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Original Research Paper

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COMPARATIVE CLINICAL STUDY OF CAUDAL EPIDURAL BLOCK WITH ROPIVACAINE PLAIN AND ROPIVACAINE WITHCLONIDINE FOR BELOW UMBLICAL SURGERIES IN PAEDIATRIC PATIENTS

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ABSTRACT

Introduction: Caudal epidural block is one of most popular & commonly performed regional blocks in pediatric population undergoing short surgical procedures below umbilicus. Adding adjuvant to local anaesthetics for caudal block enhance duration and quality of analgesia as well as decrease post operative analgesia.

Aims And Objectives: purpose of this study is to compare the effect of plain ropivaicaine and ropivaicaine with clonidine in caudal block with respect to duration and quality of anesthesia.

Methods: Eighty ASA physical status I-II patients of age group between 6 to 12 years with Below umbilical surgery under caudal epidural block were randomly allocated into two equal groups in a randomized double blind fashion. .Group R received Ropivacaine 0.2% 1ml/kg while group RC received Ropivacaine 0.2% 1ml/kg with Clonidine 1μg/kg. duration of intraoperative and post operative analgesia, quality of anaesthesia were assessed.

Results: The quality of relaxation and duration of analgesia was significantly less in group R as compared to group RC ($P < 0.05$). but there was no statistically significant difference between both the groups with respect to the heart rate, mean arterial pressure, type of surgeries, level of caudal of block.

Conclusions: Addition of Clonidine with Ropivaicaine in caudal block increase the duration of analgesia as well as quality of relaxation without any significant adverse effects.

KEYWORDS :

INTRODUCTION:

Post operative pain relief in a child is a main concern to the anaesthesiologist as patient of this age group cannot express this leads failure to recognize so ultimately failure to treat pain.

Caudal epidural block is one of most popular & commonly performed regional blocks in pediatric anaesthesia(1).It is a safe & reliable technique that can be used for intraoperative & postoperative analgesia in patients undergoing short surgical procedures below umbilicus(2). Regional anaesthetic techniques are quiet useful as requirement of both inhaled & intravenous anesthetic agents are very less during operation & also more rapid return of the consciousness as well as providing effective post operative pain relief with minimal sedation.

Various long acting local anaesthetics have been used for pediatric caudal block with various advantages ,disadvantages & adverse effects. Ropivacaine has been extensively used for regional anaesthesia in children .The lower incidence of cardiovascular side effects & neurotoxicity as well as ability to produce lesser motor blockade has made ropivacaine a safer choice for caudal anaesthesia**(3)**. Main disadvantage of single shot caudal block is its shorter duration of action even with long acting local anaesthetic agents such as Bupivacaine & Ropivacaine, this leads to early appreciation of pain by the child postoperatively,Therefore the anaesthesiologist should provide good analgesia, to avoid epidural catheter placement & yet prolong the duration & improve the quality of intraoperative & postoperative analgesia of local anaesthetics. Various drugs like Opioids(4,5 6)Midazolam(7) Ketamine(8) Neostigmine(9) Clonidine(10) etc. have been used as adjuvants with various results .Clonidine an alpha 2 adrenergic agonist is known to produce analgesia of variable intensity & duration, which is dose dependent It has been used as an adjuvant with different dosages from 1μg/kg to 3mcg/kg in pediatric caudal block .Clonidine is used as an adjuvant with local anaesthetics like Lignocaine ,Bupivacaine & Ropivacaine in caudal block to improve the intraoperative & postoperative analgesia & to reduce the dose local anaesthetics, thereby reducing the toxicity

MATERIALS AND METHODS:

After obtaining institutional ethical committee approval and informed consent the study was conducted on 80 peadiatric patients of ASA physical grade 1 and 2of either sex between 6-12 years of age. All the patients were randomly divided into 2 equal groups:

Group R(n=40) received Ropivacaine 0.2% 1ml/kg while group RC(n=40) received Ropivacaine 0.2% 1ml/kg with Clonidine 1μg/kg.

Exclusion criteria:

Parents Refusal, history of local infection at caudal region, history of bleeding diathesis, neurological disease or spinal disease, congenital anomalies of sacrum and vertebral column.

