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A Comparison of Analgesic Effects of Clonidine with Ropivacaine and Dexmedetomidine with Ropivacaine for Caudal Analgesia in Children Undergoing Lower Abdominal Surgeries

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Abstract
Introduction: *Pain is an unpleasant subjective sensation which can only be experienced and not expressed, especially in children. The concept of postoperative pain relief and its utilization in the pediatric age group has improved dramatically over the recent years.*
Materials and Methods: *The study was approved by institutional ethics committee and 60 patients with 30 in each group were included in this study. 60 patients were divided into two groups alternatively.*
Group C *(n=30): Patientswill receive 1ml/kg of 0.2% ropivacaine and 1µg/kg of clonidine (making a volume of 0.5ml with addition of 0.9% saline using a tuberculin syringe).*
Group D *(n=30): Patients will receive 1ml/kg of 0.2% ropivacaine and 1µg/kg of dexmedetomidine (making a volume of 0.5ml with addition of 0.9% saline using a tuberculin syringe).*
Results: *Present clinical study consists of 60 patients, aged between 1to 8 years, who are randomly chosen and divided into two groups alternatively into Group C and Group D which received the respective study solutions. Present clinical study was conducted on ASA Grade I and II pediatric patients who were undergoing infraumbilical (herniotomy, circumcision, high ligation of sac and rectal polypectomy) surgical procedures, at Kamineni Institute of Medical Sciences, Narketpally, Nalgonda district, Telangana.*
Conclusion: *Dexmedetomidine 1µg/kg and Clonidine 1µg/kg appear to be satisfactory adjuncts to ropivacaine, which produced satisfactory intraoperative analgesia and also satisfactory postoperative analgesia. Dexmedetomidine 1µg/kg as an adjunct to 0.2% ropivacaine produced statistically significantprolonged duration of postoperative analgesia when compared to Clonidine 1µg/kg as an adjunct to0.2% ropivacaine. In both thegroups intraoperative parameters i.e heart rate, mean arterial pressure and oxygen saturation was maintained throughout the surgery and did not differ significantly from the preoperative baseline values. Also there was no significant difference in themean heart rates, mean arterial pressure and oxygen saturation between the two groups. There was no significant difference between the mean sedation scores. There were no significant complications in the postoperative period in both the groups.*
Key Words: *Dexmedetomidine, Clonidine, ropivacaine, intraoperative analgesia, postoperative analgesia*

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I. Introduction

Pain is an unpleasant subjective sensation which can only be experienced and not expressed, especially in children. The concept of postoperative pain relief and its utilization in the pediatric age group has improved dramatically over the recent years.

The various methods of providing pain relief have some side effects which prohibit their use in children for example narcotics in children, because of their respiratory depression, the other analgesics which cannot be given for sometime after general anesthesia due to the fear of vomiting and aspiration, the objection to the needles in the case of parenterally administered analgesics.

The regional anesthetic techniques significantly decrease postoperative pain and systemic analgesic requirements. Caudal route was chosen for this study as it is one of the simplest and safest techniques in pediatric surgery with a high success rate. Epidural space in children favors rapid longitudinal spread of drugs and makes it effective in treating postoperative pain.

Caudal block is usually placed after the induction of general anesthesia and is used as an adjunct to intraoperative anesthesia as well as postoperative analgesia in children undergoing surgical procedures below the level of the umbilicus[(1)]. Caudal analgesia can reduce the amount of inhaled and IV anesthetic administration, attenuates the stress response to surgery, facilitates a rapid, smooth recovery, and provides good immediate postoperative analgesia[(1)]. In order to decrease intra operative and postoperative analgesic

requirements after single shot caudal epidural blockade, various additives such as morphine, fentanyl, clonidine and ketamine with local anaesthetics have been investigated[(2)].

Ropivacaine, a long-acting amide local anaesthetic related structurally to bupivacaine, has been used for paediatric caudal anaesthesia. It provides pain relief with less motor blockade. Ropivacaine is less cardiotoxicthan bupivacaine, hence ropivacaine may be a more suitable agent for caudal epidural analgesia especially in day care surgery[(3)].

Dexmedetomidine and Clonidine are alpha$_2$ agonists. Major advantage of dexmedetomidine is that it has an eight-fold greater affinity for alpha$_2$ adrenergic receptors than clonidine and much less alpha$_1$ effects. A major advantage of dexmedetomidine is its higher selectivity compared with clonidine for α_{2A} receptors which is responsible for the hypnotic and analgesic effects[(4)].

The aim of this study is to compare the analgesic effects of Dexmedetomidine and Clonidine when added to ropivacaine for caudal analgesia in children undergoing lower abdominal surgeries.

II. Materials And Methods

Study design:

Prospective comparative study.

Population:

The study was approved by institutional ethics committee and 60 patients with 30 in each group were included in this study.

Place of study:

Kamineni Institute of Medical Sciences, Narketpally, Nalgonda dist.

Study period:

October 2015 to September 2017

Inclusion Criteria:

1. Patients of age group 1 year to 8 years of both gender undergoing infra umbilical surgeries.
2. ASA Grade I and II.
3. Parent consent.
4. Duration of surgery less than 1 hour**.**

Exclusion criteria:

1**.** History of delayed development
2. Patients with coagulopathy.
3. Signs of infection at the site of caudal block
4. Skeletal deformities in the caudal region
5. Parents refusal
6. ASA Grade III and above.

Sample size:

60 patients were divided into two groups alternatively.

Group C (n=30): Patientswill receive 1ml/kg of 0.2% ropivacaine and 1µg/kg of clonidine (making a volume of 0.5ml with addition of 0.9% saline using a tuberculin syringe).

Group D (n=30): Patients will receive 1ml/kg of 0.2% ropivacaine and 1µg/kg of dexmedetomidine (making a volume of 0.5ml with addition of 0.9% saline using a tuberculin syringe).

