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Effect of Low Dose Intravenous Dexamethasone with Caudal Analgesia on Post Herniotomypain

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I. Introduction

- Pain in paediatric patients has become a major problem, resulting in introduction of new analgesic drugs and newer ways of application of old drugs.
- A multimodal approach is employed in current pain management.
- Psychological methods, mild analgesics, local and regional analgesia, are often combined to achieve superior pain relief and to minimise the side effects.
- The most commonly used Regional anaesthesia technique in paediatric practice is the caudal epidural block.
- It is used to provide intra and post-operative analgesia for surgeries below the umbilicus inpaediatric patients.
- It is the easiest block to perform and to teach, with good safety record in children.
- It is usually a single shot technique and has the disadvantage of short duration of action after single injection.
- Dexamethasone is a corticosteroid hormone with powerful antiinflammatory and analgesic property.
- Intravenous administration of steroids suppresses tissue levels of bradykinin and the release of neuropeptides from nerve endings.
- It inhibits synthesis of cyclooxygenase-2 in peripheral tissues and in the central nervous system resulting in a reduction in prostaglandin production which contribute to enhanced nociception in inflamed tissue.
- Dexamethasone is used prophylactically to reduce the incidence of post operative nausea and vomiting.
- Intravenous administration of dexamethasone has been shown to provide prolonged post operative analgesia.
- side effects - insomnia, weight gain, impaired skin healing, dyspepsia and hyperglycaemia, have been seen with chronic use.
- Intravenous Dexamethasone along with caudal block has also been shown to increase post operative analgesia.

AIMS

• To compare the analgesic effects of caudal block with or without low-dose intravenous dexamethasone in children undergoing unilateral inguinal herniotomy.

OBJECTIVES

1. To determine the time to first analgesic request when caudal block is given alone and in combination with intravenous
dexamethasone.
2. To compare blood sugar levels in patients given single-dose intravenous dexamethasone in addition to caudal bupivacaine and in those who had only caudal bupivacaine.

II. Methodology

- A Hospital based prospective randomized double blind controlled study over a period of 2 months from june2022 to July 2022 among 50 children aged between 1 - 7 years, male, ASA CLASS I and II posted for unilateral inguinal herniotomy in Government General Hospital attached to Rangaraya Medical College, Kakinada.
- After obtaining institutional ethics committee approval and informed consent from the parents/guardians of children, the selected study population randomly divided into two groups.
- GROUP D: will receive intravenous **0.25 mg/kg dexamethasone** in 5 ml plain solution.
- GROUP N: will receive 5ml of intravenous normal saline.

EXCLUSION CRITERIA

1. Children planned for bilateral herniotomy,
2. Children who had failed caudal block,
3. Infection at the site of caudal injection,
4. Allergy to study drugs,
5. Pre-existing neurological deficits, Spinal deformities,
6. Coagulopathy
7. Parents/guardians of children Refusal for consent.

TECHNIQUE

- Thorough pre-anaesthetic check-up of all patients including all routine investigations were done.
- The procedure was explained to the parent/guardian of patient and written informed consent was taken.
- After shifting the patient to operating room, baseline parameters like baseline heart rate (HR), mean arterial pressure (MAP)and oxygen saturation (spO2) were recorded.

Pre induction blood sugars values taken.

