ORIGINAL RESEARCH

Dexamethasone versus Dexmedetomidine as an adjuvant to Bupivacaine in caudal block in paediatric patients undergoing infra umbilical surgery

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ABSTRACT
Background: Caudal analgesia is an effective, reliable, and straightforward method for providing analgesia both during and after Pediatric infraumbilical surgery. The present study compared dexamethasone and dexmedetomidine when used as an adjuvant to bupivacaine to caudal epidural block in children undergoing infraumbilical surgeries. **Materials &Methods:** It comprised of84 pediatric patients age ranged 1-10 years of either gender scheduled for infraumbilical surgery. Patients were divided into 3 groups of 24 each. In group I (control), the patients received Inj Bupivacaine 0.25% :1 ml/kg + normal saline 0.9%-1ml. In group II, the patients received Inj. Bupivacaine 0.25%: 1 ml/kg + Injdexamethasone (0.1 mg/kg) making volume to 1 ml. In group III, the patients received Inj Bupivacaine 0.25%: 1 ml/kg + Injdexmedetomidine (1 µg/kg) making volume to 1 ml. Parameters such as time of analgesia (min), Ramsay sedation score, the modified objective pain score (MOPS) was assessed. The adverse effects in PACU also were assessed. **Results:** Group I had 15 males and 9 females, group II had 14 males and 10 females and group III had 11 males and 13 females. The mean weight was 20.2 kgs in group I, 19.6 kgs in group II and 19.7 kgs in group III patients. ASA grade I/II was seen in 12/12 in group I, 11/13 in group II and 10/14 in group III. The mean duration of analgesia was 316.4 minutes in group I, 486.2 minutes in group II and 492.6 minutes in group III. The difference was non- significant (P> 0.05). At 30 minutes, the MOPS was 3, 4 and 3 in group I, II and III respectively. At 1 hour, it was 4, 4 and 3, at 3 hours was 3, 3 and 3 and 6 hours was 3, 2 and 1 in group I, II and III respectively. There was significant difference mean Ramsay sedation score (P< 0.05). Adverse events reported were bradycardia in 1 in group I, 2 in group II and 4 in group III. Hypotension was 2 in group I, 1 each in group II and III. Vomiting 3 in group I, 2 in group II and 1 in group III. **Conclusion:** Caudal dexmedetomidine is better adjuvant in prolongation of postoperative analgesia compared to caudal local anesthetic alone or with dexamethasone. Also, they showed comparable side effects profile except bradycardia which was marginally higher with dexmedetomidine.
Keywords: dexamethasone, dexmedetomidine, adverse event

INTRODUCTION

Caudal analgesia is an effective, reliable, and straightforward method for providing analgesia both during and after Pediatric infraumbilical surgery.[1,2] Since single shot caudal analgesia has a short half-life and is associated with infection, catheter injection may be used to prolong the analgesic duration. Through the investigation of different adjuvants to local anesthetics, this issue has been avoided.[3] These drugs have been utilized to improve the block quality and analgesic duration. Depending on the kind and dosage used, a number of these adjuvants, including as fentanyl, clonidine, dexmedetomidine, neostigmine, ketamine, and midazolam, can have adverse effects.[4,5]

Dexamethasone is a long-acting corticosteroid that possesses anti-inflammatory qualities. When administered in conjunction with local anesthetics in the epidural area, it has been shown to reduce the requirement for postoperative rescue analgesics

following orthopaedic and abdominal surgeries.[6] The potent anti-inflammatory qualities of dexamethasone naturally boost the efficiency of analgesics.[7] A2 adrenergic receptor agonist dexmedetomidine has analgesic and sedative properties. It prolongs the postoperative analgesia when used caudally in conjunction with local anesthetics.[8,9]The present study compared dexamethasone and dexmedetomidine when used as an adjuvant to bupivacaine to caudal epidural block in children undergoing infraumbilical surgeries.

MATERIALS &METHODS

This study comprised of 84pediatric patientsage ranged 1-10 years of either gender scheduled for infraumbilical surgery. Parents' consent was obtained before starting the study. Data such as name, age, gender etc. was recorded. Patients were divided into 3 groups of 24 each. In group I (control), the patients received Inj Bupivacaine 0.25% :1 ml/kg + normal saline 0.9%-1ml. In group II, the patients received Inj. Bupivacaine 0.25%: 1 ml/kg + Injdexamethasone (0.1 mg/kg) making volume to 1 ml. In group III, the patients received Inj Bupivacaine 0.25%: 1 ml/kg + Injdexmedetomidine (1 µg/kg) making volume to 1 ml. Parameters such as time of analgesia (min), Ramsay sedation score, the modified objective pain score (MOPS) was assessed. The adverse effects in PACU also were assessed.The results were compiled and subjected for statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II	Group III
Agent	Inj Bupivacaine 0.25% :1 ml/kg + Normal Saline 0.9%-1ml.	Inj. Bupivacaine 0.25%: 1 ml/kg + Inj Dexamethasone (0.1 mg/kg)	Inj Bupivacaine 0.25%: 1 ml/kg + Inj Dexmedetomidine (1 µg/kg)
M:F	15:9	14:10	11:13

Table I shows that group I had 15 males and 9 females, group II had 14 males and 10 females and group III had 11 males and 13 females.