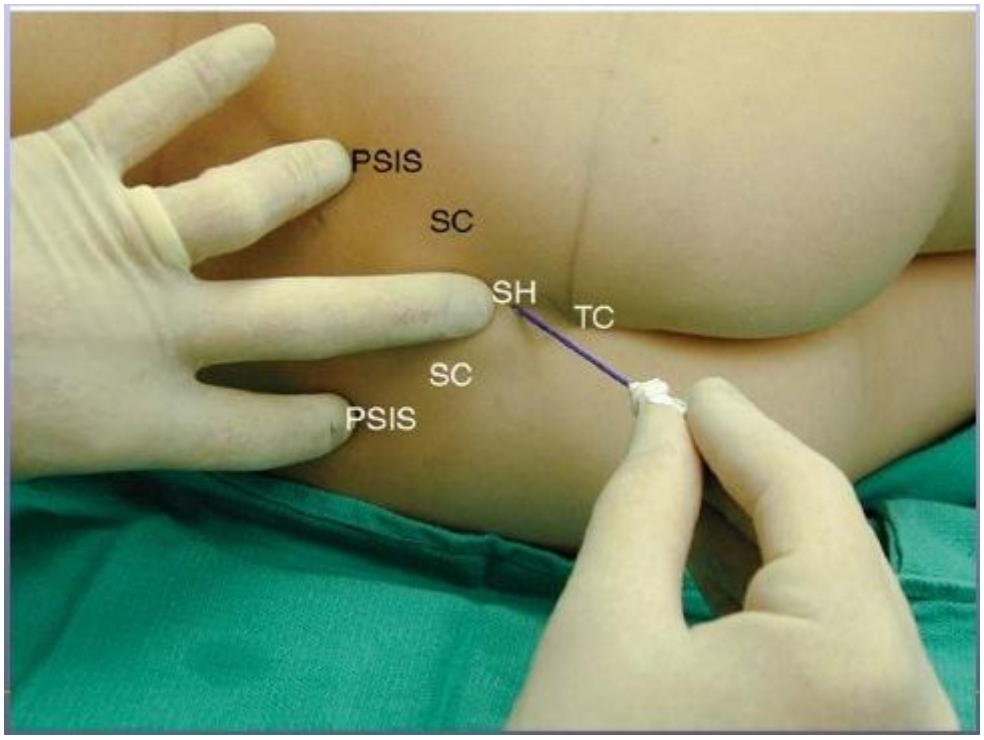
Preoperative evaluation:

In all the children age, I.P. no., body weight and baseline vital parameters were recorded. History regarding previous anesthesia, surgery, any significant medical illness, medications and allergy were recorded. Complete physical examination and airway assessment was done. Following laboratory investigations were done: blood grouping typing, hemoglobin%, blood sugar, urea, serum creatinine, serum electrolytes and urine analysis.

Study method:

After getting the institutional ethics committee approval and written informed consent from parents, the patients were allocated into two groups alternatively. Group C (n=30) taken as Clonidine group, Group D (n=30) as Dexmedetomidine group.On the day of surgery patients were shifted to the operation theatre. All the patients were premedicated after securing appropriate sized IV cannula with midazolam 0.03mg/kg and atropine 0.02mg/kg 10 min prior to induction. Multi- channel monitors (ECG, Pulse oximetry, NIBP) were attached and baseline vital parameters i.e mean arterial pressure (MAP), heart rate (HR), and arterial oxygen saturation (SPO2) were recorded. IV drip started with ringer lactate at a calculated rate of 4ml/kg according to the body weight. Anesthesia was induced with thiopentone sodium3-5mg/kg and vecuronium 0.1mg/kg and the patients

were intubated with an appropriate sized portex endotracheal tube. Caudal block for all the patients was performed after induction of general anesthesia and before the start of the surgery. After inductionoxygen:nitrous (33:66) and isoflurane was used throughout the surgery. The patients were positioned in left lateral position. Under strict aseptic precautions, a 23G needle was introduced into caudal space and either ropivacaine with clonidine (Group C) or ropivacaine with dexmedetomidine (Group D) was administered. At the end of surgery residual neuromuscular blockadereversed by neostigmine 0.04-0.05mg/kg and atropine 0.02- 0.04mg/kg and tracheal extubation performed after full recovery.



Block was considered successful when
1. There is a decrease in heart rate more than 10% from preoperative heartrate
2. Absence of increase in heart rate on incision
3. No intraoperative or postoperative analgesic supplementation

Parameters observed

The following parameters were observed at every 10min till the end of surgery and there afterwards at every 2 hours after surgery.

- Pulse rate, Mean arterial pressure
- Side effects i.e nausea, vomiting, pruritus, hypotension, bradycardia, urinary retention.
- ECG and oxygen saturation were monitored continuously.

Pain was assessed by FLACC[(39)] scale. A score of 0 signifies excellent analgesia whereas a score of 10 indicates ineffective analgesia.

Duration of postoperative analgesia will be defined as the time between the injection of drug caudally to the first administration of postoperative analgesia.

Rescue analgesiaparacetamol suppository 30mg/kg was given per rectally when FLACC Score >4.

Failure of caudal block was defined as any increase in HR or MAP>20% than pre incision values[(4)]

FLACC observational pain assessment scale

Categories	Scoring		
	0	1	2
Face	Smile or no particular expression	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Leg	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 screams or sobs, frequent complaints

Consolability	Content, relaxed	Reassured by occasional touching, hugging, or talking to, distractable	Difficult to console

- Sedation was assessed by 4 point scale:

4. Awake
3. Sleepy (eyes open but less active and responsive)
2. Asleep (eyes closed, arousable with soft voice or light touch.
1. Barely arousable (sleep needs shaking or shouting to arouse)

STATISTICAL ANALYSIS

Data was analyzed using SPSS version 15.0 computer software. Numerical variables were presented as mean and standard deviation (Mean±SD). Comparison between thegroupswas performed by the student t test.

