

Comparative Evaluation of Epidural Levobupivacaine and Levobupivacaine with Fentanyl for Pediatric Abdominal Surgeries.

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ABSTRACT

Background: Levobupivacaine has increasingly been used in the clinical anesthesia practice since last few years because of its safer pharmacological profile. Literary evidence has established the safety of levobupivacaine over bupivacaine when used in regional anesthesia as the incidence of various adverse outcomes is higher with the latter as compared to levobupivacaine. **Aim:** Comparative evaluation of Epidural Levobupivacaine and levobupivacaine with fentanyl for pediatric abdominal surgeries. **Methods:** Sample size of 50 patients in pediatric age group between 8 years to 13 years of ASA Grade I coming for abdominal surgeries were included. Patients are randomly selected and allocated into two groups. Group LN [N=25] received 0.25% of levobupivacaine and 0.5ml of normal saline, Group LF [N=25] received 0.25% of levobupivacaine + 1 µg/kg of fentanyl. **Results:** Levobupivacaine with fentanyl group onset of sensory block was 14.2 ± 1.155 . Levobupivacaine with normal saline onset of sensory block was 14.72 ± 1.542 . The onset of motor blockade in 0.25% levobupivacaine with normal saline was mean 19.56 ± 1.71 . At the same time motor blockade of 0.25% levobupivacaine with fentanyl was mean 18.64 ± 1.72 . Level of blockade of both LF and LN groups are comparable but not significant. Duration of Anesthesia for LF was 84.4 ± 17.5 , LN group was 79.6 ± 16.7 . Duration of Analgesia for LF group was 11.2 ± 0.39 and LN group was 10.94 ± 0.37 . **Conclusion:** This study showed that combining lower dose levobupivacaine with fentanyl and sufentanil provides faster onset of sensory block, lower frequency and shorter duration of motor block, and longer analgesia time in TURP under spinal anesthesia.

Keywords: Fentanyl, levobupivacaine, spinal anesthesia.

INTRODUCTION

Spinal anaesthesia is the most commonly used technique for infraumbilical surgeries because of its unmatched reliability, cost effectiveness, effective analgesia, muscle relaxation and prolonged postoperative analgesia.^[1] Recent advances in anesthesia has allowed more surgeries to be performed on day case basis.^[2] The properties of an anaesthetic agent used for day case surgeries in spinal anaesthesia should have decreased incidence of anaesthesia related complications, should provide adequate postoperative analgesia and allow early patient discharge. Levobupivacaine is the pure S (-) enantiomer of racemic bupivacaine and has low cardiotoxicity and less undesired effects on the central nervous system. Because of its significantly low side effects, levobupivacaine seems to be an attractive alternative to bupivacaine.^[3,4] Opioids and local anesthetics administered together intrathecally have a potent synergistic effect, improving the quality of intraoperative and postoperative analgesia.^[5] A combination of these agents allows

for a reduction in the dose of both classes of drugs, lessening the likelihood of side effects attributable to each, which is particularly beneficial for geriatric patients.^[6] Based on 'combination wisdom,' fentanyl was used widely with mini dose bupivacaine in the mid-eighties.

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Aim

Comparative evaluation of Epidural Levobupivacaine and levobupivacaine with fentanyl for pediatric abdominal surgeries.

MATERIALS AND METHODS

Prospective randomized comparative study was conducted in Department of Anesthesiology, Tirunelveli Medical College Hospital. Sample size

of 50 patients in pediatric age group between 8 years to 13 years of ASA Grade I coming for abdominal surgeries were included. Past History of these patients is taken. Parameter such as sex, weight, age and vital statistics like pulse, blood, pressure, respiratory rate, temperature are noted. Spinal cord examination is done for rule out any spinal deformity local infection. Vital systems like cardiovascular, respiratory and central nervous system are examined. Exclusion Criteria: ASA II III & IV grade, Spinal abnormalities and local skin infection. Procedure was explained to the parents or guardians and informed written consent was obtained. Premedicated with injection ketamine 2 mg/kg with injection of glycopyrrolate 0.01mg / kg body weight intramuscularly 30 – 45 min before surgery. 50 patients are randomly selected and allocated into two groups. Group LN [N=25] received 0.25% of levobupivacaine and 0.5ml of normal saline, Group LF [N=25] received 0.25% of levobupivacaine + 1 µg/kg of fentanyl. Baseline measurements of pulse rate, blood pressure and spo2 are recorded. The following vital parameter are monitored Heart rate, spo2, Non-invasive arterial blood pressure. These parameters were recorded every 5 minutes for first 15 minutes, every 15 minutes for next 45 minutes, every 30 minutes for next 2 hours. Sensory block was assessed by pinprick method using a short beveled hypodermic needle. Level of block was assessed by highest dermatomal level of sensory blockade by facial expressions to the bilateral pin prick method. Motor block was assessed by modified bromage scale. Sedation was best assessed by four point scale.

