Original Article

STUDYING ANALGESIC EFFECT OF PREINCISIONAL INFILTRATION OF LIDOCAINE AS A LOCAL ANESTHETIC WITH DIFFERENT CONCENTRATIONS ON POSTOPERATIVE PAIN

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ABSTRACT

***Objective*:** Preincisional infiltration of anesthetics into surgical wounds may be effective in various elective surgeries. The aim of this study was to asses the effect of lidocaine infiltration with different concentrations in relieving post operative pain in tubectomy patients.

Methodology: This is a placebo controlled double blind trial, performed on 80 female patients candidated for tubectomy with general anesthesia between the years 2006-2007. The study was conducted in Tabriz University of Medical Sciences, Tabriz, IRAN. The patients were consecutively randomized into four groups. Three groups which consisted of 20 patients each received lidocaine infiltration before skin incision with different concentrations (0.5%, 1%, 1.5%) and were examined for intensity of feeling pain and the duration of analgesia in comparison to the fourth group or control group (20 patients), in which normal saline solution infiltration was used. In this study the intensity of postoperative pain was assessed using VRS (Verbal Rating Scale). Data collection was done using the questionnaire, and collected data was analyzed by student t-test, using SPSS software and descriptive statistical program. $P<0.05$ was considered significant.

Results: Average duration of analgesia was five hours about groups I, 3:30 hours for group II and it reported to be 20 hours in group III. In the control group, however, it was only an hour.

Conclusion: Preincisional local infiltration of lidocaine 1.5% is an effective, simple and cost-effective approach for postoperative pain relief among tubectomy patients.

KEY WORDS: Lidocaine, Local infiltration, Analgesia.

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INTRODUCTION

The relief of pain and suffering is, and has always been, one of the primary aims of medicine. Postoperative pain is an unpleasant experience for the patients and it is also associated with a number of physiological responses that are thought to contribute to organ dysfunction and postoperative morbidity. There are different methods for providing analgesia before operation such as giving opioids (intravenously or by intramuscular route) or employing PCA

(Patient Controlled Analgesia), a method that allows the patient to self administer small doses of intravenous opioid at frequent intervals.

Tramadol is another choice, a synthetic analgesic that is a weak opioid receptor agonist. Non Steroidal Anti-Inflammatory Drugs (NSAIDs) are a heterogeneous class of drugs that shows their effect through the inhibition of cyclo-oxygenase (COX), and hence reduce the production of inflammatory prostaglandins. Local anesthetics, epidural analgesia, nerve blocks, and eventually local anesthetic infiltration are other alternatives.[1] It is hypothesized that such "preemptive analgesia" prevents central sensitization and hyperexcitability of neurons ("wind up"). Central sensitization is thought to be dependent on painful stimuli acting on N-methyl-D-aspartic acid (NMDA) receptors located within the central neuraxis.[2] Bilateral tubal ligation is a brief surgical procedure with minimal tissue injury, yet postoperative recovery times and analgesia requirements are often disproportionately large.[3]

The purpose of this study was to investigate the effect of preincisional lidocaine infiltration with different concentrations on postoperative pain relief, since pain can cause complication in many systems, mainly in the respiratory system, and can disturb the patient.

METHODOLOGY

This is a placebo controlled double blind trail performed in Tabriz University of Medical Sciences, Tabriz, IRAN, after obtaining ethics committee approval between the years 2006 and 2007. The study was performed on 80 female ASA I and II patients candidated for tubectomy. The vascular way was opened and a three – way stopcock inserted to the vein. The monitoring of the vital signs was recorded by a non-invasive pressure monitor, ECG and pulse oximeter.