III. Results

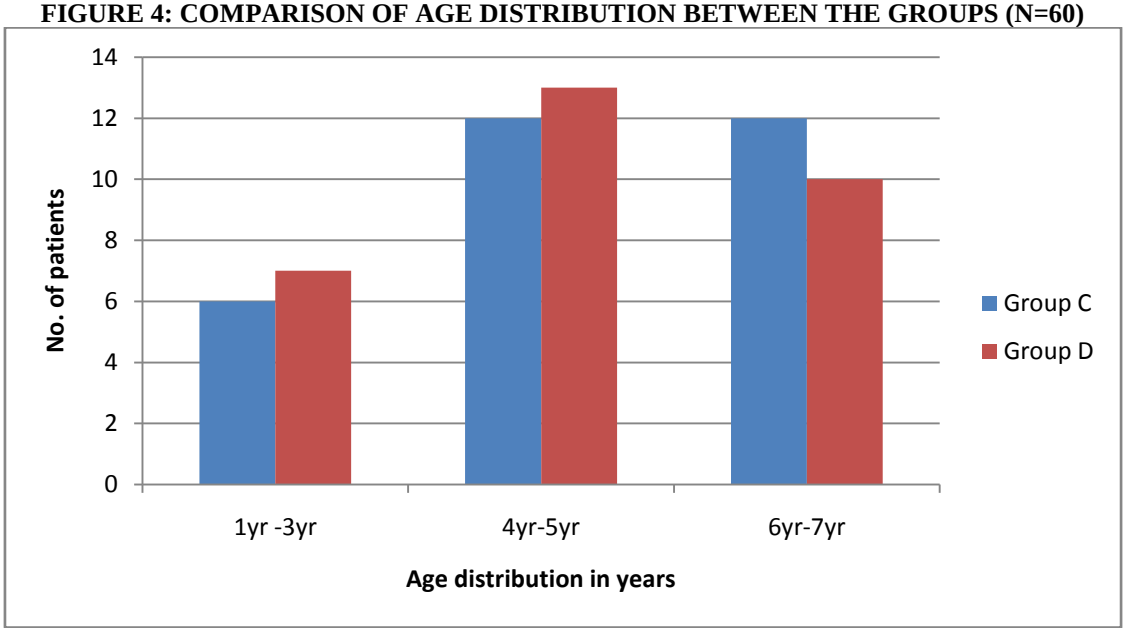
Present clinical study consists of 60 patients, aged between 1to 8 years, who are randomly chosen and divided into two groups alternatively into Group C and Group D which received the respective study solutions. Present clinical study was conducted on ASA Grade I and II pediatric patients who were undergoing infraumbilical (herniotomy, circumcision, high ligation of sac and rectal polypectomy) surgical procedures, at Kamineni Institute of Medical Sciences, Narketpally, Nalgonda district, Telangana.

The following were the observations and results

TABLE III: COMPARISON OF AGE DISTRIBUTION BETWEEN THE GROUPS (N=60)

Age distribution in yrs	Group C(n=30)		Group D(n=30)	
	No. of patients	%	No. of patients	%
1yr – 3yr	6	20	7	23
4yr -5yr	12	40	13	43.6
6yr-7yr	12	40	10	33.3
Mean + SD	4.76±1.78		4.66±1.59	
P value	0.81			

FIGURE 4: COMPARISON OF AGE DISTRIBUTION BETWEEN THE GROUPS (N=60)



The mean age the C group was 4.76+1.78 years and the D group was 4.66+1.59years. The difference between the C,D groups was not statistically significant (P>0.05i.e 0.81).

TABLEIV: DISTRIBUTION OF GENDER IN BETWEEN THE GROUPS(N=60)

Sex distribution	Group C(n=30)		Group D(n=30)	
	No. of patients	%	No. of patients	%
Male	26	86	26	86
Female	4	14	4	14
Total	30	100	30	100

The gender wise distribution of groups C and D were 26/4(M/F) and 26/4(M/F). Both the groups were comparable and there is no statistical significance.

FIGURE 5: COMPARISON OF GENDER DISTRIBUTION BETWEEN THE GROUPS (N=60)

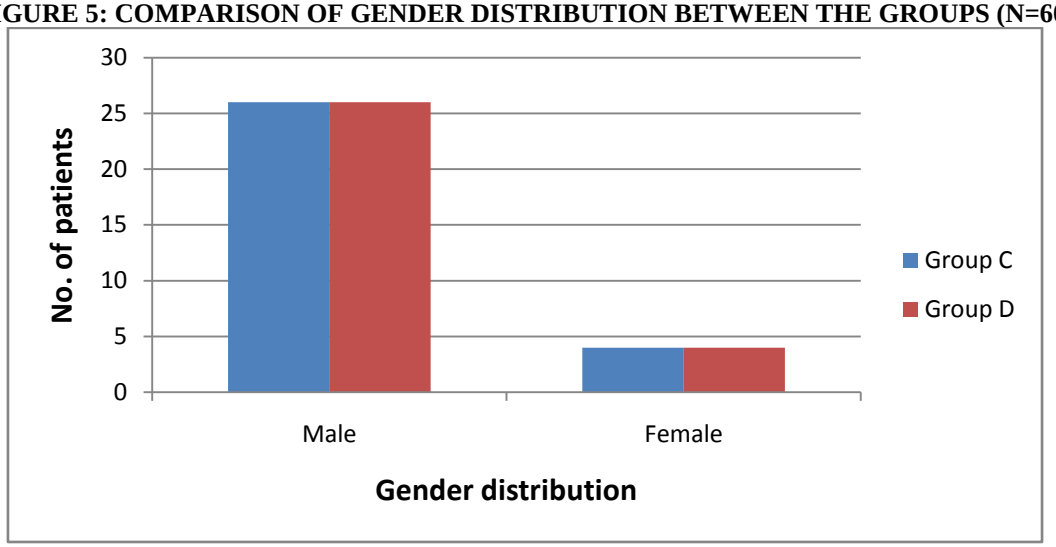
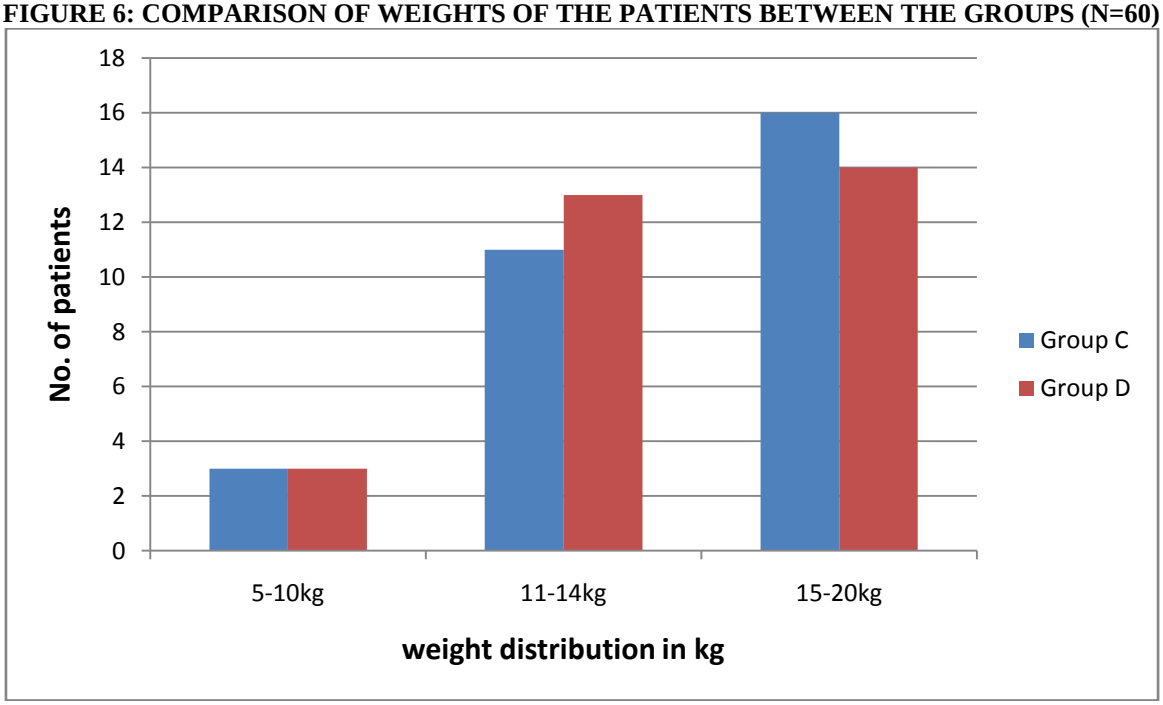


