

# Prospective Comparison of INJ Bupivacaine vs INJ Ropivacaine in Ilioinguinal Nerve Blocks for Paediatric Herniotomies

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**Abstract:** The ilioinguinal nerve block is a safe, effective, and easy to perform procedure in order to provide analgesia for a variety of inguinal surgical procedures in pediatric patients. **Aim and Objectives:** To compare 2 mg/kg of 0.5% Inj Bupivacaine and 2 mg/kg of 1% Inj Ropivacaine for Intraoperative and postoperative analgesia by Ilioinguinal nerve blocks in Paediatric Herniotomies. **Materials and Methods:** After obtaining institutional ethical committee approval and informed written consent, 50 ASA grade I and II patients, in the age group of 2-12 years undergoing inguinal herniotomies under general anaesthesia were included. Patients were decided to receive the study drugs-Group A- 2 mg/kg Inj Bupivacaine (0.5%) and Group B- 2 mg/kg Inj Ropivacaine (1%). After placement of LMA, ilioinguinal nerve block was given. Heart rate, SBP, DBP and MAP values were noted at baseline, after administering block, at the time of incision and at the end of surgery. The time for rescue analgesia in the postoperative period was noted. **Result:** No hemodynamic response to the incision was observed in both groups and the values were stable throughout the surgery, in both Bupivacaine and Ropivacaine groups. The average duration of analgesia in both groups was similar. **Conclusion:** 2mg/kg, 1% Inj Ropivacaine provides a reliable intraoperative hemodynamic stability and effective postoperative analgesia similar to 2mg/kg, 0.5% Inj Bupivacaine.

**Keywords:** Paediatric herniotomies, Bupivacaine, Ropivacaine

## 1. Introduction

Inguinal hernia is a common paediatric condition, occurring in approximately 2% of infant males and of slightly reduced incidence in females, and as high as 9-11% in premature infants. Inguinal Herniotomy, the reparative operation, is most commonly performed under general anaesthesia with regional anaesthesia. Regional anaesthesia can be provided via the epidural (usually caudal) or spinal routes, or by blocking peripheral nerves with local anaesthetic agents.

Ilioinguinal block provides excellent analgesia in the intraoperative and postoperative phases. With this technique there is decreased need for routine intravenous opioid analgesia, thus reducing the incidence of problems from these drugs in the postoperative period.

The knowledge in the neuron- physiology and pharmacology of pain in recent years have been spectacular although this knowledge has yet to have a major impact on the treatment of acute pain for the majority of sufferers. Acute post operative pain is a complex sensation which extends beyond simple nociceptor input, the central processing of which is modulated strongly by emotive elements such as fear, anxiety or depression and by previous experience of pain, following most of the surgical operations and its intensity varies according to the nature of the surgery and the residual wound with which the patient is left. For any operation the intensity of pain varies with time and reaches peak about 6-8 hours after the surgery. Post operative pain is commonly treated with drugs which are with undesirable side effects such as nausea, drowsiness, and respiratory depression.

Analgesia with nerve block using local anesthetics is having some evidence for a pre – emptive analgesic effect. Ilioinguinal nerve block provides postoperative analgesia <sup>(1)</sup>

Blockade of the ilioinguinal and iliohypogastric nerves with bupivacaine is a useful procedure that provides postoperative analgesia in paediatric patients undergoing

inguinal surgery<sup>(2)</sup>. Bupivacaine 2 mg/kg has been recommended for this block. Ropivacaine has been previously used in paediatric patients for caudal block<sup>(3-9)</sup>

Thus this present study was conducted to compare 2 mg/kg of 0.5% Inj Bupivacaine and 2 mg/kg of 1% Inj Ropivacaine for Intraoperative and postoperative analgesia by Ilioinguinal nerve blocks in Paediatric Herniotomies.

## 2. Material and Methods

This study was conducted in the department of Anaesthesia, Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi (Meghe) Wardha after taking due permission from ethical committee in the academic session 2014-2015.

It was a randomized, controlled, prospective study including 50 patients in the age group of 2-12 years.

A detailed routine pre-anaesthetic check-up was performed according to the departmental PAC and fitness protocol. Routine laboratory investigations were obtained. Demographic data such as age, sex and weight of the patient were noted. Informed Consent was taken from the parents for the procedure. All patients were kept fasting 6 hours before surgery. When we received the patient on table, NBM status was confirmed from parents and consent checked. After attaching all monitors baseline reading of HR and NIBP were noted.

Pre anesthetic medication (Inj Glycopyrolate 0.004mg/kg, Inj Midazolam 0.05mg/kg, were given followed by preoxygenation with 100% O<sub>2</sub> for 3 minutes. Induction was done with Inj Propofol 2mg/kg body weight. After confirming that the patient can be ventilated through bag and mask, the airway was secured using an appropriate size Laryngeal Mask Airway. Bilateral air entry was checked and LMA secured.

