

ORIGINAL RESEARCH

Comparative Analysis of Caudal and Intravenous Dexamethasone as Adjuvants for Caudal Epidural Block at a Tertiary Care Hospital

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ABSTRACT

Background: The present study was conducted for comparing caudal and intravenous dexamethasone as adjuvants for caudal epidural block. **Materials & Methods:** A total of 60 subjects were enrolled who were scheduled to undergo inguinal herniotomies. Complete demographic and clinical details of all the subjects was obtained. All the subjects were divided into three study groups as follows: Group A: In addition to caudal normal saline (NS) IV, patients received caudal ropivacaine 0.15% (1.5 ml/kg), Group B: In addition to caudal normal saline (NS) IV, patients received 0.15% caudal ropivacaine (1.5 ml/kg), and 0.1 mg/kg caudal dexamethasone (0.025 ml/kg), and Group C: Patients received IV dexamethasone 0.5 mg/kg (maximum 10mg) (dexamethasone sodium phosphate vial 4mg/ml), caudal ropivacaine 0.15% (1.5 mL/kg), caudal NS 0.025 ml/kg, and NS. ANOVA test and chi-square test was used for evaluation of level of significance. **Results:** Mean time to first rescue analgesia was 298.1 minutes, 531.8 minutes and 398.4 minutes respectively among subjects of group A, group B and group C respectively; on comparing the results were found to be statistically significant. Mean time to initiation of clear fluids among subjects of group A, group B and group C was 7.3 hours, 5.1 hours and 5.9 hours respectively; on comparing the results were found to be statistically significant. **Conclusion:** It can be concluded that in subjects having an inguinal hernia repaired, adding dexamethasone either caudally or intravenously as an adjuvant to caudal 0.15% ropivacaine may significantly lengthen the mean time to first rescue analgesia. Dexamethasone can also be thought of as a risk-free adjuvant to caudal block.

Key words: Caudal, Intravenous, Dexamethasone.

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INTRODUCTION

The introduction of novel analgesic medications and improved methods of administering existing ones is evidence that pain in paediatric patients has grown to be a major problem worldwide. The Society of Paediatric Anaesthesia outlined the relief of pain as a "fundamental human right" in 2001 at its 15th annual meeting in New Orleans, Louisiana, irrespective of age, medical condition, therapy, or medical institution.¹⁻³

Despite this, the most frequent post-day-case surgery consequence is still discomfort. Day-case surgery, also known as ambulatory surgery, is when a patient is hospitalised, operated on, and then released all on the same day. The orchidopexy, circumcision,

inguinal hernia repairs, tonsillectomy, and myringotomy are a few procedures done on a day-case basis. Children who undergo minor surgery, like circumcision, often experience severe agony. Consequently, it is crucial to provide youngsters with pain relief. The purpose of post-operative pain treatment in day-case procedures is specifically to lessen or completely remove pain with few negative effects.²⁻⁴

Caudal block is the most popular and commonly used regional anaesthetic technique in children with a high success rate, for surgeries below the level of the umbilicus. It reduces the requirement of inhaled and intravenous (IV) anaesthetic agents, attenuates the stress response to surgery, facilitates a rapid and

smooth recovery and provides satisfactory post-operative analgesia but with the limitation of relatively short duration of analgesia with single shot technique. Use of caudal catheter for continuous infusion is usually not preferred due to high risk of catheter contamination from faecal soiling. To overcome this limitation, several adjuvants are added to local anaesthetic agent in a single shot technique.⁵⁻⁷Hence; the present study was conducted for comparing caudal and intravenous dexamethasone as adjuvants for caudal epidural block.

MATERIALS & METHODS

The present study was conducted in the Department of Anaesthesia, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh (India) for comparing caudal and intravenous dexamethasone as adjuvants for caudal epidural block. A total of 60 subjects were enrolled who were scheduled to undergo inguinal herniotomies. Complete demographic and clinical details of all the subjects was obtained. All patients underwent routine laboratory examinations, which included measurements of their haemoglobin levels. Pain estimation was done using the visual analogue scale (VAS) on a scale of 0 to 10 with 0 indicating no pain and 10 indicating maximum unbearable pain. All the subjects were divided into three study groups as follows:

Group A: In addition to caudal normal saline (NS) IV, patients received caudal ropivacaine 0.15% (1.5 ml/kg),

Group B: In addition to caudal normal saline (NS) IV, patients received 0.15% caudal ropivacaine (1.5 ml/kg), and 0.1 mg/kg caudal dexamethasone (0.025 ml/kg).

Group C: Patients received IV dexamethasone 0.5 mg/kg (maximum 10mg) (dexamethasone sodium phosphate vial 4mg/ml), caudal ropivacaine 0.15% (1.5 mL/kg), caudal NS 0.025 ml/kg, and NS.