TABLE V: COMPARISON OF DISTRIBUTION OF WEIGHT OF THE PATIENTS BETWEEN THE GROUPS (N=60)

Weight in kgs	Group C (n=30)		Group D (n=30)	
	No	%	No	%
5-10kg	3	10	3	10
11-14kg	11	36.6	13	43.3
15-20kg	16	53.3	14	46.6
Mean + SD	14±2.38		14±2.76	
P value	0.96			

FIGURE 6: COMPARISON OF WEIGHTS OF THE PATIENTS BETWEEN THE GROUPS (N=60)



The mean weight of C group was 14+2.38 kg and that of D group was 14+2.76 kg. The difference of weight between the groups was not statistically significant (p=0.96).

TABLE VI: COMPARISON OF TYPE OF SURGERY BETWEEN THE GROUPS (N=60)

Type of surgery	Group C (n=30)	Group D (n=30)
Herniotomy	13	16
High ligation of sac	6	4
Circumcission	6	5
Orchidopexy	3	4
Rectal polypectomy	2	1
Total	30	30

The type of surgery between the groups was also comparable and not statistically significant.

FIGURE 7: COMPARISON OF TYPE OF SURGERY BETWEEN THE GROUPS (N=60)

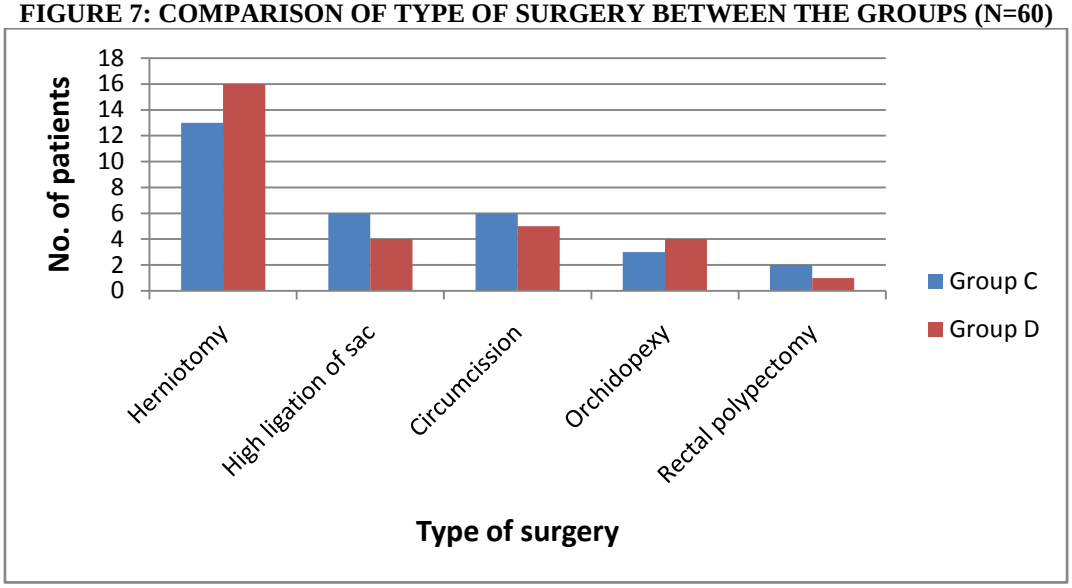
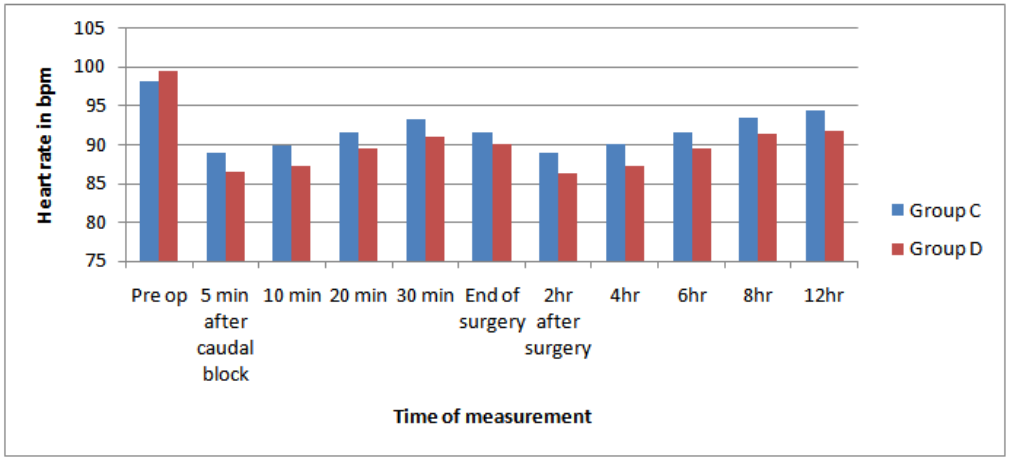


TABLE VII: COMPARISON OF MEAN HEART RATE BETWEEN THE GROUPS(N=60)

