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# Original Article

## Dexamethasone as an Adjunct to Epidural Block- Comparative Study

Raju Jharbade[1], Sunita B. Wadekar[1], Sunita Dhupia[1] , Neil Alwani[2] , Santosh Pancholi[2]

[1]Associate Professor, [2]Senior Resident, Department Of Anaesthesiology, Amaltas Institute Of Medical Sciences, Dewas, Madhya Pradesh, India

***ABSTRACT:***

**Background**: Pain control is of major concern when operating. In today's age there has been a paradigm shift from general anaesthesia to regional anaesthesia. Caudal block is the most consistent technique used for regional analgesia among paediatric subjects. The aim of the present study was to compare the effect of caudal versus intravenous dexamethasone as an adjuvant to epidural block. **Materials and Methods:** This prospective study was conducted in the Department of anaesthesia for a period of 1 year. The study included 90 subjects belonging to ASA grade I and grade II category The required monitors were attached to the patient on entering the operation theatre and the baseline BP, MAP, heart rate and oxygen saturation was recorded. A 22 gauge cannula was used to secure intravenous line and ringer's lactate was initiated at 4ml/ kg/hr. All the data was arranged in a tabulated form and analysed using SPSS software. Chi square test was used to perform the statistical analysis and probability value of less than 0.05 was considered as significant. **Results**: A total of 90 patients took part in the study with 30 patients in each group. The mean duration of surgery in the groups was 38.52 +/-9.63, 32.77 +/- 12.1 and 40.21 +/-10.12 minutes respectively in the three groups. The difference was significant between the groups. Clear fluids were initiated comparatively early in Group II (5.2 +/-0.4 hours) compared to Group III and Group I. **Conclusion**: From the present study we that dexamethasone is a useful assistant to ropivacaine in providing caudal block for an efficient and effective analgesia without any undue side effects

**Key words:** Caudally, Dexamethasone, epidural, intravenous

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**Corresponding author:** Dr. Sunita B. Wadekar, Associate Professor, Department Of Anaesthesiology, Amaltas Institute Of Medical Sciences, Dewas, Madhya Pradesh, India

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### INTRODUCTION

Important advancements have befallen in paediatric anaesthesia. It comprises of both the advances in the technology of anaesthesia and pain management[1]and better understanding of the pain perception physiology. Unmanaged pain amongst children severely effects sensitivity to pain, immune function, health care attitude and neurophysiology amongst children.[2] Pain control is of major concern when operating. In today's age there has been a paradigm shift from general anaesthesia to regional anaesthesia.Caudal block is the most consistent technique used for regional analgesia among paediatric subjects. However, it carries a disadvantage of shorter duration of action despite using longer acting anaesthetics like bupivacaine. Its duration of work can be extended by adding various adjuncts like opoids, neostigimine, alpha 2 agonists and ketamine.[3,4]Dexamethasone is a corticosteroid with anti-inflammatory and analgesicaction. It is also used for its antiemetic property. Studies have been conducted on its use amongst adults to decrease the incidence of pain.[5]It also diminishes the chances of nausea; vomiting and fever amongst children.[6] There have been differentstudies in the past that compared the use of dexamethasone in different ways during epidural block. The aim of the present study was to compare the effect of caudal versus intravenous dexamethasone as an adjuvant to epidural block.

### MATERIALS AND METHODS

This prospective study was conducted in the Department of anaesthesia for a period of 1 year. The study included 90 subjects belonging to ASA grade I and grade II category. Ethical committee clearance was obtained from the institutional ethical board and a written consent was obtained from guardians. Children with allergies, coagulopathies, neurological diseases or spinal deformities were excluded from the study. During the preoperative visit subject's baseline characteristics were noted. All the subjects were fasting 6 hours before the surgery. Complete blood examination, history and

physical examination of all the subjects were also performed. All the subjects were premedicated with0.01 mg/kg atropine, 0.05 mg/kg midazolam and 1.5 microgm/kg fentanyl. Patients were randomly allocated into three groups. Syringes were prepared for both iv and caudal block. The required monitors were attached to the patient on entering the operation theatre and the baseline BP, MAP, heart rate and oxygen saturation was recorded. A 22 gauge cannula was used to secure intravenous line and ringer's lactate was initiated at 4ml/ kg/hr. A constant air flow of 3-4 L/min was maintained using laryngeal mask. Group I patients established 0.15% of ropivacaine with 0.025 ml/kg of caudal normal saline. Group II patients established 0.15% ropivacaine with 0.1 mg/kg of dexamethasone and 0.125 ml/kg of iv normal saline. Group III patients established 0.15% ropivacaine with 0.025 ml/kg of normal saline caudally and 0.5 mg/kg of dexamethasone intravenously. Around 10 minutes after the block surgery was initiated. Vitals were monitored hourly for three hours followed by every three hours. The mean duration of surgery and the number of analgesics required postoperatively were noted. 15 mg/kg of paracetamol was given as rescue analgesia. All the data was arranged in a tabulated form and analysed using SPSS software. Chi square test was used to perform the statistical analysis and probability value of less than 0.05 was considered as significant.

