



AN OBSERVATIONAL STUDY OF CAUDAL BLOCK VS ILIOINGUINAL /ILIOHYPOGASTRIC BLOCK IN INTRAOPERATIVE AND POSTOPERATIVE ANALGESIA FOR INGUINAL SURGICAL PROCEDURES IN PAEDIATRIC PATIENTS

Sanyogita Naik	Professor, BJMC, Pune.
Sarita Thanekar*	Assistant Professor, GMC Miraj Diamond collection, Herwadkar plaza, near hotel Mazali, Bhaurao chaur, Miraj, district Sangli. 416410, Maharashtra. *Corresponding Author
Hemanth Kumar C	Senior Resident, GMC Miraj Veerabhadreshwara Nilaya, opposite basveshwara temple, Ganigarapalya, Bangalore-62.
Vidya Kelkar	Professor GMC Miraj.

ABSTRACT Inguinal surgeries are most commonly performed in paediatric age group. Surgical pain is better controlled by regional anaesthetic technique compared to IV opioids. Caudal block and ilioinguinal / iliohypogastric block are the oldest and still most commonly used techniques of regional anaesthesia in children. Both caudal and ilioinguinal / iliohypogastric blocks have been used to provide effective intra operative and post operative analgesia in combination with opioids to increase duration of analgesia. Both are comparable in terms of quality, duration of analgesia and clinical efficacy with some residual motor block with caudal block.

KEYWORDS : Caudal block, ilioinguinal/iliohypogastric block, post operative analgesia

INTRODUCTION

Inguinal surgeries are most commonly performed in paediatric age group. Paediatric patients perceive operative pain to same degree as adult. So it is mandatory to control both intra operative and post operative pain in pediatric patients. Pain is better controlled by regional anaesthetic technique compared to IV opioids. Caudal block and ilioinguinal / iliohypogastric block are the oldest and still most commonly used techniques of regional anaesthesia in children [1]. Caudal epidural block may be used as the sole anaesthetic technique in children undergoing lower abdominal surgeries. Ilioinguinal / iliohypogastric nerve block is the most common technique used in unilateral inguinal hernia repair. Both techniques have been used to provide effective intra operative and post operative analgesia. Local anaesthetics may be used alone or in combination with opioids to increase duration of analgesia. This study was designed to compare the clinical efficacy, duration, quality of analgesia and to see any complications of caudal block in comparison with ilioinguinal / iliohypogastric block.

AIMS AND OBJECTIVES

To Study clinical efficacy, duration of analgesia, quality of analgesia of caudal block and ilioinguinal/iliohypogastric block by using 0.25% bupivacaine in combination with fentanyl 1mcg/kg as an adjuvant.

MATERIALS AND METHODS

After obtaining approval from institutional ethics committee, all the patients parents/guardian were fully explained about the study procedure. Then written informed consent was obtained from patients parents or guardian. Childrens (6 months - 5yrs) were randomly allocated into two groups of 30 each.

GROUP C : 30 children receiving caudal block

GROUP I : 30 children receiving ilioinguinal/iliohypogastric block

Children of age 6 months-5yrs, ASA Grade I and II undergoing pediatric inguinal surgeries like herniotomy, orchidopexy, hydrocele were included. ASA grade III & IV, Emergency cases, those with documented allergies to local anaesthetics, any abnormalities of spine or infection at the caudal region, block failure patients, any coagulation abnormalities were excluded from study.

A detailed history and pre anaesthetic evaluation was done on the previous day of the surgery with help of the child's parent. Routine investigations like haemoglobin, blood grouping, serum electrolytes, blood sugar was noted. Written informed consent was taken prior to scheduled operation from the patient's parents/ guardian. Children were divided into two groups

GROUP C - Child who receive caudal block using 0.25% bupivacaine

(1ml/kg) with fentanyl 1 microgram per kg

GROUP I - Child who receive ilioinguinal/iliohypogastric block using Bupivacaine 0.25% (1ml/kg) with fentanyl 1 microgram per kg