Time		Group C (n=30)		Group D (n=30)		P value
		Mean	SD	Mean	SD	
Pre op (baseline)		98.13	6.80	99.4	7.41	0.49
Intra op	**5min**	88.8	4.75	86.53	6.65	0.13
	10min	89.9	4.40	87.26	6.68	0.07
	20min	91.5	4.73	89.43	6.77	0.17
	30min	93.23	4.78	91.03	5.13	0.09
End of surgery		91.42	5.87	90.03	5.13	0.33
Post op	**2hr**	88.96	5.20	86.16	6.44	0.06
	4hr	89.96	4.89	87.26	6.68	0.07
	6hr	91.5	4.94	89.36	6.83	0.17
	8hr	93.36	4.86	91.36	6.12	0.16
	12hr	94.26	5.03	91.66	6.76	0.09

FIGURE 8: COMPARISON OF MEAN HEART RATE BETWEEN THE GROUPS(N=60)

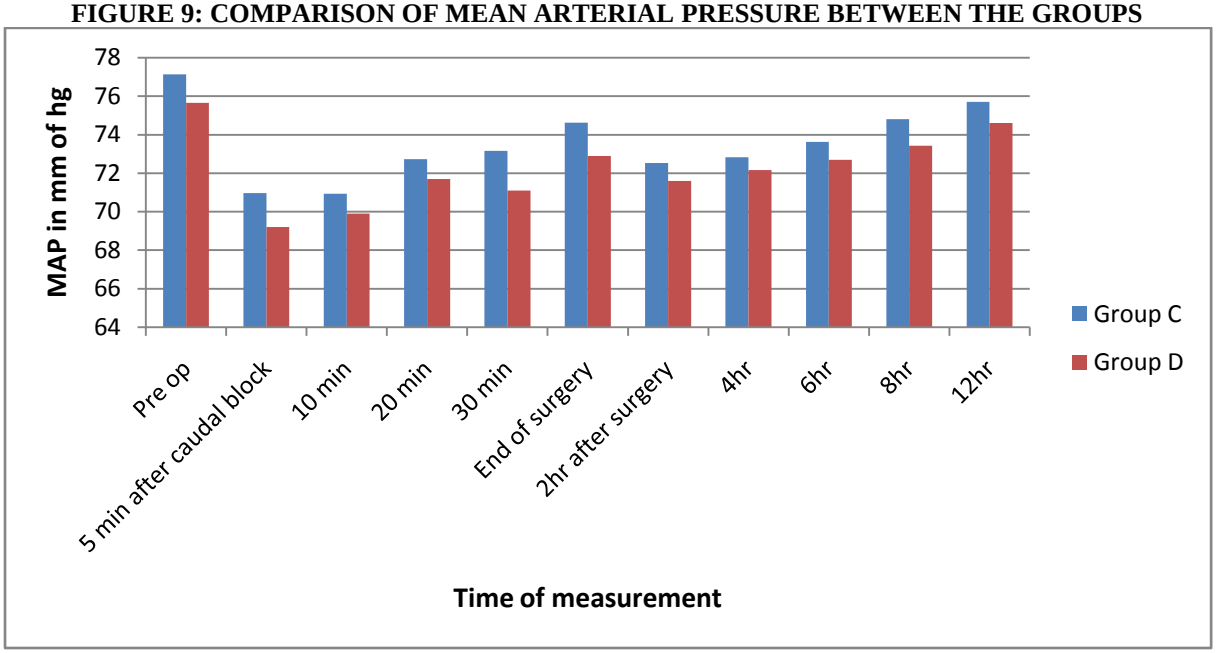


The preoperative, intraoperative and postoperative heart rates between the groups were comparable and were not statistically significant (p>0.05) and therapeutic interventions were not required. There was reduction in mean heart rate 5min after giving caudal block when compared to the baseline which indicates a successful block and adequate analgesia and there was no significant increase in the heart rate throughout the intraoperative and postoperative periods.

TABLE VIII: COMPARISON OF MEAN ARTERIAL PRESSURE BETWEEN THE GROUPS (N=60)

Time		Group C (n=30)		Group D (n=30)		P value
		Mean	SD	Mean	SD	
Pre op (baseline)		77.13	4.59	75.66	4.27	0.20
Intra op	5min	70.96	3.30	69.2	3.80	0.06
	10min	70.93	3.47	69.90	2.14	0.17
	20min	72.73	3.59	71.7	2.46	0.20
	30min	73.16	3.68	71.1	2.27	0.20
End of surgery		74.63	4.90	72.9	2.07	0.08
Post op	2hr	72.53	3.94	71.6	2.17	0.26
	4hr	72.83	2.86	72.16	2.49	0.33
	6hr	73.63	2.73	72.7	1.85	0.12
	8hr	74.8	3.19	73.43	2.44	0.06
	12hr	75.7	3.88	74.6	2.66	0.07

FIGURE 9: COMPARISON OF MEAN ARTERIAL PRESSURE BETWEEN THE GROUPS

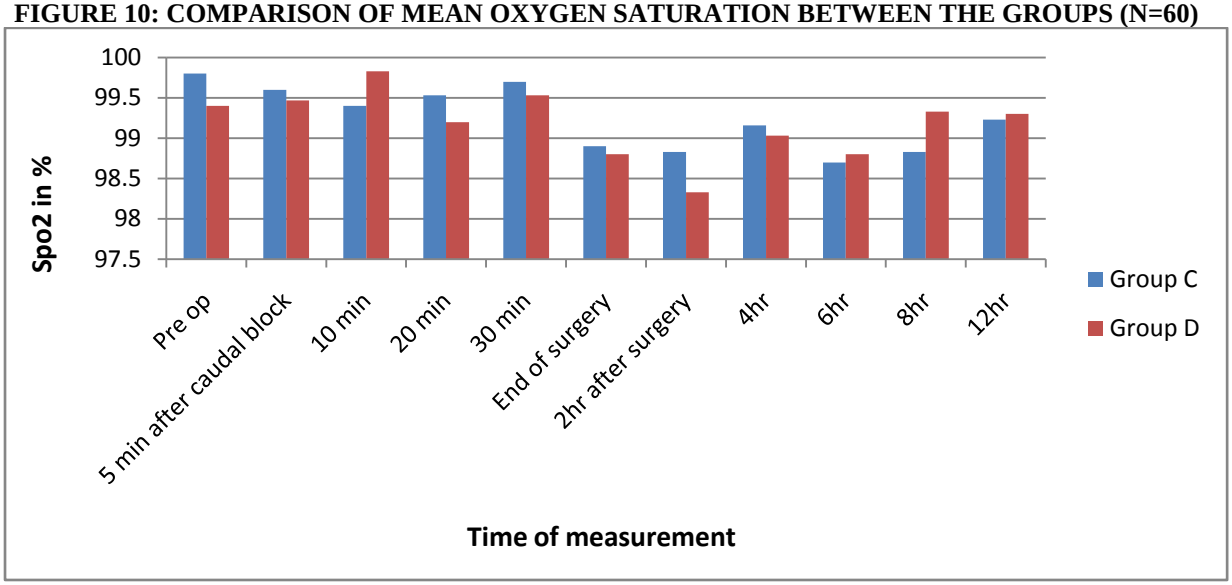


Fall in MAP was noted after caudal block, throughout the intraoperative and postoperative periods when compared to the baseline, but was in the normal range (no hypotension i.e. less than 20% of the baseline) and did not require any treatment.The preoperative, intraoperative and postoperative mean arterial pressures between the groups were comparable and were not statistically significant (p>0.05).

