Radial artery cannulation: topical amethocaine gel versus lidocaine infiltration

S. J. Olday*, R. Walpole and J. Y. Y. Wang

Department of Anaesthesia, Royal Infirmary of Edinburgh, Lauriston Place, Edinburgh EH3 9YW, UK
*Corresponding author: Department of Anaesthesia, Frenchay Hospital, Frenchay Park Road, Bristol BS16 1EE, UK

Background. In a prospective randomized study, we compared topical 4% amethocaine gel (Ametop™) with 2% lidocaine infiltration for analgesia for radial artery cannulation. A previous study had shown topical analgesia with EMLA cream reduced pain, shortened cannulation time, and improved success rates when compared with lidocaine infiltration.

Methods. One hundred adult patients undergoing elective cardiac surgery were randomized. Cannulation times and success rates were compared between the two groups. The quality of analgesia was assessed using a visual analogue scale (VAS) and four-point verbal pain scoring system.

Results. Ninety-nine sets of data were analysed using Mann–Whitney U and chi-squared tests. Mean time to cannulation was 56 s in the amethocaine group (interquartile range (IQR) 41–142) and 59 s in the lidocaine group (IQR 40–105). The median pain score on the VAS was 2 in both groups (IQR 1–3.5 for amethocaine and 0–4 for lidocaine).

Conclusions. There was no significant difference between these two methods of analgesia for any measured variable.

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Radial artery cannulation is a painful procedure, and standard analgesia is subcutaneous infiltration with lidocaine before cannulation. Topical analgesia with EMLA cream has been shown to shorten cannulation time, improve the success rate, and reduce the pain of radial artery cannulation.1 Despite these findings, EMLA cream is not widely used for this procedure, and this may be because of the slow onset of action of EMLA (2 h). Compared with EMLA, 4% amethocaine provides a faster onset and longer duration of analgesia for venous cannulation.2 We postulated that the vasodilatory properties of amethocaine might further improve the speed and success rate of radial artery cannulation by arterial dilatation and prevention of reflex vasoconstriction. In this study, we evaluated the use of topical 4% amethocaine gel for arterial cannulation by comparing it with lidocaine infiltration.

Methods and results

We recruited 100 adult patients undergoing elective cardiac surgery. The study received ethical approval and informed consent was obtained from all patients. Patients with an abnormal Allen’s test or known sensitivity to local anaesthetics were excluded from the study. Patients were randomized to receive either topical 4% amethocaine gel (Ametop™) or 2% lidocaine infiltration. Amethocaine gel was applied to both wrists under an occlusive dressing over the proposed puncture site at least 1 h before attempted arterial cannulation. Alternatively, 2% lidocaine (0.5–0.7 ml) was infiltrated with a 25-gauge needle at least 1 min before attempted arterial cannulation. All patients received premedication with lorazepam 1–3 mg, 2 h before transfer to the anaesthetic room.

Before arterial cannulation, the wrist was hyperextended over a gauze roll. The occlusive dressing and excess amethocaine gel were removed, or 2% lidocaine infiltrated, according to randomization. An experienced registrar or consultant anaesthetist attempted cannulation with a 20-gauge Abbocath™ cannula (Baxter).

Immediately after the procedure, each patient was asked to complete a 10 cm visual analogue scale (VAS): 0=no pain, 10=worst pain imaginable; and a verbal pain score
Lidocaine or amethocaine for radial artery cannulation?

A number of studies have shown EMLA to be superior to lidocaine infiltration in providing analgesia for radial artery cannulation.\(^1\)\(^-\)\(^7\) A study by Joly and colleagues compared EMLA and lidocaine infiltration in over 500 patients and found superior analgesia, a higher success rate and shorter cannulation times in the EMLA group.\(^1\) Against this background, our results appear surprising until the studies are compared more closely. We cannulated the radial artery with a 20-gauge cannula whereas the study by Joly and colleagues used an 18-gauge cannula and a 5f sheath. The latter allocated unpremedicated patients according to day of surgery: that is all patients on 1 day received topical infiltration and those on the next day, EMLA. Patients in our study were premedicated. Although premedication with a benzodiazepine does not provide analgesia, it is well recognized that a premedicated patient may perceive and recall pain differently. The populations were slightly different, in that Joly’s patients were attending for coronary angiography, and ours for cardiac surgery. These two groups may perceive the importance of good analgesia for arterial cannulation differently.