Table II Baseline characteristics

Parameters	Group I	Group II	Group III	P value
Weight	20.2	19.6	19.7	0.95
ASA (I/II)	12/12	11/13	10/14	0.82
Time of analgesia (min)	316.4	486.2	492.6	0.04

Table II shows that the mean weight was 20.2 kgs in group I, 19.6 kgs in group II and 19.7 kgs in group III patients. ASA grade I/II was seen in 12/12 in group I, 11/13 in group II and 10/14 in group III. The mean duration of analgesia was 316.4 minutes in group I, 486.2 minutes in group II and 492.6 minutes in group III. The difference was non- significant (P> 0.05).

Table III Comparison of parameters

Parameters	Variables	Group I	Group II	Group III	P value
MOPS	30 minutes	3	4	3	0.05
	1 hour	4	4	3	
	3 hours	3	3	3	
	6 hours	3	2	1	
RSS	30 minutes	4	4	4	0.03
	1 hour	4	3	2	
	3 hours	3	3	1	
	6 hours	2	2	1	
Adverse events	bradycardia	1	2	4	0.04
	Hypotension	2	1	1	
	Vomiting	3	2	1	

Table III shows that at 30 minutes, the MOPS was 3, 4 and 3 in group I, II and III respectively. At 1 hour, it was 4, 4 and 3, at 3 hours was 3, 3 and 3 and 6 hours was 3, 2 and 1 in group I, II and III respectively. There was significant difference mean Ramsay sedation score (P< 0.05). Adverse events reported were bradycardia in 1 in group I, 2 in group II and 4 in group III. Hypotension was 2 in group I, 1 each in group II and III. Vomiting 3 in group I, 2 in group II and 1 in group III.

DISCUSSION

The traditional method of giving children analgesia during and after abdominal, pelvic, and lower limb procedures is called caudal analgesia.[10,11] When given as a single injection, the caudal block's effectiveness is only constrained by the local anesthetic's duration

of action. As a result, many adjuvants are now used to extend the local anesthetic's duration of action.[12,13]The present study compared dexamethasone and dexmedetomidine when used as an adjuvant to bupivacaine to caudal epidural block in children undergoing infraumbilical surgeries.

We found that group I had 15 males and 9 females, group II had 14 males and 10 females and group III had 11 males and 13 females. In a research by El-Hennawy AM et al[14], 120 kids (3–10 years old) who were scheduled for lower abdomen procedures under general anesthesia were split up into 4 groups. Group I (Control) patients received 0.5 ml caudally (at a dosage of 0.5 ml/kg) of a 0.25% bupivacaine and 1% lidocaine solution diluted in saline. Patients in Group II (fentanyl group) received fentanyl (1 lg/kg) in addition to the same caudal dosage as those in Group I. The dexmedetomidine group's patients received the identical caudal combination as Group I plus one gram of dexmedetomidine per kilogram. Patients in Group IV (dexamethasone group) received the same combination of Group I plus dexamethasone (0.1 mg/kg) caudally. The duration of analgesia was prolonged and the pain score was lower in the dexmedetomidine and dexamethasone groups.In comparison to the control and fentanyl groups, the dexmedetomidine and dexamethasone groups saw lower pain scores, longer durations of analgesia, and fewer individuals who needed analgesia. The fentanyl and dexmedetomidine groups showed greater sedation. The incidence of side effects was much higher in the fentanyl group.

We found that the mean weight was 20.2 kgs in group I, 19.6 kgs in group II and 19.7 kgs in group III patients. ASA grade I/II was seen in 12/12 in group I, 11/13 in group II and 10/14 in group III. The mean duration of analgesia was 316.4 minutes in group I, 486.2 minutes in group II and 492.6 minutes in group III. We found that at 30 minutes, the MOPS was 3, 4 and 3 in group I, II and III respectively. At 1 hour, it was 4, 4 and 3, at 3 hours was 3, 3 and 3 and 6 hours was 3, 2 and 1 in group I, II and III respectively. There was significant difference mean Ramsay sedation score ($P< 0.05$). Adverse events reported were bradycardia in 1 in group I, 2 in group II and 4 in group III. Hypotension was 2 in group I, 1 each in group II and III. Vomiting 3 in group I, 2 in group II and 1 in group III.Nasr et al[15] compared caudal fentanyl or dexmedetomidine on lower abdominal and limb surgeries and cardiac surgery in pediatrics respectively and concluded that in dexmedetomidine group the pain score was decreased and the duration of postoperative analgesia was prolonged.

CONCLUSION

Authors found that compared to caudal local anesthetic alone or in combination with dexamethasone, caudal dexmedetomidine is a superior adjuvant in extending postoperative analgesia. Additionally, their side effect profiles were similar, with the exception of bradycardia, which was somewhat more common with dexmedetomidine.

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