Intravenous pethidine as the sole agent for regional anesthesia; a randomized controlled trial

Abstract

Background: Intrathecally pethidine has been shown to be very effective as the sole anesthetic for surgery of the lower limbs, prostatic, perineum and endoscopic urologic procedures and cesarean. Aims: The purpose of this study was to evaluate pethidine as the sole anesthetic for a minimal surgery of upper limbs. Settings and Design: randomized controlled single blinded trial Methods and Material: 30 patients undergoing minor surgery on their upper limbs. A double tourniquet was placed on the upper operative arm. Group A was anesthetized by IV injection of 40ml (0.6-0.7 ml/kg) pethidine 0.3% and the other group (B) with IV injection of 40ml (0.6-0.7ml/kg) lidocaine 0.5%. The subject reported the sensation verbally as pinprick, touch, or absent. After tourniquet deflation the sensory and motor assessments continued until full recovery. Statistical analysis used: All analyses were done using SPSS v.11. Results: Depth of anesthesia caused by lidocaine was higher than pethidine (p<0.05). The needle tip sensation block with lidocaine was sooner than pethidine but this difference was not significant (p>0.05). Loss of or decreased sensation of ice by pethidine was less efficient than lidocaine (p=0.05). Duration of anesthesia was shorter with pethidine than lidocaine (p<0.05). The finger motion block by pethidine was later than lidocaine (p=0.05). Duration of motion block with pethidine was less than lidocaine (15min vs. 30min, p<0.05). The adverse effects of pethidine were more than lidocaine. Conclusions: Pethidine could be used as alternative local anesthetics for lidocaine for minimal surgery of upper limbs.

Key words: lidocaine; pethidine; regional anesthesia; upper limbs surgery.

INTRODUCTION

Pethidine has local anesthetic effects. Intrathecally pethidine has been shown to be very effective as the sole anesthetic for surgery of the lower limbs, prostatic, perineum and endoscopic urologic procedures and cesarean. [1-4] Intravenous regional anesthetics (IVRA) provides safe and effective anesthesia for hand surgery of, 1 h duration. Various analgesics, including morphine, fentanyl, sufentanil, meperidine, and ketorolac, have been added to the IVRA solution to improve perioperative analgesia.[5-12] The addition of 100 mg pethidine for intravenous regional anesthesia (IVRA) showed an increased quality of the sensory and motor block.[13] Because of its local anesthetic effect on peripheral nerves, meperidine may be the ideal analgesic for IVRA.

The purpose of this study was to evaluate whether pethidine could be used as the sole anesthetic for a minimal surgery of upper limbs when compared to 0.5% lidocaine.

METHODS

It was a randomized controlled single blinded trial on 30 patients from 2003 to 2005 in …referred hospital.

Subjects

Thirty patients with a traumatic complaint of upper limbs were enrolled to this study. The inclusion criteria were: needing a minor surgery on the upper limbs (colles fracture, wound suture and tendon repairment), no history of central and peripheral neuropathy, myopathy, vasculopathy and diabetes mellitus. The patients were randomly assigned into two groups; one group was locally anesthetized by pethidine (A) and the other group by lidocaine (B).

Ethics

The study protocol was approved by the ethics committee of our university. All patients gave informed consent after detailed explanation.

Intervention

A double tourniquet was placed on the upper operative arm after the use of routine ASA monitor. No opiates were used preoperatively or intraoperatively. Participants were premedicated with <5mg of midazolam if necessary. The proximal cuff was inflated to 250 mm Hg. Circulatory isolation of the operative arm was confirmed by inspection of the hand and by absence of the radial pulse. Group A was anesthetized by IV injection of 40ml (0.6-0.7 ml/kg) pethidine 0.3% and the other group with IV injection of 40ml (0.6-0.7ml/kg) lidocaine 0.5%.

Evaluation

Sensory and motor block

After administrating the anesthetics the sensory block was assessed using a 22-gauge short beveled needle. The subject reported the sensation verbally as pinprick, touch, or absent. Cold sensation was assessed by a small piece of ice.

Six areas supplied by the ulnar, radial, and median nerves were tested in a random sequence with the subject unable to observe the testing.

At the same time the motor function was assessed by asking the subject to flex and extend his wrist and fingers, and the complete motor block was noted when any voluntary movement proved impossible.

The tourniquet was deflated after 10 min and the sensory and motor assessments continued until full recovery had occurred at all six sites.
Adverse effects

The adverse effects included hemodynamic instability, nausea, vomiting, flushing, vertigo; respiratory depression and dry mouth were recorded during the operation and 60min of tourniquet cuff deflation.

Statistical Analysis

The quantitative data were compared by Mann-Whitney test. The qualitative data were compared using Fisher’s exact test. P value less than 0.05 was considered significant. All analyses were done using SPSS v.11.

RESULTS

Sensory block

Depth of anesthesia caused by lidocaine was higher than pethidine (p<0.05). The needle tip sensation block with lidocaine was sooner than pethidine but this difference was not significant (264s vs. 210s, p>0.05). Loss of or decreased sensation of ice by pethidine was less efficient than lidocaine (p=0.05). Duration of anesthesia was shorter with pethidine than lidocaine (32min vs. 41min, p<0.05).

Motor block

The finger motion block by pethidine was later than lidocaine (13min vs. 10min, p=0.05). Duration of motion block with pethidine was less than lidocaine (15min vs. 30min, p<0.05).

Adverse effects

The adverse effects of pethidine were more than lidocaine. The pain of tourniquet fastening during the peration was seen in 10 (66%) of the pethidine anesthetized group which was more than other group with 5 (33%) pain. Sedation and drowsiness after tourniquet opening in pethidine group was more than other group (60% (n=9) vs. 26% (n=4), p<0.05). Nausea was more in pethidine group (26% [n=4] vs. 20% [n=3]). There was no nausea and vomiting within the study.

DISCUSSION

Pethidine was suggested as a local anesthetic drug by Armstrong et al. It was found that 100mg pethidine when is added to prilocaine 25% could increase anesthesia depth and severity. Pethidine has been used previously for intrathecal anesthesia but the respiratory depression limited the usage of this drug. [14] Rabbit neural block with fentanyl and sufentanyl did not reverse with naloxan showing that the anesthetic effects of these drugs are not due to their opiates.

ACalovschi and Cristea showed that pethidine has an anesthetic effect with IRVA method but this effect is less than lidocaine. [13] None of them used pethidine solely and its pure effect was not clear.

Based on the results of the present study, pethidine has local anesthetic effect and could be used in the minimal surgery needing IVRA. In the present study pethidine was evaluated for its regional anesthetic effect, the systemic effect of this drug did not appear due to the tourniquete pressure. Pethidine could be used as alternative local anesthetics for lidocaine for minimal surgery of upper limbs. More investigation could be designed to evaluate the effect of other opiates on regional anesthesia.

REFERENCES