TABLE IX: COMPARISON OF MEAN OXYGEN SATURATION BETWEEN THE GROUPS (N=60)

Time		Group C (n=30)		Group D (n=30)		P value
		Mean	SD	Mean	SD	
Pre op		99.8	1.40	99.4	1.57	0.30
Intra op	5min	99.6	0.47	99.47	0.50	0.30
	10min	99.4	1.62	99.83	1.37	0.27
	20min	99.53	0.50	99.2	0.99	0.11
	30min	99.7	0.46	99.53	0.62	0.23
End of surgery		98.9	1.09	98.8	0.99	0.71
Post op	2hr	98.83	1.94	98.33	1.43	0.26
	4hr	99.16	0.59	99.03	0.76	0.46
	6hr	98.7	1.022	98.8	0.99	0.70
	8hr	98.83	0.94	99.33	1.24	0.08
	12hr	99.23	0.50	99.3	0.65	0.64

FIGURE 10: COMPARISON OF MEAN OXYGEN SATURATION BETWEEN THE GROUPS (N=60)



The preoperative, intraoperative and postoperative percentage of oxygen saturation between the groups were comparable and were not statistically significant (p>0.05).

TABLE X: COMPARISON OF MEAN SEDATION SCORES BETWEEN THE TWO GROUPS (N=60)

Time in hours	Group C (n=30)		Group D (n=30)		Significance
	Mean	SD	Mean	SD	
2 hrs	2.26	0.63	2.13	0.43	0.35
4 hrs	2.63	0.76	2.73	0.82	0.62
6 hrs	3.06	0.73	2.93	0.73	0.49
8 hrs	3.26	0.73	3.16	0.83	0.62
12 hrs	3.53	0.73	3.36	0.80	0.39

After 2 hours, most of the patients of all the groups had sedation score 2 (asleep) whereas after six hours, maximum number of patients had sedation score 3 i.e. less active (in all the groups). At twelve hours, patients of all the three groups mostly had sedation score 4(awake).The mean sedation scores in the postoperative period between the groups were comparable andnot statistically significant (P>0.05).

TABLE XI: FLACC SCORE OF C GROUP CHILDREN IN POST-OP PERIOD

Time	Score-0	Score-1	Score-2	Score-3	Score≥4
2 hrs	30	0	0	0	0
4 hrs	12	16	2	0	0
6 hrs	0	21	6	3	0
8 hrs	0	3	17	8	2
12 hrs	0	0	2	14	14
14 hrs	0	0	0	4	26
16hrs	0	0	0	0	30
20 hrs	0	0	0	0	30

FIGURE 11: FLACC SCORE OF C GROUP CHILDREN IN POST-OP PERIOD

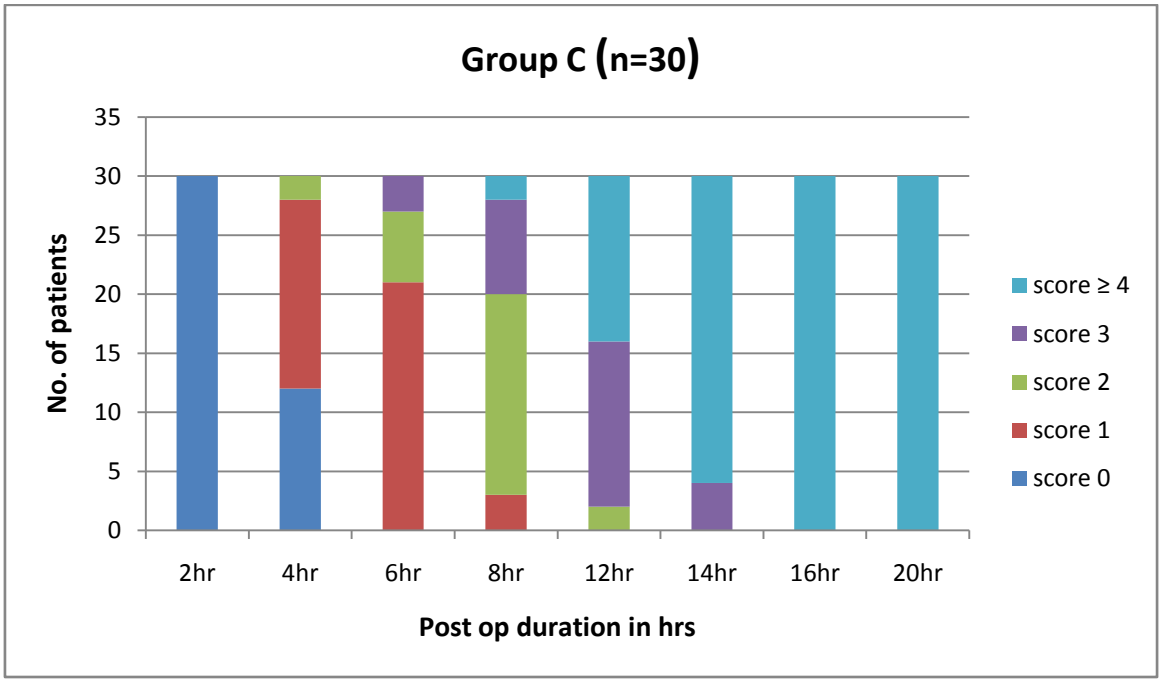
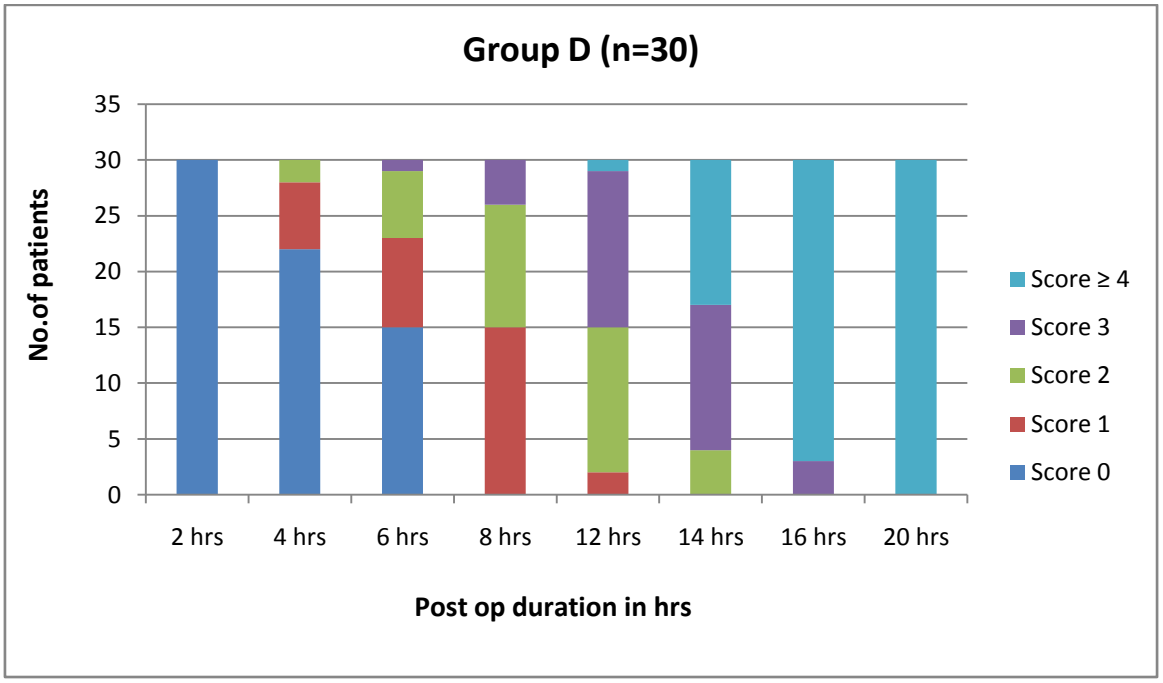