METHODS:

After doing preanaesthetic checkup All chidren were kept fasting for 6 hours, they were received inside the pre operative room 30 minutes before surgery, then a peripheral venous access is secured through I.V. Cannula. Patient were premedicated with IV Midazolam 0.1mg/kg, IV Glycopyrrolate 0.01mg/kg, IV Ondansetron0.1mg/kg, .Multi Channel Monitors will be attached to the patient for the pulse rate, NIBP and ECG and SPO2 ,Respiratory rate and these findings are recorded. Then intravenous Ketamine (1 mg/kg) will be given following which oxygenation will be done via face mask & maintain the patient on spontaneous respiration, then patient were positioned in left lateral position with hip & knee flexed. Under strict aseptic precautions, after painting & drapping, a 25G long sheft hypodermic needle was inserted in sacral hiatus at 45^0 to the skin. Once the sacrococcygeal membrane was penetrated and loss of resistance obtained, the angle was changed to nearly $15\text{-}20^0$ and needle was directed up to the canal for further 2-3 mm. A Whoose test has been described for identifying correct needle placement in the caudal canal. This characteristic sound has been noted during auscultation of the thoraco-lumbarcaudal region during the injection of 2-3 ml of air into the caudal epidural space. The injection was made after gentle aspiration to rule out any intrathecal or intravascular placement.

Group R receieved 0.2% 1ml/kg of Ropivaicane alone.

Group RC receieved 0.2% 1ml/kg of Ropivaicane & Clonidine 1μg/kg.The patient will be immediately turned to supine position. The pin prick method was used to assess the level of sensory anesthesia and the 15% variation in the heart rate was chosen as the response variable to confirm the dermatomal level. The surgical incision was made 15 minutes after administrating the caudal block. Meanwhile children were surgically prepared & drapped. Adequate caudal block was defined as hemodynamic stability as indicated by absence of increase in heart rate & systolic blood pressure of more than 15% compared with baseline values obtained just before surgical incision. if the systolic blood pressure & rate incrased by more than 15% of baseline, analgesia was considered inadequate & rescue opioid was given, these patients were excluded from study. Intra-operative fluid management was taken care by using Holiday Segar formula, in form of Isolyte p.

Duration of analgesia were measured time from caudal administration of drug to FLACC score >3.

Hemodynamic parameters like Heart rate (HR), Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP), Respiratory rate (RR), SpO2 were monitored preoperatively and intraoperatively at 0 (immediately after block), 5, 15, 30, 45, 60, 90 minutes, respectively.

The Pain score was assessed postoperatively by Face, Legs, Activity, Cry, Consolability (FLACC) scale and was noted at 1, 2, 3, 4, 8, 12, 24 hrs postoperatively respectively

Table 1 FLACC SCALE

Criteria	Score 0	Score 1	Score 2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, uninterested	Frequent to constant quivering chin, clenched jaw.
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
`Activity	Lying quietly, normal position, moves easily	Squirming, shifting, back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers occasional complaint	Crying steadily, scream or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

0:, No Pain
1-3: Mild Pain
4-7: Moderate Pain
8-10:Severe Pain

All patients were monitored during the surgery and post operative period till complete recovery, employing Multi parameter monitors.

Statistical Analysis:
Independent sample 't' test (to measure difference between two groups) and chi square test (for relationship between categorical variables) were employed. P <0.001 was considered highly significant and p < 0.05 was considered as just significant.

RESULTS:

Table 2: Demographic data of the study subjects

Patient characteristics	Group R	Group RC	P value
Age(yrs)	8.23±1.901	7.95±1.768	0.505
Weight(kg)	17.55±3.266	16.93±2.795	0.361
Level of caudal block(T8/T9/T10)	4/15/21	4/17/19	0.893

Table 2 shows the demographic data of the patients. There was no statistically significant difference between the two groups with respect to age, weight, level of caudal block and type of surgeries.