CONTD.,

- All patients were induced with sevoflurane 8% in oxygen with spontaneous ventilation and IV line was secured with appropriate size cannula (22 and 24 gauge) and Normal saline was started at the rate of 4 ml/kg/hr for first 10kgs, then 2ml/kg/hr for next 10kgs and 1ml/kg/hr for subsequent kgs.
- All the patients were premedicated with IV atropine 0.01 mg/Kg and IV fentanyl 1 mcg/kg.
- After induction of general anaesthesia, an appropriate sized endotracheal tube was inserted, and after intubation, sevofluraneconcentration was reduced to 3% with fresh gas flow of 3–4 L/min.
- All the patients were placed in left lateral decubitus position, and under aseptic precautions, single-dose caudal block was performed using a 23-gauge short-bevelled hypodermic needle.
- Patients in Group D received caudal bupivacaine 0.25%(0.5mL/kg) and IV dexamethasone 0.25 mg/kg and patients in Group N received caudal bupivacaine 0.25%(0.5ml/kg) and iv 5ml normal saline.
- The time of caudal block was recorded, and surgery was allowed to start 10 min after caudal injection. Anaesthesia was maintained with sevoflurane in oxygen and air.
- Sevoflurane was discontinued at beginning of skin closure and during emergence from anaesthesia, endotracheal tube was removed, and patient was transported to post-anaesthesia care unit.
- Monitoring of vital signs continued at 5 min interval until the end of surgery.
- Postoperative pain was assessed and recorded on arrival at PACU, 0 (baseline), 30, 60, 120, 180 and 240 min after surgery using the Objective Pain Score (OPS).
- Objective Pain Scale (OPS; minimum score: 0 = no pain and maximum score: 8-10 = extreme pain) is composed of five parameters; systolic blood pressure, crying, movements, agitation and complaints of pain. Each parameter has a score of 0–2.
- The time to first analgesic requirement was the duration from the time of administration of study drugs to the time of first request for analgesic (TFA).

III. RESULTS

• Demographic data associated with the two study groups

	Group D (n=50)	Group N (n=50)
Age (Mean in Years)	4.26 ± 1.28	4.08 ± 1.14
Weight (Mean in kg)	15.44± 2.98	14.24 ± 3.94
Duration of surgery (Mean in mins)	36.72 ± 8.72	37 ± 13.6

CONTD.,

• the time to first analgesic requirement (TFA) was longer in Group D compared to in Group N.

Variables	Group D	Group N	P value
Time to first analgesia request (min)	650.24 ± 29.48	259.28 ± 11.12	0.0001
Total oral paracetamol consumed at home within 24 h (mg)	40.62 ± 16.84	57.36 ± 18.96	0.0001

CONTD.,

• The difference between increase in postoperative blood glucose in Group D and Group N was not statistically significant.

	Group D	Group N	P value
Pre-induction blood glucose (mg/dl)	95.28 ± 7.86	91.30 ± 12.86	0.065
Post-operative blood glucose (mg/dl)	100.92 ± 8.76	99.86 ± 13.74	0.646

THE OBJECTIVE PAIN SCORES IN BOTH THE GROUPS

Time	Group	Pain score	P value
Baseline	Group D	2.00 ± 0.20	0.0001
	Group N	3.00 ± 0.19	
At 30 mins	Group D	1.50 ± 0.15	0.0001
	Group N	2.20 ± 0.19	
At 60 mins	Group D	1.00 ± 0.18	0.0001
	Group N	2.10 ± 0.18	
At 120 mins	Group D	0.80 ± 0.10	0.0001
	Group N	1.50 ± 0.24	
At 180 mins	Group D	0.70 ± 0.08	0.0001
	Group N	1.50 ± 0.14	
At 240 mins	Group D	0.60 ± 0.08	0.0001
	Group N	1.30 ± 0.14	

IV. Results

- Statistical analysis was done with the student t-test and chi-square test, and the p-value of <0.001 is significant.
- The time to first analgesic requirement was longer in Group D compared to Group N.
- The difference between postoperative blood glucose in Group D and Group N was not statistically significant.

- There was also a statistically significant difference in pain score between the two groups at 0,60,120, 180 and 240 min.

V. Discussion

- This study suggested that single dose of intravenous dexamethasone in combination with caudal epidural bupivacaine (0.25%) prolonged the TFA and decreased post-operative analgesic consumption compared with caudal bupivacaine alone.
- In prolongation of analgesia, the exact mechanism of action of dexamethasone is not known but it is said to act through strongly mediated anti-inflammatory process.
- Compared to preoperative blood sugars, increase in blood glucose was observed post-operatively in both groups, but there was no statistically significant difference between two groups. This increase may be due to perioperative stress.

VI. Conclusion

• The use of low-dose intravenous Dexamethasone 0.25 mg/kg, in combination with caudal bupivacaineprolonged the duration of analgesia and reduced postoperative pain scores and analgesic consumptions in children undergoing unilateral inguinal herniotomy.

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