V. A new route, jet injection of lidocaine for skin wheal for painless intravenous catheterization.

Zsigmond EK, Darby P, Koenig HM, Goll E.

Department of Anesthesiology, University of Illinois Medical School, Chicago, USA.

Abstract

OBJECTIVE: The objective of this study was to compare the efficacy of intradermal lidocaine anesthesia by two jet injectors to the routine needle infiltration and to the topical EMLA cream.

SUBJECTS AND METHODS: In a randomized, prospective, controlled trial, 100 consenting surgicenter patients in a university hospital setting were divided into four groups (n = 25, each); intradermal lidocaine anesthesia was given either by the conventional 25 g needle/syringe or the Med-E-Jet or Biojector injector or EMLA cream was applied on the skin. Visual analogue pain scores (VAS) or verbal pain intensity scores (PIS) were reported by the patients at lidocaine application and i.v. catheterization. Cost was also assessed.

RESULTS: At lidocaine application, no pain was reported, since proportions of VAS = 0 were 25/25 (CI: 0.868, 0.999) with Med-E-Jet; 24/25 (0.804, 0.991) with Biojector; 25/25 (0.868, 0.999) with EMLA; in contrast to pain, 3/25 (0.044, 0.302) with the needle (PP > 0.999). The VAS scores (mean +/- SD) were 0.00 +/- 0.00, 0.04 +/- 0.20, 0.00 +/- 0.00, and 2.4 +/- 2.2 respectively (p < 0.001). No pain was reported by proportions of PIS = 0 with Med-E-Jet: 25/25 (CI: 0.868, 0.999); with Biojector: 23/25 (0.749, 0.976); EMLA 25/25 (0.868, 0.999); but pain with the needle: 5/25 (0.090, 0.394) (PP > 0.999). The mean +/- SD PIS scores were 0.00 +/- 0.00, 0.16 +/- 0.55, 0.00 +/- 0.00, and 1.24 +/- 1.00, respectively (p < 0.001). At i.v. catheterization, the proportions of VAS = 0 scores were 22/25 with Med-E-Jet (0.698, 0.956); 21/25 (0.651, 0.934) with Biojector; but some pain with needle: 6/25 (0.116, 0.436) (PP > 0.999). The mean +/- SD VAS scores were: 0.12 +/- 0.33, 0.44 +/- 0.20, and 1.64 +/- 1.50, respectively (p < 0.001). No pain was reported by PIS = 0 scores in 24/25 (0.804, 0.991) with Med-E-Jet; 24/25 (0.804, 0.991) with the Biojector; but pain by zero PIS scores 13/25 (0.334, 0.703) in half of the patients in the needle group (PP > 0.999). The mean +/- SD scores were 0.00 +/- 0.00, 0.00 +/- 0.00, and 0.76 +/- 0.88, respectively (p < 0.001). The EMLA cream was not evaluated because of inadequate duration of application prior to anesthetic induction. Cost/application were: Med-E-Jet = $ 0.13; needle = $ 0.50; Biojector = $ 0.94 and EMLA = $ 3.76.
**CONCLUSION:** Almost completely painless i.v. catheterization by jet injection of lidocaine was accomplished, while needle infiltration produced pain/discomfort and did not significantly reduce it at the i.v. needle insertion.

PMID: 10082173 [PubMed - indexed for MEDLINE]

**Publication Types, MeSH Terms, Substances**

**Publication Types:**
- Clinical Trial
- Comparative Study
- Randomized Controlled Trial

**MeSH Terms:**
- Administration, Cutaneous
- Anesthetics, Combined/administration & dosage
- Anesthetics, Combined/economics
- Anesthetics, Combined/pharmacology
- Anesthetics, Local/administration & dosage*
- Anesthetics, Local/economics
- Anesthetics, Local/pharmacology
- Catheterization, Peripheral*/economics
- Catheterization, Peripheral*/methods
- Catheterization, Peripheral*/standards
- Costs and Cost Analysis
- Female
- Humans
- Injections, Intradermal
- Injections, Jet
- Lidocaine/administration & dosage*
- Lidocaine/economics
- Lidocaine/pharmacology
- Male
- Middle Aged
- Pain Measurement
- Prilocaine/administration & dosage
- Prilocaine/economics
- Prilocaine/pharmacology
- Prospective Studies
- Skin/drug effects*

**Substances:**
- Anesthetics, Combined
- Anesthetics, Local
- EMLA
- Lidocaine
- Prilocaine

**LinkOut - more resources**

**Other Literature Sources:**
Molecular Biology Databases:

- PRILOCAINE - HSDB
- LIDOCAINE - HSDB

Supplemental Content

Related citations

- Painless intravenous catheterization by intradermal jet injection of lidocaine: a randomized trial. [J Clin Anesth. 1999]

  Painless intravenous catheterization by intradermal jet injection of lidocaine: a randomized trial.


- Jet Injection of 1% buffered lidocaine versus topical ELA-Max for anesthesia before peripheral intravenous catheterization in children: a randomized controlled trial. [Pediatr Emerg Care. 2008]

  Jet Injection of 1% buffered lidocaine versus topical ELA-Max for anesthesia before peripheral intravenous catheterization in children: a randomized controlled trial.


- Subcutaneous administration of midazolam: a comparison of the Bioject jet injector with the conventional syringe and needle. [J Oral Maxillofac Surg. 1998]

  Subcutaneous administration of midazolam: a comparison of the Bioject jet injector with the conventional syringe and needle.


Review Topical anesthetics for dermal instrumentation: a systematic review of randomized, controlled trials.


- Review Age-related response to lidocaine-prilocaine (EMLA) emulsion and effect of music distraction on the pain of intravenous cannulation. [Pediatrics. 1994]

Review Age-related response to lidocaine-prilocaine (EMLA) emulsion and effect of music distraction on the pain of intravenous cannulation.


See reviews... See all...

Cited by 1 PubMed Central article


Jet anesthesia and jet local anesthesia for the 21st century.


All links from this record

- Related Citations

Calculated set of PubMed citations closely related to the selected article(s) retrieved using a word weight algorithm. Related articles are displayed in ranked order from most to least relevant, with the “linked from” citation displayed first.

- Compound (MeSH Keyword)

PubChem chemical compound records that are classified under the same Medical Subject Headings (MeSH) controlled vocabulary as the current articles.

- Substance (MeSH Keyword)
PubChem chemical substance (submitted) records that are classified under the same Medical Subject Headings (MeSH) controlled vocabulary as the current articles.