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To compare the sensory and motor blockade produced by caudal Bupivacaine and Ropivacaine in pediatric patients

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Abstract---Background & Method: The aim of the study is to compare the sensory and motor blockade produced by caudal Bupivacaine and Ropivacaine in pediatric patients. Patients were randomly allocated to 1 of the 2 groups ($n = 25$) by using a random number table, to receive caudal block with either Inj Bupivacaine (0.25%) 1ml/kg (Group I) or Inj. Ropivacaine (0.25%) 1ml/kg (Group II). Result: The mean age distribution in Group Bupivacaine and Group Ropivacaine were almost the same without any significant difference. Heart rate and systolic arterial pressures measured at specific time intervals showed no significant difference. Conclusion: Present study was designed to compare the effect of bupivacaine versus ropivacaine used in caudal block in pediatric patients, in a prospective randomized controlled study. Mean motor score at different time intervals postoperatively was more for ropivacaine group but Heart rate and systolic arterial pressures measured at specific time intervals were similar.

Keywords---sensory, motor blockade, bupivacaine, ropivacaine & pediatric.

Introduction

Caudal analgesia is a useful adjunct to the general anaesthesia for lower abdominal surgeries in the children as it provides for postoperative analgesia and reduces perioperative narcotic requirement[1]. Unfortunately motor blockade resulting from caudal block may be a cause of distress in post-operative period and may lead to delayed hospital discharge[2].

Caudal block is the most commonly practiced form of regional anaesthesia in children. It is a form of peridural analgesia which was first described by Catheline and Sicard of Paris. The usefulness of the technique was recognized by Stoeckal who used caudal block in obstetrics and by Lawen in surgery.

Paediatric regional anaesthesia has attained wide use internationally because of its efficacy and safety[3]. It is used mostly in conjunction with general anaesthesia. They provide part of anaesthesia and significantly improve patient comfort in the post-operative period[4].

The first report of regional anesthesia in children was made by Bier when he administered cocaine spinal anesthetic in an 11 year old boy. During a brief period, spinal and caudal blocks gained enthusiastic but transient acceptance, the reasons for which were numerous[5]. Regional anesthetic techniques were underused in pediatric patients for three major reasons, fear of adverse effects, lack of experience and lack of patient's cooperation.

Material & Method

This was a prospective study conducted in the Department of Anaesthesiology, SS Medical College, Rewa, M.P. from Sep 2020 to Aug 2021, written informed parental consent was obtained for each subject. We studied 60 patients, ASA physical status I, aged 1–12 yrs, scheduled to undergo elective unilateral inguinal herniotomy and urogenital surgeries as inpatients.

The study design was randomized: patients were randomly allocated to 1 of the 2 groups ($n = 25$) by using a random number table, to receive caudal block with either Inj Bupivacaine (0.25%) 1ml/kg (Group I) or Inj. Ropivacaine (0.25%) 1ml/kg (Group II)

Exclusion criteria

1. Coagulopathy
2. Spinal deformities
3. Infection at injection site

Premedication was done with inj. Glycopyrolate and all procedures were performed under general anaesthesia. Anaesthesia was induced with inj Propofol 2-3mg/kg and oro-tracheal intubation was facilitated with Inj. Suxamethonium Chloride 2mg/kg. Anaesthesia was maintained with 70% nitrous oxide in oxygen and Isoflurane 0.2%–0.4%, with intermittent positive-pressure ventilation.

Results

Table No. 01: Age distribution

Age (years)	Group I (Bupivacaine)	Group II (Ropivacaine)
1-3	09	12
4-6	09	08
7-9	06	03
10-12	06	07
Mean +/- 2SD	5.96 +/- 3.94	5.64 +/- 2.09

The mean age distribution in Group Bupivacaine and Group Ropivacaine were almost the same without any significant difference.

Table No. 02: Sex distribution

Sex	Group I (Bupivacaine)	Group II (Ropivacaine)
Male	28	28
Female	02	02

Both groups have equal ratio of gender, hence avoiding the statistical difference.

Table No. 03: Profile Compare

	Group I (Bupivacaine)		Group II (Ropivacaine)	
	Mean HR	Mean SAP	Mean HR	Mean SAP
Baseline	123.4±19.3	86.2±10	127.4±18.4	88.5±8.4
Before incision	137.3±20.6	94.2±9.8	135.8±19.3	96.3±10.2
After incision	136.3±21	94.7±9.2	135.6±15.8	94.1±7.6
30 min	131.1±16.3	92.3±10.8	131.8±6.9	91.8±6.9
60 min	136.3±13.6	88.4±8.8	134.2 + 12	90.2±12
90 min	120.8±16.5	87.7±9.6	118.7±9.3	89.7±9.3

Heart rate and systolic arterial pressures measured at specific time intervals showed no significant difference.

Discussion

Da Conceicao et al[5] also studied the effect of bupivacaine and ropivacaine on heart rate and blood pressure after caudal block. The heart rate and arterial pressure were measured every 5 min after administration of local anesthetic until discharge from the recovery room. There were no differences in heart rate or arterial pressure between the two groups. These findings are comparable with our study findings[6].

Various studies have stated the prolonged motor blockade associated with bupivacaine in comparison with ropivacaine[7]. Locatelli B et al³⁰ performed a randomized, double-blind, phase III, controlled trial comparing levobupivacaine 0.25%, ropivacaine 0.25% and bupivacaine 0.25% by the caudal route in

children. Bupivacaine produced a significant incidence of residual motor block compared with levobupivacaine or ropivacaine at wake-up ($P < 0.01$) [8].

Similarly Da Conceicao et al[5] studied 60 children, randomly allocated in a double-blind manner, to receive one of two local anaesthetics: 0.375% ropivacaine 1.0 ml kg⁻¹ or 0.375% bupivacaine 1.0 ml kg⁻¹. The extent of motor block in the recovery room was scored as 1-3. The degree of motor block was significantly different between the two groups[9]. The ropivacaine group showed a shorter duration of motor block than the bupivacaine group ($P < 0.05$). These findings were comparable with our study findings.

Conclusion

Present study was designed to compare the effect of bupivacaine versus ropivacaine used in caudal block in pediatric patients, in a prospective randomized controlled study. Mean motor score at different time intervals postoperatively was more for ropivacaine group but Heart rate and systolic arterial pressures measured at specific time intervals were similar.

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