TABLE XII: FLACC SCORE OF D GROUP CHILDREN IN POST-OPERATIVE PERIOD

Time	Score-0	Score-1	Score-2	Score-3	Score≥4
2 hrs	30	0	0	0	0
4 hrs	22	6	2	0	0
6 hrs	15	8	6	1	0
8 hrs	0	15	11	4	0
12 hrs	0	2	13	14	1
14 hrs	0	0	4	13	13
16hrs	0	0	0	3	27
20 hrs	0	0	0	0	30

FIGURE 12: FLACC SCORES OF D GROUP CHILDREN IN POST-OPERATIVE PERIOD



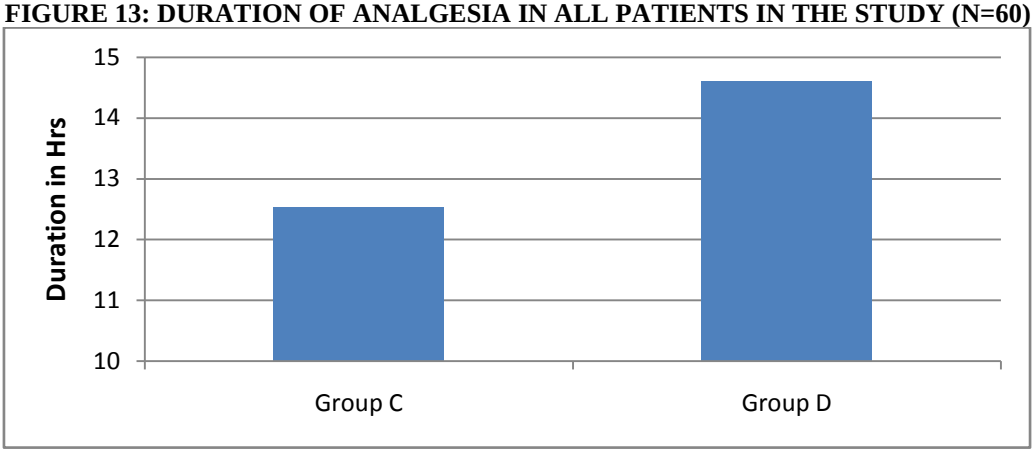
There was a difference between the groups in the FLACCScore measured 2nd hourly in the postoperative period. Group C patients achieved higher FLACC SCORE compared with Group D patients. 14

patients achieved a FLACC score of 4 at 12thhr in Group C and 13 patients at 14thhr in Group D. Majority of Group C patients had FLACC score of 4 at 14th hour and that of Group D patients had FLACC score of 4 at 16th hour. All the patients had a FLACC score of 4 at 16thhr in Group C and at 20thhr in Group D.

TABLE XIII: COMPARISON OF MEAN DURATION OF ANALGESIA BETWEEN THE GROUPS (N=60)

	Mean duration of analgesia in hrs	SD	P value
Group C (n=30)	12.53	2.09	0.0001
Group D (n=30)	14.61	1.61	

FIGURE 13: DURATION OF ANALGESIA IN ALL PATIENTS IN THE STUDY (N=60)



The duration of postoperative analgesia recorded a mean duration of analgesia of 12.53±2.09 hrs in Group C and 14.61±1.61hrsin Group D, with a P value of 0.0001.

There is statistically significant difference between duration of analgesia between the C and D group (P<0.05i.e 0.0001).

TABLE XIV: POSTOPERATIVE COMPLICATIONS (N=60)

	Group C(n=30)	Group D (n=30)
PONV	1	2
Respiratory depression	Nil	Nil
Urinary retention	Nil	Nil
Hypotension	Nil	Nil
Bradycardia	Nil	Nil

No episodes of clinically significant postoperative complications such as PONV, respiratory depression, urinary retention, pruritus, hypotension and bradycardia were observed.