## RESULTS

A total of 90 patients took part in the study with 30 patients in each group.

Table 1 demonstrates the demographic data, end tidal sevoflurane concentration and duration of surgery. The mean age in Group I was 3.2 +/- 1.7, in Group II was 3.7+/-1.1 and in Group II was 4.1 +/-2.0 years. All these parameters were comparable to each other and there was no significant difference between them. The mean duration of surgery in the groups was 38.52 +/-9.63, 32.77 +/- 12.1 and 40.21 +/-10.12 minutes respectively in the three groups.

Table 2 demonstrates the time of first rescue analgesia. It was significantly longer in Group II (13.1 +/- 3.3 hours) and Group III (11.4 +/-3.5 hours) as compared to Group I (3.2 +/- 1.1 hours). Total rescue analgesia doses were recorded to be 2.5 +/- 0.4 in Group I, 1.5 +/- 0.1 in Group II and 1.2 +/- 0.2 in Group III. The difference was significant between the groups. Clear fluids were initiated comparatively early in Group II (5.2 +/-0.4 hours) compared to Group III and Group I. The difference was significant amongst the groups. The time of discharge was same between all the groups.

Table 1 : Demographic data, end tidal conc of sevoflurane and duration of surgery

| Parameters | Group I | Group II | Group III |
|---|---|---|---|
| Age ( Years) | 3.2 +/- 1.7 | 3.7+/-1.1 | 4.1 +/-2.0 |
| Weight (Kgs) | 15.2 +/-3.1 | 14.6 +/-3.5 | 13.2 +/- 4.3 |
| Male:Female | 2:1 | 5:1 | 2:1 |
| End tidal conc of sevoflurane | 3.4 +/- 0.3 | 3.1 +/- 0.2 | 3.5 +/- 0.2 |
| Duration of surgery (mins ) | 38.52 +/-9.63 | 32.77 +/- 12.1 | 40.21 +/-10.12 |

Table 2 : Other comparative parameters

| Parameters | Group I | Group II | Group III | P value |
|---|---|---|---|---|
| Time for 1st rescue analgesia (hrs ) | 3.2 +/- 1.1 | 13.1 +/- 3.3 | 11.4 +/-3.5 | <0.05 |
| Number of analgesia doses | 2.5 +/- 0.4 | 1.5 +/- 0.1 | 1.2 +/- 0.2 | <0.05 |
| Time for initiation of clear fluids (hrs) | 7.4 +/- 1.5 | 5.2 +/-0.4 | 6.5 +/- 0.3 | <0.05 |
| Time to discharge ( days) | 1 | 1 | 1 | >0.05 |

## DISCUSSION

Pain control is of supremeposition amongst children. With pain child becomes anxious, frightened, insomniac and hence is shelled with unpleasant feelings. Other penalties of pain are vomiting, nausea, disturbance in sleep and parental disappointment.[7,8,9] Analgesics used orally are not apposite for children in the immediate postoperative time. The method of regional analgesia reduces pain as well as reduces the stress of surgery.[10] Caudal block is basically local anaesthesia inoculation in caudal epidural space and is a commonly used method of giving regional analgesia among children. One dose of caudal block provides partial period of analgesia. Different adjuncts are added to increase this duration. Different studies have been conducted which include addition of dexamethasone through caudal[11] or intravenous way.[12,13] Adding dexamethasone expressively increases the duration of analgesia. In our study, time of rescue analgesia was significantly longer in Group II (13.1 +/- 3.3 hours) and Group III (11.4 +/-3.5 hours) as compared to Group I (3.2 +/- 1.1 hours). Total rescue analgesia doses were recorded to be 2.5 +/- 0.4 in Group I, 1.5 +/- 0.1 in Group II and 1.2 +/- 0.2 in Group III. The difference was significant between the groups. Clear fluids were initiated comparatively early in Group II (5.2 +/-0.4 hours) compared to Group III and Group I. The difference was significant amongst the groups. The time of discharge was same between all the groups.Dexamethasone reduces the levels of bradykinin in tissues and constrains the release of neuropeptides from endings of nerve. COX-2 enzyme is

also inhibited by dexamethasone and hence leads to decrease inproduction neuropeptides that are responsible nociception.[14,15]. Systemic delivery of steroids is also an efficient tool to reduce postoperative pain but there have been inconclusive results.According to a study done by Bharath Srinivasan et al[16], a noteworthy reduction number of rescue analgesics and in time to first analgesia was observed. Dexamethasone also has antiemetic action because of its direct effect on nucleus tractus of the CNS. As per the study performed by Sinha et al[17], dexamethasone was a good substitute to clonidine and provided a stable hemodynamics and limited sedation during the immediate postoperative time. The main limitation of the present study was that there was no evaluation of motor block and late complications were not assessed.

## CONCLUSION

From the present study we that dexamethasone is a useful assistant to ropivacaine in providing caudal block for an efficient and effective analgesia without any undue side effects. It can be safely used amongst both adults and children for epidural block.

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