Inclusion criteria consisted of ASA I and II patients who were candidated for elective tubectomy while all the patients who didn't sign consent form and the patients who had a history of allergy to different drugs were excluded. Patients who had a history of alchohol abuse in the previous six months were also excluded. In this study, by taking familial medical history and reviewing patients' own medical history, sensitivity to amide drugs was also investigated. Unique general anesthesia technique, in the study, included administration of sodium thiopental 3-5mg/kg as an induction agent and succinylcholine as an intubating drug 1-1.5mg/kg. For the maintenance of anesthesia, halothane 0.5-2% in combination with oxygen and nitrous oxide (50:50) are recommended.

The patients did not receive any premedication such as analgesics and opioids. The patients were divided into four groups randomly. Three of them received lidocaine with different concentrations and volumes (20cc 0.5%, 10cc 1%, 10cc 1.5%), with the fourth group (the control group) receiving normal saline solution infiltration. After anesthesia induction and establishing surgical anesthesia, a 21 G- 60mm spinal needle was used to infiltrate drug subcutaneously as a fan shaped in all four groups, before making surgical incision to the planned incision site, which could be longitudinally or crossed and not exceeded 5 cm. Infiltration was documented correct if a wheel appeared over the patients' skin. After completing the drug infiltration, patients' skin was prepped, draped and surgical incision is made, of course it is recommended to wait for five minutes for drug absorption before skin incision, as it may lead to some problems for surgical performance. The estimation of the duration of analgesia was the most important point. Pain intensity was also evaluated using VRS (Verbal Rating Scale) which consists of four stages including no pain=0, mild pain=1, moderate pain=2, severe pain=3 and intolerable pain=4, which are postoperatively assessed at 1, 10, 24 hours. The need for rescue analgesic treatment in the first 24 hours was another factor reported in all the patients. The duration of surgery was another parameter documented in this regard. Data collection was done using the questionnaire. The collected data was analyzed by student t-test, using SPSS software and descriptive statistical program. $P<0.05$ was considered significant.

RESULTS

The results of this study revealed that the average weight of the patients was 57.7kg and their average age was 36.4. It was also reported that from all the cases 92.5% were in ASA class I physical status and 7.5% in ASA II. (Fig 1).

The size of incision was 5cm. In 55% of the cases it was crossed and in 45%, it was longitudinal. The duration of surgery was approximately 35 minutes. The pain intensity was assessed by VRS (Verbal Rating Scale), which was significantly less for group III than for group I, II and also the control group (VRS=1). Monitoring data analysis showed that there was no difference between the three groups' systolic and diastolic arterial pressures, heart rates, and peripheral oxygen saturation values, but there was a 10% increase in systolic blood pressure and 15% increase in the heart rate with the control group. From the point of analgesia and its duration, it reported to be five hours in group I, 3:30 hours in group II and more than 20 hours in group III. It is noticeable that patients in group IV experienced a pain free period only for an hour. (Fig 2).

The results also indicated that the incidence of post surgical pain for up to 10 hours after surgery in group III, was significantly lower than that groups I, II and the control group ($P<0.05$). The need for rescue analgesic treatment was one of the other points that had to be investigated. It is noteworthy that in the present study, the number of patients who requested analgesics was significantly higher in group II and the control group than it was in groups I and III ($P<0.05$). The patients in the control group asked for rescue analgesic in the first early hours.

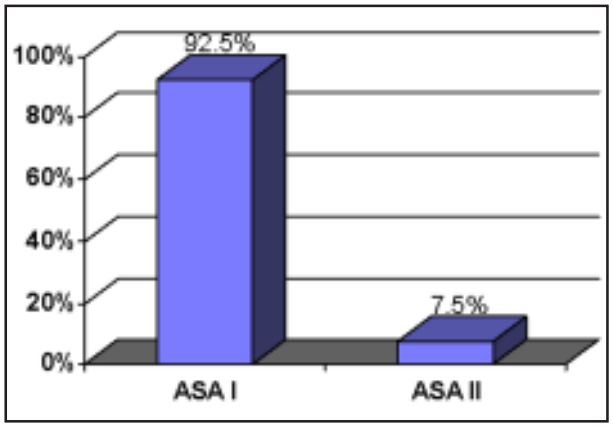

Fig-1: Physical status of the patients in percent.