It is also worth noting that our sample size is smaller than Joly’s study. Based on our power analysis, 100 patients were required to detect a mean difference in time to successful arterial cannulation of 45 s. We feel that this is the minimum mean difference required to justify the greater effort and expense in the use of amethocaine gel in clinical practice. Presently, one tube of Ametop\textsuperscript{TM} gel costs £1.15 and a 5 ml ampoule of 2% lidocaine costs 23 pence.

We have shown that in premedicated patients, topical 4% amethocaine gel and lidocaine infiltration are equally effective in providing analgesia for radial artery cannulation. Success rate and speed of cannulation were also similar for both methods. As amethocaine gel is both more expensive and time consuming to apply, we cannot recommend its routine use for arterial cannulation instead of lidocaine infiltration.

References

(VPS): 0=no pain, 1=mild, 2=moderate, 3=severe pain. These pain scales were discussed with the patient at the preoperative visit.

We measured the time to successful cannulation. The clock started as the cannula touched the skin to start cannulation and stopped as soon as the arterial line was connected. Failure to cannulate within 10 min or procedures abandoned earlier were classed as failures. Additional lidocaine was infiltrated in patients who complained of pain or looked uncomfortable.

This requirement for additional lidocaine was noted, in addition to any erythema of the amethocaine gel site.

One-tailed power analysis suggested that the study had 80% power to detect a difference in cannulation time of 45 s between the groups (SD 90 s). Power analysis was one tailed, as we were primarily interested in a result in favour of amethocaine. The SD of 90 s used in power analysis was an estimate based on a small pilot study assuming normal distribution. However, the study data were not normally distributed and further statistical analysis used Mann–Whitney \(U\) and chi-squared tests. The statistical analysis was performed with SPSS v. 9.0 on a Windows based PC.

Of 100 patients enrolled, one was too sedated to give a pain score and his data were excluded; this left 99 sets of data for analysis. Both groups were similar in terms of age, sex, height, weight, and operative procedure (\(P\)=0.55–0.85). Median time to cannulation was 65 s for the amethocaine group, IQR 41–142, and 59 s for lidocaine, IQR 40–105 (95% confidence intervals for difference −13.99 and 29.02, respectively). Four-point pain scoring by the patient showed a median of 2 in both groups (IQR 1–3.5 for lidocaine and 0–4 for amethocaine, \(P\)=0.93, 95% confidence intervals were −1.0 to 1.0).

The median, IQR, and range of VAS for pain are shown in Figure 1. Failure to cannulate occurred in five of the amethocaine group and seven of the lidocaine group (\(P\)=0.54); this failed cannulation rate of 12% correlates well with rates reported previously.\(^3\)\(^,\)\(^4\) Additional lidocaine was required in seven of the lidocaine group and 11 of the amethocaine group (\(P\)=0.54). There was no correlation between the failure to cannulate and additional lidocaine. There were no serious skin reactions to the amethocaine application. Erythema of the proposed cannulation site was common.

Comment
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References

![Box and whisker plot for VAS pain scores (median, IQR). No significant difference shown.](image-url)
Higgins et al.

Postoperative sore throat after ambulatory surgery

P. P. Higgins, F. Chung* and G. Mezei

Department of Anesthesia, Toronto Western Hospital, University of Toronto, 399 Bathurst Street, Toronto, Ontario, Canada M5T 2S8

*Corresponding author

Background. Sore throat is a common complication of anaesthesia that affects patient satisfaction after surgery.

Methods. We studied 5264 ambulatory surgical patients prospectively to determine the patient, anaesthetic, and surgical factors associated with sore throat.

Results. In 5264 patients, 12.1% reported a sore throat. Patients with tracheal tube had the greatest incidence, 45.4%, followed by patients with laryngeal mask airway, 17.5%, while patients with a facemask had a lower incidence of sore throat, 3.3%. Female patients had more sore throats than male patients (13.4 vs 9.1%). Airway management had the strongest influence on the incidence of sore throat. Sore throat in ambulatory surgical patients was associated with female sex, younger patients, use of succinylcholine, and gynaecological surgery.

Conclusion. Airway management, female sex, younger patients, surgery for gynaecological procedure, and succinylcholine predicts postoperative sore throat. Increased awareness of the predictive factors can help to avoid this combination and improve patient satisfaction.

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