

Original Research Article


Ketamine and levobupivacaine versus levobupivacaine alone for post operative analgesia and side effects in lower abdominal surgeries in children – A comparative study

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Abstract

Background: Different additive drugs such as opioids, epinephrine, clonidine, and neostigmine have been used along with local anaesthetics to improve the duration and quality of analgesia. Few studies have demonstrated the increase of efficacy in various aspects after combining dexmedetomidine and ropivacaine and dexmedetomidine to caudal bupivacaine in pediatric major abdominal cancer surgeries.

Objectives: The present study was designed to compare the duration of postoperative analgesia and the incidence of any side effects of single-dose caudal levobupivacaine with ketamine versus levobupivacaine alone in childrens undergoing lower abdominal surgeries.

Materials and methods: A total of 50 pediatric patients, 2–4 years of age, were included in the study. They were divided into two groups: group A (n = 25) received levobupivacaine, whereas group B (n = 25) received ketamine with levobupivacaine. Postoperative duration of analgesia and postoperative complications were recorded in all the childrens.

Results: The duration of postoperative analgesia was longer in group B than in group A, which was statistically significant. Few postoperative complications were recorded in group B.

Conclusion: Combination of ketamine with levobupivacaine by caudal epidural administration produced an additive analgesic effect with few side effects when compare to levobupivacaine alone.

Key words

Post-operative analgesia, Ketamine, Levobupivacaine.

Introduction

The caudal epidural block is proved to be a simple and effective anesthetic technique for pediatric surgeries. The main disadvantage of caudal block is short duration of action [1]. Different additive drugs such as opioids, epinephrine, clonidine, and neostigmine have been used along with local anaesthetics to improve the duration and quality of analgesia [2]. Ketamine, an anesthetic agent, has also attracted some interest as an additive to local anesthesia. Ketamine is pharmacologically related to the hallucinogen phencyclidine. It also called as dissociative anaesthetic. Which provide marked analgesia without inducing respiratory depression. Ketamine is classified as an *N*-methyl D-aspartate receptor antagonist. These receptors are located throughout the central nervous system, including the spinal cord [3]. Ketamine has been used for operations on the head and neck, in patients who have bled, in asthmatics (relieves bronchospasm), in those who do not want to lose consciousness and for short operations. It is good for repeated use; particularly suitable for burn dressing. Combined with diazepam, it has found use in angiographies, cardiac catheterization and trauma surgery. Various previous studies have demonstrated the prolongation of spinal analgesia by use of opioids such as fentanyl [4]. Harsoor and Vikram (2008) found that intrathecal fentanyl added to bupivacaine enhances quality of intraoperative analgesia, prolongs the duration of analgesia, without affecting the newborn clinical status [5]. However, no study was done on combination of ketamine and levobupivacaine in comparison with levobupivacaine alone. Therefore, the present study has been designed to compare the duration of postoperative analgesia and the

incidence of any side effects of single-dose caudal with levobupivacaine and ketamine with levobupivacaine alone in childrens undergoing lower abdominal surgeries.

Materials and methods

The study protocol was approved by institutional ethics committee and informed written consent also obtained from the father/ mother/ relatives of study subjects. 50 pediatric patients, of both sexes, aged 2–4 years of ASA I or II scheduled for elective lower abdominal surgeries were selected for the study. They were divided into two groups: group A ($n = 25$) received levobupivacaine alone, whereas group B ($n = 25$) received ketamine with levobupivacaine.

Exclusion criteria included co existing disease such as infection at the site of block, bleeding diathesis, pre-existing neurological or spinal disease, or congenital anomalies such as cardiac or sacral anomalies and known or suspected allergy to local anesthetics. The age less than 2 years or more than 4 years, ASA grad III were also excluded from the study.