DISCUSSION

Pre-emptive analgesia is to decrease the postoperative pain by preventing the intense nociceptive bombardment of the central nervous system due to surgery. The intse painful stimuli is not only caused by surgical incisions, but chemical substances and the enzymes released from the injured tissue play a role in this mechanism as well.[4] Many researchers have done studies in this field but almost all of them have used bupivcaine(0.5%), although preincisional infiltration techniques were similar. In a study done by B wittels and et al entitled "Analgesia After Bilateral Tubal Ligation" 0.5% bapivacaine was employed in which significant differences were reported in comparison to the control group.[3] In the present study, the reason for employing lidocaine as a local anesthetic, was its low level of toxicity especially in low doses. Rapid onset and high potency of lidocaine were the other advantages. Besides the factors mentioned above, the overall condition and polices of our operating rooms made researches select lidocaine as a drug of choice and sole local anesthetic.

Estimating the duration of analgesia was the most important goal in this study. According

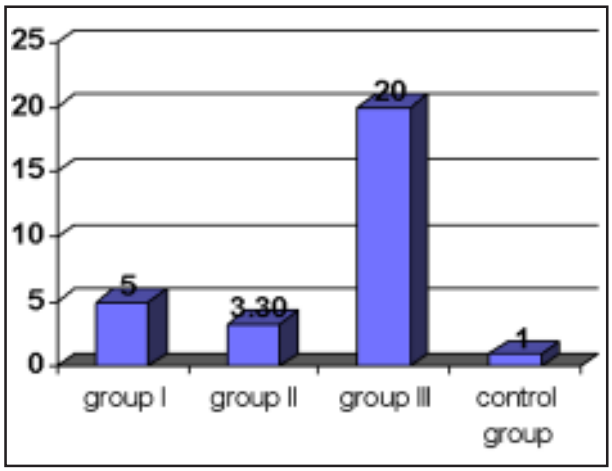

Fig-2: Duration of analgesia in comparison to the control group

to the results obtained, lidocaine 10cc, 1.5% could make patients free of pain for 20 hours in comparison to groups I and II in which the duration of analgesia has been reported to be five hours and 3:30 hours, respectively. In group IV, the patients experienced a pain free period only for an hour. This subject of course has not been studied in previous similar studies in this manner. For evaluating the intensity of postoperative pain in similar studies done by D.Janet pavlin[2], B wittels[3], and N Rawal[5], Visual Analogue Scale (0-10) was employed, but in the present study Verbal Rating Scale is used, which was significantly less for group III (VRS=1) than for groups I, II and also for the control group. These results coordinate with similar studies in which however VAS was 2-5cm. In this study the need for rescue analgesic was significantly higher in group II and the control group than the group I and III patients. In similar studies, because of the use of two or three drugs in combination with local anesthetic, the need for postoperative analgesia was significantly lower in comparison to this study ($P<0.05$)[2,3,5].

An important point that should be considered here is that preincisional infiltration of local anesthetic, even bupivacaine, does not help to decrease the need for postoperative pain analgesic use in patients with acute pain, which may be related with previous central sensitization.[4] In conclusion we have demonstrated that postoperative analgesia in tubectomy surgery with preincisianal infiltration of lidocaine 1.5% was more potent and long-lasting than what could be achieved by lidocaine 0.5% and 1%. It is also concluded that the pain scores and analgesic use in the first 10 and 24 hour after surgery could be reduced, by employing this simple and safe technique. As with many practical procedures performed in the patients, cost effectiveness of a technique has always been an important point. In this study this subject was also considered in comparison to intravenous administration of analgesics and opioids, also employing neuroaxial techniques. So according to the results obtained we recommend routine usage of this safe, feasible and cost effective technique for relieving post tubectomy pain.

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