RESULTS

In our study 50 children were selected aged between 8 – 13 years, of ASA I. These children were undergoing various surgical procedures like appendicectomy, Umbilical Hernia, Mesenteric Cyst excision. These 50 children was randomly selected and allocated into two groups. One group that is 25 of children were undergoing surgical procedure using 0.25% of Levobupivacaine with fentanyl called as (LF) group second group was include 25 children using 0.25% levobupivacaine normal saline called as (LN) group. The children body weight ranges from 21.92 ± 3.968 for 0.25% levobupivacaine with fentanyl group. 19.8 ± 4.021 of weight belong to the 0.25% levobupivacaine with normal saline groups. The base line pulse for 0.25% levobupivacaine with fentanyl was 111.8 ± 13.07 . The base line pulse rate for 0.25% levobupivacaine with normal saline was 109.4 ± 12.78 . The initial increase in the pulse rate is dur to the effects of premedication. Premedication was used with injection ketamine 2 mg/kg and injection glycopyrrolate 0.01mg kg. Hemodynamic stability in the epidural anaesthesia was well maintained

small period of hypotension occur in few cases this hypotension was well handled with IV fluids alone. No other children in this study required vasopressor drugs. In our study, Spo2 value increased from 99% to 100%. This was maintained throughout the duration of surgery. This can be best achieved by oxygen to all children through mask. In this study, onset of sensory block was assessed by pin prick sensation, for levobupivacaine with fentanyl group onset of sensory block was 14.2 ± 1.155 . Levobupivacaine with normal saline onset of sensory block was 14.72 ± 1.542 . The onset of motor blockade in 0.25% levobupivacaine with normal saline was mean 19.56 ± 1.71 . At the same time motor blockade of 0.25% levobupivacaine with fentanyl was mean 18.64 ± 1.72 . From these results onset time of motor blockade was earlier with 0.25% levobupivacaine with Fentanyl. [Figure 1] Level of blockade of both LF and LN groups are comparable but not significant. [Table 1] Duration of Anesthesia for LF was 84.4 ± 17.5 , LN group was 79.6 ± 16.7 . There is no statistical significance. [Figure 2] Duration of Analgesia for LF group was 11.2 ± 0.39 and LN group was 10.94 ± 0.37 , there was statistical significant difference was there. [Figure 3] There was statistical significant difference seen in visual analogue scale of both groups. [Figure 4] Compares the systolic blood pressure of groups intraoperatively at different time intervals of 5, 15, 30, 45, 60 minutes and end of surgery and they were not statistically significant ($p>0.05$). Also compares of the diastolic blood pressure of groups intraoperatively at different time intervals of 5, 15, 30, 45, 60 minutes and end of surgery and they were not statistically significant ($p>0.05$). In our study 2 children had nausea and 2 children has rigor in the postoperative period. These are best treated with warm blankets and injection metoclopramide.

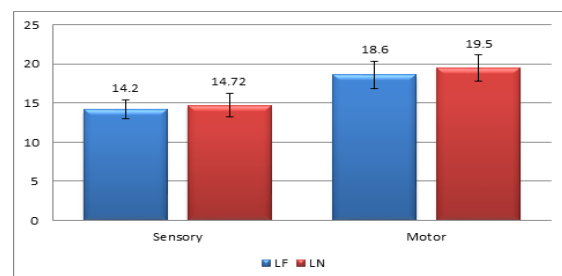


Figure 1: Onset of Sensory and Motor Blockade

Table 1: Level of Blockade

Level	LF	LN
T8	21	21
T6	3	3
T9	0	1
T10	1	0

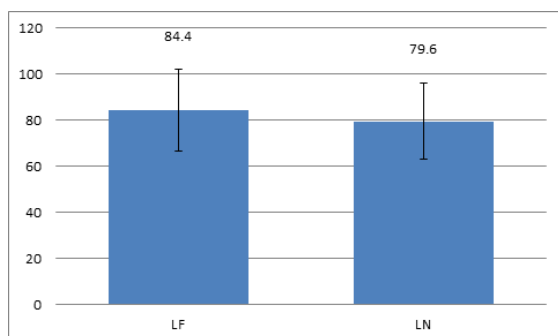


Figure 2: Duration of Anesthesia.