Under all aseptic precautions sacral hiatus was identified by palpating sacral cornua and a short length short bevel needle of 23-G was penetrated at 90° until a pop was felt and then angled down to 30° and slightly advanced in the cephalad direction. After negative aspiration for blood and cerebrospinal fluid, the drugs were introduced slowly into the caudal epidural space. Total 50 patients were randomly divided into group A and group B of 25 each. Patients of group A were given 2 – 2.5 ml of 0.5% plain levobupivacaine, whereas patients of group B were given 50 mg ketamine in 2 – 2.5 ml of 0.5% levobupivacaine.

Surgery was started after 15 min from caudal injection of test drugs. Postoperative duration of analgesia, and postoperative complications were recorded in all the children and compared. Complications such as, nausea and vomiting, urinary retention, headache, hypotension, bradycardia and respiratory depression were noted and treated accordingly. The data collected was subjected to statistical analysis using SPSS - 16 version software. Data was analysed by unpaired “t” test. $P < 0.05$ was considered as a statistical significance.

Results

There was no statistical difference was observed in sex, weight, duration of surgery in both the groups (**Table - 1**). The duration of postoperative analgesia was greater in levobupivacaine and ketamine combination when compared to levobupivacaine alone (**Table - 2**). However few side effects were noted in levobupivacaine and ketamine combined group (**Table - 3**).

Table - 1: Demographic data.

Characteristics	levobupivacaine (n=25)	levobupivacaine and ketamine (n= 25)
Sex (M:F)	19:6	20:5
Weight (Kg)	17.83 ± 1.56	18.19 ± 1.44
Duration of surgery (min)	29.60 ± 3.57	25.80 ± 1.54
Type of surgery		
Inguinal hernia	21	22
Undescended testis	4	3

Data was expressed as Mean ± SEM, * $P < 0.05$

Table - 2: Comparison of duration of analgesia (hrs) in two groups.

Characteristics	levobupivacaine (n=25)	levobupivacaine and ketamine (n= 25)
Duration of analgesia (hours)	4.56 ± 5.43	6.92 ± 1.46*

Data was expressed as Mean ± SEM, * $P < 0.05$

Table - 3: Comparison of postoperative complications in two groups.

Variables	levobupivacaine (n=25)	levobupivacaine and ketamine (n= 25)
Nausea and Vomiting	0	1
Urinary retention	0	0
Headache	0	1
Hypotension	0	1
Bradycardia	0	0
Respiratory depression	0	0

Data are presented as number of patients.

Data was expressed as Mean ± SEM, * $P < 0.05$

Discussion

In the present study levobupivacaine was selected in combination with ketamine, because levobupivacaine is a safer alternative to bupivacaine [6]. It has shown less depressant

effects on myocardial and central nervous system in pharmacodynamic studies and also had a superior pharmacokinetic profile when compare to bupivacaine. Reports of toxicity with levobupivacaine are scarce and occasional toxic

symptoms are usually reversible with minimal treatment with no fatal outcome. In the present study we compared the duration of postoperative analgesia and the incidence of side effects of ketamine with levobupivacaine and levobupivacaine alone.

Few contradictory results have been published in relation to ketamine and bupivacaine combination for their analgesic benefit. Previous studies have demonstrated that addition of intrathecal ketamine to spinal bupivacaine had shorter duration of action in patients undergoing transurethral resection of prostate [7]. In another study, the mixture of ketamine 50 mg and 2 – 2.5 ml of 0.5% bupivacaine intrathecally showed quick sensory block and longer duration of analgesia [8]. Recently Anand, et al., (2013) showed that, dexmedetomidine and ropivacaine combination increased post operative analgesia and sedation [9]. Fares and colleagues found that addition of dexmedetomidine to caudal bupivacaine achieved significant postoperative pain relief for up to 19 hours in pediatric major abdominal cancer surgeries [10]. The results of this study showed that the addition of ketamine to local anesthetic levobupivacaine for single-dose caudal analgesia produced longer postoperative analgesia when compared to levobupivacaine alone. However the combination of levobupivacaine and ketamine produced few side effects. The findings of the present study are corroborated with earlier studies.

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