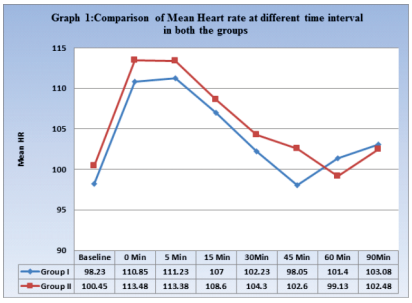
QUALITY OF RELAXATION WAS ASSESSED AS:

1. Excellent: if no response to surgical stimulus.
2. Good: if patient showing sad facial expressions & moving upper half of body, but is allowing surgery without pain/cry; & requires supplemental Inj. midazolam for sleep.
3. Poor: Not allowing surgery at all & requires supplemental dose of Inj. ketamine and midazolam for anaesthesia.

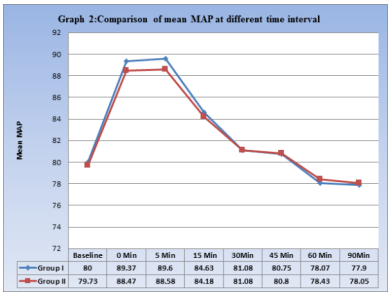
Table 3- quality of relaxation and duration of analgesia in both the groups

	Group R	Group RC	P value
Duration of analgesia(min.)	250 ±4.662	600.25 ±57.13	0.001(highly significant)
Quality of relaxation (excellent/good/poor)	18/21/1	30/10/0	0.019

Table 3 shows the quality of relaxation and duration of analgesia in both the groups. duration of analgesia as well as quality of relaxation was significantly higher in group RC then group R.



Graph 1 shows comparison of mean heart rate at different time intervals in both the groups, there was no statistically significant difference with respect to mean heart rate at different time intervals in both the groups.



Graph 2 shows comparison of mean arterial pressure at different time intervals in both the groups. There was no stastically significant difference with respect to MAP in both the groups.

DISCUSSION:

Caudal epidural block is extensively & widely used regional block in pediatric population. This technique may be used with inhalational anaesthetics as general anaesthesia or can

be used with intravenous anaesthetics such as inj. ketamine prior to induction for various short surgical procedures. The Advantage of this technique is fast onset, smooth recovery & effective intraoperative as well as postoperative analgesia, whereas the disadvantage of this single shot epidural block is short duration of action when using only local anaesthetic ,to overcome this disadvantage various adjuvants have been used. In our study caudal epidural block was given using Ropivacaine alone & Ropivacaine with clonidne combination, we conducted this study in 80 children of age group 6 to 12 years of ASA grade I and II for below umbilical short surgeries. In present study, after premedication iv ketamine 1mg/kg was used & caudal block was performed & spontaneous ventilation was maintained via face mask. Children requiring supplemental analgesic or sedation were excluded from study, we have choosen 0.2% Ropivacaine 1ml/kg which provide better quality of analgesia & Clonidine 1mcg/kg which prolong the duration of analgesia without much adverse effects like excessive sedation, bradycardia, hypotension associated with higher doses of Clonidine). we have used FLACC (face, legs, activity ,cry & consolability) to measure postoperative pain & discomfort in young children . If score >3 than patient need rescue analgesia. There was no incidence of pain score >3 in both the groups At the end of 3rd & 4th hours, pain score was significantly high in group R **2.20+ 0.70 & 2.42 + 0.705** respectively while in group RC it was **1.85+ 0.504 & 2.10 + 0.405**. respectively **(p<0.05).** Similarly at the end of 8th& 12th hours the difference was very much significant i.e. mean pain score was much increased in group R that was **4.13+ 0.516 & 4.60 + 0.744** respectively than in group RC it was **2.15+ 0.580** & **3.83+ 0.594 respectively(p value <0.001).** While in remaining time interval difference was not statistically significant between both the groups **p=0.068.**

The findings of our study were in concurrence with the studies done by Manickam et al with respect to duration of analgesia(11).

CONCLUSION:

To conclude, the combination of 0.2% Ropivaicane 1ml/kg with Clonidine 1μg/kg given caudally is found better as it provides better quality of relaxation, postoperative analgesia without any significant hemodynamic effects with lesser side effects in pediatric patients undergoing below umbilical surgeries.

Ethical Clearance: No deviation from standard care of treatment.

Conflict of Interest:None.
Source of Support: Nil.

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