The surgical field for inguinal herniotomy is supplied by ilioinguinal and iliohypogastric nerves, arising from 1st lumbar root, as well as by the lower intercostals nerves, arising from T11 and T12. Caudal block is provided by placing local anaesthetic agents into epidural space via caudal route. It then diffuses across the dura to anaesthetize the ventral rami, which supply sensory and motor nerves. Ilioinguinal block is achieved by injecting local anaesthetic between the external oblique and internal oblique and transverses abdominus. These injections cover the ilioinguinal, iliohypogastric and lower intercoastal nerves, anaesthetizing the operating field, including the inguinal sac. Local anaesthetics used in the technique was bupivacaine 0.25%, 1ml per kg in combination with fentanyl 1 microgram per kg as an adjuvant. Patients were kept nil orally for 6 hrs before the surgery. Patients were shifted to the operation theatre. Pulse oximeter, non invasive blood pressure and electrocardiography monitors were connected. Baseline parameters like heart rate, non invasive blood pressure, respiratory rate and ECG were recorded. A peripheral intravenous line was secured with 22 gauge intravenous cannula and Lactated ringer's solution started as maintenance fluid. The patients were premedicated with Inj Ranitidine (1mg/kg), Inj Ondansatrom (0.1mg/kg), Inj Midazolam (0.02mg/kg), Inj Glycopyrrolate (4mcg/kg). Inj ketamine was given as analgesic dose of around 1mg/kg, patients were maintained on spontaneous ventilation with minimal percentage of sevoflurane and nitrous oxide with oxygen on JR circuit. Under all aseptic precaution caudal block and ilioinguinal / iliohypogastric block was given in corresponding group C and group I.

Intraoperatively patients were monitored and parameters were noted like onset of analgesia, duration of analgesia, vital parameters heart rate, non invasive blood pressure, SpO2 recorded, residual motor block evaluated by Modified Bromage scale. Duration of surgery recorded. Post operative vital parameters were monitored and pain was evaluated using the CHIPPS with numeric scale from 0 to 10 points and if the score is ≥ 4 as rescue analgesia a rectal suppository of paracetamol 10-15mg/kg was administered.

Any adverse events like arrhythmias, hypotension, convulsions etc, from the time of pre medication to patient discharge was recorded, also patients were observed for complications of caudal like accidental dural puncture, intravascular injection, infection and epidural abscess formation, epidural haematoma, complications of ilioinguinal/iliohypogastric block like infection and abscess formation, mechanical nerve damage also observed.

Results were statistically analyzed and Data was entered in MS-Excel

and analyzed in SPSS V22. Descriptive statistics were represented with percentages, Mean with SD. Chi-square test, Independent t-test were applied to find significance. $P < 0.05$ was considered as statistically significant.

OBSERVATIONS AND RESULTS

Both the groups were compared with respect to age, gender, weight, ASA physical status, haemodynamic variables like heart rate, systolic, diastolic and mean blood pressure, onset of analgesia, duration of analgesia, duration of surgery and residual motor blockade.

There was no statistical significance with respect to Age, Gender, Weight, ASA physical status between two groups.

Table 1: Showing mean analgesia onset time, mean duration of surgery, mean duration of analgesia

VARIABLE	GROUP - C					GROUP - I					P-VALUE
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD	
Analgesia Onset (min)	30	9.0	12.0	10.2	1.0	30	9.0	12.0	10.4	1.3	0.439
Surgery Duration (min)	30	36.0	48.0	42.1	3.1	30	36.0	46.0	41.8	2.8	0.663
Duration of Analgesia (min)	30	350	480.0	390.1	34.4	30	340	470	384.1	34.0	0.500

In Group C and Group I, Mean time for onset of analgesia was 10.2 & 10.4, mean duration of surgery 42.1 & 41.8, mean duration of analgesia was 390.1 & 384.1 respectively. Onset of analgesia, mean duration of surgery and mean duration of analgesia was compared statistically. P value was found 0.43, 0.66 and 0.5 respectively. which was statistically insignificant. Heart rate and Mean blood pressure was stable intraoperatively and postoperatively and was comparable between two groups and there was no any statistically significant difference between two groups with P value > 0.05 .

Residual motor blockade (RMB) was compared between two groups and found significant with P value < 0.001 at wake time and statistically insignificant at 180 min with P value 0.1. There was no statistical difference in CHIPPS score among both groups. No complications were noted in both groups intraoperatively and postoperatively.