The caudal block time was noted, and 10 minutes after the caudal injection, the surgery could begin. Hemodynamic variables were recorded and compared. Assessment of results was done using SPSS software. ANOVA test and chi-square test was used for evaluation of level of significance.

RESULTS

Mean duration of surgery among subjects of group A, group B and group C was 49.2 minutes, 51.8 minutes and 51.3 minutes respectively. Non-significant results were obtained while comparing the mean duration of surgery among all the three study groups. Mean time to first rescue analgesia was 298.1 minutes, 531.8 minutes and 398.4 minutes respectively among subjects of group A, group B and group C respectively; on comparing the results were found to be statistically significant. Mean time to initiation of clear fluids among subjects of group A, group B and group C was 7.3 hours, 5.1 hours and 5.9 hours respectively; on comparing the results were found to be statistically significant.

Table 1: Duration of surgery

Groups	Duration of surgery (mins)		p- value
	Mean	SD	
Group A	49.2	8.4	0.115
Group B	51.8	10.3	
Group C	51.3	10.7	

Table 2: Comparison of time to first rescue analgesia

Groups	Time to rescue analgesia (mins)		p- value
	Mean	SD	
Group A	298.1	82.3	0.00*
Group B	531.8	102.3	
Group C	398.4	98.1	

*: Significant

Table 3: Comparison of VAS postoperative

Groups	VAS		p- value
	Mean	SD	
Group A	2.3	0.9	0.287
Group B	2.1	0.8	
Group C	1.9	0.8	

Table 4: Comparison of time to initiation of clear fluids

Groups	Time to initiation of clear fluids (hours)		p- value
	Mean	SD	
Group A	7.3	0.8	0.01*
Group B	5.1	0.5	
Group C	5.9	0.6	

*: Significant

DISCUSSION

Postoperative pain in children is difficult to assess and associated with strong emotional component, however undertreated. Caudal epidural anesthesia is a common technique providing intra and postoperative analgesia in pediatric infraumbilical surgical procedures but with the disadvantage of short duration of action after single injection. Ropivacaine offers some advantages over bupivacaine, for example, less cardiac and neurological toxicity, less motor blockade and prolonged sensory analgesia.⁸⁻¹⁰ Hence; the present study was conducted for comparing caudal and intravenous dexamethasone as adjuvants for caudal epidural block.

Mean duration of surgery among subjects of group A, group B and group C was 49.2 minutes, 51.8 minutes and 51.3 minutes respectively. Non-significant results were obtained while comparing the mean duration of surgery among all the three study groups. Mean time to first rescue analgesia was 298.1 minutes, 531.8 minutes and 398.4 minutes respectively among subjects of group A, group B and group C respectively; on comparing the results were found to be statistically significant. In a previous study conducted by Choudhary S et al, authors evaluated whether caudal dexamethasone 0.1 mg/kg as an adjuvant to the ropivacaine improved analgesic efficacy after paediatric herniotomies. Results were statistically analysed using Student's t-test. Pain scores measured at 1, 2, 4, and 6 h post-operative, were lower in Group B as compared to Group A. Mean duration of analgesia in Group A was 248.4 ± 54.1 min and in Group B was 478.046 ± 104.57 min with $P = 0.001$. Rescue analgesic requirement was more in Group A as compared to Group B. Adverse effects after surgery were comparable between the two groups. Caudal dexamethasone added to ropivacaine is a good alternative to prolong post-operative analgesia with less pain score compared to caudal ropivacaine alone.¹⁰

Mean time to initiation of clear fluids among subjects of group A, group B and group C was 7.3 hours, 5.1 hours and 5.9 hours respectively; on comparing the results were found to be statistically significant. In another similar study conducted by Yousef GT et al, authors compared the analgesic effects and side-effects of dexamethasone or magnesium added to caudal ropivacaine in pediatric patients undergoing inguinal hernia repair. The time to 1(st) analgesic dose was significantly longer in groups RM and RD (500 ± 190 and 730 ± 260 min) respectively compared with group R (260 ± 65 min). Group R patients achieved significantly higher Children's Hospital of Eastern Ontario Pain Scale and Faces Legs Activity Cry

Consolability scores (4(th) hourly) compared with groups RM and RD patients (8(th) and 12(th) hourly, respectively). The addition of dexamethasone or magnesium to caudal ropivacaine significantly prolonged the duration of postoperative analgesia in children undergoing inguinal hernia repair.¹¹

CONCLUSION

We come to the conclusion that in subjects having an inguinal hernia repaired, adding dexamethasone either caudally or intravenously as an adjuvant to caudal 0.15% ropivacaine may significantly lengthen the mean time to first rescue analgesia. Dexamethasone can also be thought of as a risk-free adjuvant to caudal block.

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