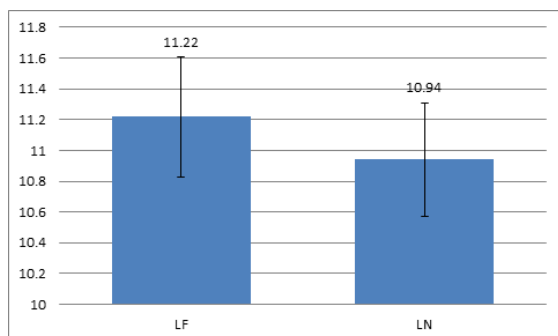


Figure 3: Duration of Analgesia.

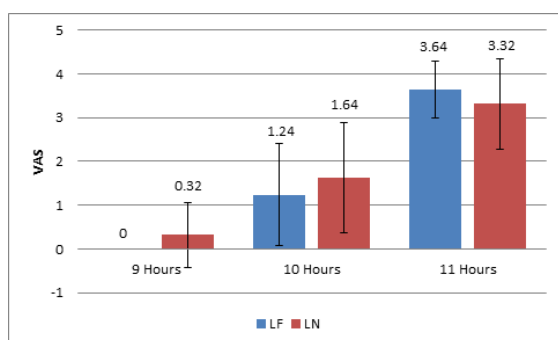


Figure 4: Visual Analogue Scale.

DISCUSSION

Spinal anaesthesia is a commonly used technique for infraumbilical surgeries, as it provides faster and effective onset of sensory and motor block and prolonged postoperative analgesia. Levobupivacaine is a preferred local anaesthetic due to its longer sensory block, lower cardiac and central nervous system toxicity and shorter motor block. It produces localized anesthesia by blocking the transmission of action potential in sensory, motor and sympathetic nerve fibers, by inhibiting the passage of sodium through voltage sensitive ion channels in the neuronal membrane.^[7] The duration of action of levobupivacaine is dose dependent and it was found that 10 mg is the minimum dose for effective sensory and motor block in spinal anesthesia.^[8] Intrathecal opioids as an adjuvant to low dose local anesthetics, produces a synergistic effect by acting directly on the opioid receptors in the spinal cord.^[9] Fentanyl, stimulates both $\mu 1$ and

$\mu 2$ receptors and potentiates the afferent sensory blockade.^[10] Studies reported that addition of 25 μ g fentanyl to LA improves anesthesia quality and prolongs postoperative analgesia without prolonging the time to void.^[11] Inspired by the above findings, we selected 10 mg dose of levobupivacaine and compared it with 10 mg levobupivacaine plus 25 μ g fentanyl given intrathecally for spinal block characteristics. Ozyilkan et al.^[12] compared 2.2 ml of levobupivacaine plain with 10 μ g fentanyl or 2.5 μ g sufentanil as adjuvant in spinal anesthesia for caesarean section. Onset of sensory and motor block was achieved more rapidly in fentanyl and sufentanil group ($P < 0.001$). Duration of sensory and motor block and time for first analgesic requirement was longer in adjuvant groups as compared to plain group ($P < 0.001$). Akan et al.^[13] while using 10 mg plain levobupivacaine and comparing it with 7.5 mg levobupivacaine plus 25 μ g fentanyl and 7.5 mg levobupivacaine plus 2.5 μ g sufentanil in patients undergoing transurethral resection of the prostate under spinal anaesthesia concluded that combining lower doses of levobupivacaine with fentanyl and sufentanil provides faster onset of sensory block, lower frequency and shorter duration of motor block and prolonged analgesia time.

CONCLUSION

Levobupivacaine is the newer ideal safe anesthesia choice for pediatric epidural used in abdominal surgeries. By adding with fentanyl will increase the of onset of motor blockade, sensory blockade and produce prolongation of analgesia. No significant adverse effects were noted.

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