DISCUSSION

Pain is an unpleasant sensory or emotional experience. Good pain control decreases mortality and morbidity in paediatric patients (2). Use of opioids and NSAIDs may cause vomiting, aspiration, respiratory depression in children. Caudal block and ilioinguinal / iliohypogastric block is a good option for both intra & postoperative analgesia and provide analgesia approximately 4-6 hours, and advantageous as they allow avoidance of systemic narcotics and resumption of early feeding and mobilisation in paediatric patients. Local anaesthetics may be used alone or in combination with opioids to increase duration of analgesia (3).

For Caudal block patient should be placed in lateral position and posterior superior iliac spines, sacral cornua and sacral hiatus identified. 1.5 inch 23 gauge needle inserted at 45 degree angle over hiatus, pop up felts when it enter in epidural space, after negative aspiration and in absence of skin bulge caudal block should be given. Armitage formula used to decide level of block with 0.25% Bupivacaine up to a maximum of 20ml.

0.5ml/kg for a lumbosacral block.
1ml/kg for a thoracolumbar block.
1.25ml/kg for a midthoracic block.

complications are absent or patchy block, dural puncture, accidental iv injection, motor weakness, urinary retention, intra osseous injection and excessive spread.

The iliohypogastric nerve supplies the skin over the inguinal region. The ilioinguinal nerve supply the skin on the superomedial aspect of the thigh, the ventral rami of the lower intercostal nerves (T11 and T12) also supply sensation to the inferior abdominal wall and all these

nerves should be blocked for procedures of lower abdomen. The anterior superior iliac spine is palpated and a mark made 2 cm medial and 2 cm superior from it. A loss of resistance is appreciated first between external oblique and internal oblique and then between internal oblique and transversus abdominus muscle, 2ml local anaesthetic agent injected after each loss of resistance, procedure repeated by redirecting needle at 45 degree medially and laterally thus total 12 ml of local anaesthetic agent injected.

Bupivacaine is highly lipid soluble and more potent local anaesthetic agent which acts on cell membrane of axon and intrifers with propagation of impulse. Fentanyl is more potent than commonly used opioids. large safety margin, relatively short duration of action, and minimal respiratory depression at analgesic doses observed for fentanyl soon made it the drug of choice for anesthesia.

Markham S J et al (4) in 1986 compared analgesic effect of ilio-inguinal block versus caudal block in childrens undergoing lower abdominal surgeries. Analgesia was assessed both during and after surgery. Both the blocks had comparable analgesic effect. Robert A Paul (2013)(5) in his review article described about the technique and efficacy of both the block in paediatric surgery. He describes that both caudal and ilioinguinal block are effective ,safe techniques for inguinal herniotomy and there is no need of routine iv opiod analgesia and efficacy is comparable in both the groups.

Tarlika P et al (2013)(6) compared the effectiveness of Inj. Ropivacaine (0.25%) or Inj. Bupivacaine (0.25%) with fentanyl in caudal block for intra and postoperative analgesia. They monitored vitals and requirement of inhalational gases intraoperatively and also observed pain by pain score (Visual Analogue Score and Objective Pain Scale) and vitals postoperatively .They found out that addition of fentanyl prolonged duration of analgesia in both the groups.

Heart rate and mean areterial blood pressure was stable intra and post operatively and these findings were similar to study conducted by Abualhassan A Abdellatif et al(7) and concluded that ultrasound-guided ilioinguinal/iliohypogastric nerve blocks is an ideal postoperative analgesic for unilateral groin surgery in children and is as effective as caudal block.

In our study there was significant residual motor blockade in group C at wakeup time and not at 180 min. Harsha Shanthanna et al(8) showed systemic review and metaanalysis of studies published 1946 – 2013 stating that caudal block has the significant risk of motor block and urinary retention.

Our study findings were similar to above mentioned studies.

LIMITATION OF STUDY

This study did not include placebo group.

CONCLUSION

Caudal and ilioinguinal/iliohypogastric blocks are safe and effective for intraoperative and post postoperative analgesia and comparable in terms of onset of analgesia, duration of analgesia, haemodynamic parameters. Although residual motor block at wakeup time is more with caudal block than ilioinguinal/iliohypogastric block.

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