IV. Discussion

Motor blockade resulting from caudal block is very distressing to children in the postoperative period and delays hospital discharge. Ropivacaine in comparison to bupivacaine has a wider margin of safety, lesser motor blockade, lesser cardiovascular / neurological toxicity and similar duration of analgesia. It can be safely used for regional anesthesia and analgesia in the ambulatory setting in paediatrics[1, 2,3,31,38,39,40].

Postoperative analgesia provides not only pain relief but also inhibits trauma induced nociceptive impulses to blunt autonomic reflexes. It allows the patients tobreathe and move freely to enhance early restoration of function. Historically, because of the wrong notion that children neither suffer or feel pain, nor respond to or remember the painful experiences to the same degree that adults did, they have been under treated for pain.

Enteral and parenteral analgesics (both opioids and non-opioids), used for providing postoperative analgesia, are associated with risks like gastro-intestinal bleeding, precipitation of asthma, nausea and vomiting, thrombocytopenia, sedation, respiratory depression, hepatotoxicity, nephrotoxicity etc. The regional techniques including the caudal block, avoid most of the problems and it is possible to achieve analgesia with minimum of drug dose and complications. Caudal block is easy to perform and has been found to be very effective in children, especially in infraumbilical surgery like herniotomy[68].

Several local anesthetic agents (eg. Bupivacaine, ropivacaine etc.) have been used for caudal block. Adjuvants like opioids (morphine[69], butorphanol, etc.) clonidine,dexmedetomidine, midazolam and ketamine are added to local anesthetic agents to increase the duration of analgesia, decrease the individual dose of the drug and thereby decreasing the side effects.

Like clonidine[70,71], dexmedetomidine also enhances the effects of local anesthetics without increasing the incidence of side effects[72]. A major advantage of dexmedetomidine is its higher selectivity compared with clonidine for α_{2a} receptors which is responsible for the hypnotic and analgesic effect. Dexmedetomidine, although currently available for i.v. use only, has been successfully administered epidurally for postoperative analgesia in humans in clinical trials.

El-Hennawy et al.[4] administered Dexmedetomidine and Clonidine both in a dose of 2µg/kg as adjuvant with 0.25% Bupivacaine caudally. They found that duration of analgesia was significantly higher in the group receiving bupivacaine-dexmedetomidine mixture [median (95% confidence level): 16 (14-18) hrs] bupivacaine-clonidine mixture [median (95% confidence level): 12(3-21) hrs] than the group receiving bupivacaine alone [median (95% confidence level): 5 (4-6) hrs]. In our study we found that ropivacaine and dexmedetomidine mixture had a mean 14.13 hrs (CI 12.97 – 15.28), ropivacaine and Clonidine mixture had a mean 12.60hrs(CI 11.62-13.58) duration of analgesia than ropivacaine alone, which had 5.83 hrs (CI 5.33 – 6.33)

Saadawy et al.[52] compared caudal bupivacaine 0.25% with dexmedetomidine 1ug/kg and caudal bupivacaine alone and showed that the incidence of agitation following sevoflurane anesthesia was significantly lower with dexmedetomidine ($P<0.05$); The duration of analgesia was significantly longer with dexmedetomidine ($P<0.001$); No statistically significant difference in hemodynamics between both groups; This study showed that caudal dexmedetomidine 2µg/kg with 0.25% Ropivacaine also has similar results like *Saadawy et al.*

Upadhyay and Colleagues, they used 1µg/kg of clonidine as adjuvant with 0.25% bupivacaine in children undergoing infraumbilical surgery and observed a significant prolongation of postoperative analgesia without any significant incidence of side effects. In our study, we used clonidine in the dose of 1µg kg along with 0.25% ropivacaine and did not observe significant incidence of side effects like bradycardia and hypotension.

Lee et al. AP administered clonidine in a dose of 2µg/kg along with local anesthetic agent in children undergoing orthopedic surgery in their study. They observed higher incidence of bradycardia and hypotension associated with 2µg kg dose of clonidine.

Klimscha et al[73]**.** also reported that analgesic efficacy does not seem to be enhanced by increasing the dose of clonidine from 1µg/kg to 2µg/kg.The analgesic activity of alpha$_2$ agonist dexmedetomidine is mediated by both supra-spinal and spinal mechanisms. It is assumed that central alpha$_2$ adrenoceptors in the locus ceruleous (a supra-spinal site) and in the dorsal horn of the spinal cord are involved in this activity. Dexmedetomidine has also been shown to have anti hyperalgesic action in rats with neuropathic pain originating in the peripheral nervous system. Like clonidine, this drug also enhances the effects of analgesics without increasing the incidence of side effects. In a recent study conducted on 60 children undergoing unilateral inguinal herniotomy / orchidopexy subjects received either 1ml kg 0.25% caudal bupivacaine alone or bupivacaine (same dose) mixed with dexmedetomidine 1µg/ kg during sevoflurane anesthesia. The duration of analgesia was significantly longer (0.001) and the total consumption of rescue analgesics was significantly lower (0.01) in the group receiving bupivacaine-dexmedetomidine than in the group receiving bupivacaine alone.

In another study conducted by *Schnaider et al***.** addition of clonidine 150µg or dexmedetomidine 2µg kg to ropivacaine 0.75% (20ml) administered into epidural space in patients undergoing upper abdominal surgery caused a 25% decrease in systemic systolic pressure in clonidine group and 30% decrease in dexmedetomidine group. In our study, we had administered 1µg kg clonidine and 1µg kg dexmedetomidine along with 0.25% ropivacaine caudally and observed that the magnitude of haemodynamic changes between the groups were similar. There was no significant difference in the incidence of side effects like pruritus and nausea and vomiting. No episodes of respiratory depression or urinary retention were noted. Sedation scores were comparable between all the groups.

V. Conclusion

- Dexmedetomidine 1µg/kg and Clonidine 1µg/kg appear to be satisfactory adjuncts toropivacaine, which produced satisfactory intraoperative analgesia and also satisfactory postoperative analgesia. Dexmedetomidine 1µg/kg as an adjunct to 0.2% ropivacaine produced statistically significantprolonged duration of postoperative analgesia when compared to Clonidine 1µg/kg as an adjunct to0.2% ropivacaine.
- In both thegroups intraoperative parameters i.e heart rate, mean arterial pressure and oxygen saturation was maintained throughout the surgery and did not differ significantly from the preoperative baseline values.
- Also there was no significant difference in themean heart rates, mean arterial pressure and oxygen saturation between the two groups.
- There was no significant difference between the mean sedation scores.
- There were no significant complications in the postoperative period in both the groups.

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