, and be acceptable to children and their parents.

The study by Migdal *et al* shows that pain associated with venipuncture can be reduced using powdered lidocaine (0.5 mg) delivered by pressurised helium gas. The technique provides rapid onset of local anaesthesia, making it useful for venipuncture in an outpatient setting.

The rapid onset of local anaesthesia within 2–3 minutes makes this technique more useful than liposomal lidocaine, which has an onset of 20 minutes, and eutectic mixture of local anaesthetics (EMLA) with occlusion, which has an onset of 45 minutes. Lidocaine iontophoresis provides excellent local anaesthesia <10 minutes but was described as unpleasant by 5% of children.² Migdal *et al* do not comment on children's perceptions of their technique or whether any of the children experienced this technique as unpleasant. Likewise, they do not comment on non-pharmacological techniques that may have been used to augment the efficacy of their technique. Vapocoolant sprays combined with distraction have a rapid onset (<1 min), are inexpensive, and are effective in reducing pain associated with immunisations and venipuncture. The efficacy and cost effectiveness of using pressurised powdered lidocaine over vapocoolant sprays remains unknown.

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1 Agency for Health Care Policy and Research. *Acute pain management in infants, children, and adolescents: operative and medical procedures*. Rockville, MD: Agency for Health Care Policy and Research, 1992. Publication no 92-0020.

2 Zempsky WT, Anand KJ, Sullivan KM, *et al.* Lidocaine iontophoresis for topical anesthesia before intravenous line placement in children. *J Pediatr* 1998;132:1061–3.

Lidocaine, 0.5 mg or 0.25 mg, v placebo for reducing pain in venipuncture*

Outcome	Comparison	Effect size (95% CI)
Pain (FPS-R for children 3–7 y and VAS for children 8–18 y)	0.5 mg v placebo	–0.43 (–0.83 to –0.02)
	0.25 mg v placebo	–0.38 (–0.79 to 0.02)†

*FPS-R = Faces Pain Scale-Revised; VAS = 10 cm visual analogue scale. †Not statistically significant.