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Patients were maintained on O<sub>2</sub>, N<sub>2</sub>O and Sevoflurane on spontaneous ventilation. Ilioinguinal nerve block was given after placing the LMA. A point 1 cm medial and 1 cm superior to Anterior Superior iliac spine was selected. According to computer generated randomization, patients were decided to receive the study drugs-

Group A- 2 mg/kg Inj Bupivacaine (0.5%)

Group B- 2 mg/kg Inj Ropivacaine (1%)

Standard Monitoring was done intraoperatively. Heart rate, SBP and DBP values were noted at baseline, after administering block, at the time of incision and at the end of surgery. Patients were shifted to ward and observed. The time for rescue analgesia in the postoperative period was noted.

### 3. Results

Both the groups were comparable regarding age, weight and duration of surgery. (Table 1)

The hemodynamic variables were noted at baseline, after the block, at the time of incision and at the end of surgery. It was observed that there was no hemodynamic response to the incision and the parameters remained constant and near the baseline values at all times throughout the surgery, in both Bupivacaine and Ropivacaine groups. (Table 2a, 2b)

The average duration of analgesia was calculated as the time from the administration of block till the time of first rescue analgesia. It was 390.2±35.16 min and 377.0±34.41 min in Group A and Group B respectively, the difference being statistically insignificant.

Nausea was observed in one patient in each group. No patient had vomiting, pruritis, hypotension or flushing in either group.

### 4. Discussion

Paediatric regional anaesthesia has gone through significant development in recent years with advances in safety, pharmacology and block techniques. There is an increased interest in paediatric regional anaesthesia. Ilioinguinal nerve block is a relatively simple technique and provides excellent postoperative analgesia. This long acting regional technique provides good postoperative analgesia with smooth recovery period and therefore facilitates early discharge.

Kokki et al.<sup>(10)</sup>, demonstrated that children undergoing inguinal hernia without ILIH block, suffered from variable degree of pain in the area. Not many studies have been done comparing Bupivacaine and Ropivacaine for Ilioinguinal

nerve blocks. Studies have been carried out comparing these two drugs for caudal anaesthesia in paediatric undergoing infraumbilical surgeries.

In our study, both the groups were homogenous regarding age, weight and duration of surgery. The variation in vital parameters, in the intraoperative period, were also comparable in both the groups and there was no significant effect on hemodynamics in either group.

The duration of analgesia was calculated as the time from the administration of block till the time of first rescue analgesia. In this study, the quality and duration of analgesia did not differ significantly between the two groups. The overall incidence of side effects was low in this study.

In conclusion, 2mg/kg, 1% Inj Ropivacaine provides a reliable intraoperative hemodynamic stability and effective postoperative analgesia similar to 2mg/kg, 0.5% Inj Bupivacaine.

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**Table 1:** Comparison of Demographic data of the two groups

Parameters	Group A	Group B	p-value
Age	5.50 ±2.07	4.7 ±2.14	0.147,NS
Weight	18.40 ±5.12	17.37 ± 5.77	0.466,NS
Duration of surgery	28.00±11.79	26.17 ± 10.31	0.524,NS

**Table 2a:** Comparison of hemodynamic parameters in the two groups

	Systolic Blood Pressure			Diastolic Blood Pressure		
	Group A (Mean±SD)	Group B (Mean±SD)	P value	Group A (Mean±SD)	Group B (Mean±SD)	P value
<b>Baseline</b>	128.20±8.22	127.06±4.91	0.825,NS	78.80±3.98	79.87±6.37	0.741,NS
<b>After block</b>	108.06±6.48	106.53±6.00	0.178,NS	74.00±6.91	74.13±5.28	0.165,NS
<b>At incision</b>	126.53±9.80	127.73±10.44	0.24,NS	82.00±7.20	80.67±7.78	0.42,NS
<b>End of surgery</b>	126.87±7.91	122.27±7.68	0.32,NS	83.07±6.72	78.67±6.59	0.34,NS

**Table 2b:** Comparison of hemodynamic parameters in the two groups

	Heart Rate			Mean Arterial Pressure		
	Group A (Mean±SD)	Group B (Mean±SD)	P value	Group A (Mean±SD)	Group B (Mean±SD)	P value
<b>Baseline</b>	81.00±7.77	80.13±9.29	0.793,NS	91.60±3.33	94.20±4.99	0.089,NS
<b>After block</b>	79.67±6.75	76.20±5.79	0.070,NS	84.87±5.95	84.43±4.92	0.361,NS
<b>At incision</b>	87.13±8.95	82.33±6.56	0.54,NS	96.50±7.62	95.77±7.66	0.76,NS
<b>End of surgery</b>	85.67±7.41	80.53±7.08	0.22,NS	94.13±6.64	92.83±6.48	0.34,NS