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Original Research Article

Safety of Post-Operative Epidural Analgesia in the Paediatric Surgery

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Abstract

Background: Regional analgesia has been associated with earlier ambulation and discharge, as well as decreased need for both narcotic and non-narcotic analgesics. Profound analgesia is produced with minimal physiologic alterations. This pain-free period provides ideal psychological conditions for the recovering child and the family, and because the duration of action of most blocks is fairly predictable, administration of a subsequent analgesic drug can be precisely timed so that it becomes effective as the block wears off. Regional anaesthesia is also useful when general anaesthesia is technically difficult or is associated with an increased morbidity & mortality.

Material and Method: The present study was carried out on sixty in the department of Anaesthesia. The study was carried out on Thirty paediatric patients admitted in surgical and orthopaedic units of the tertiary care hospital.

Results: Mean Weight in group A was 9.75 Kg with range of approximately 7 to 12 Kg and in group B the mean weight was 22.59 Kg with the range of approximately 15 to 29 Kg. The mean dose on the basis of weight, was 8.0 ± 0.72 mg/Kg in group A and 9.0 ± 0.59 mg/kg in group B. The mean volume of local anaesthetic solution (1.5%) came out to be 6.58 ±2.41 ml for group A and for group B it was 14.11±5.19 ml.

Conclusion: The patient wakes pain-free after surgery is over - child is much easier to manage and at the same time the anxiety of attendants becomes much less as the patient lies comfortably post-operatively. Many of the harmful effects of general anaesthesia when general anaesthesia is used as a sole anaesthetic technique, can be avoided by using epidural block.

Keywords: Analgesic, Paediatric, Post-operative and Epidural Analgesia.

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Introduction

In paediatric patients, most regional blocks are performed with the primary goal of providing postoperative analgesia. A child awakening without pain is much easier to manage than one who wakes with pain; it is possible that a child who wakes up after a regional block will never develop the same level of pain that a child who wakes up in pain will experience.[1]

Regional analgesia has been associated with earlier ambulation and discharge, as well as decreased need for both narcotic

and non-narcotic analgesics. Profound analgesia is produced with minimal physiologic alterations. This pain free period provides ideal psychological conditions for the recovering child and the family, and because the duration of action of most blocks is fairly predictable, administration of a subsequent analgesic drug can be precisely timed so that it becomes effective as the block wears off. Regional anaesthesia is also useful when general anaesthesia is technically difficult or is associated with an increased morbidity & mortality. Regional anaesthesia may offer an alternative to general anaesthesia in children with neuromuscular, metabolic, cardiac or chronic lung disease, with a history of malignant hyperthermia, and in emergency situations when patients are at increased risk of pulmonary aspiration of stomach contents. Regional anaesthesia provides analgesia without interfering with neurologic monitoring eg, cases of trauma in which neurological assessment remains incomplete and the vital signs are labile (particularly with accompanying head injury).[2]

In elective surgery, the objectives differ from those in an emergency situation. Regional anesthesia is one of several available anaesthetic techniques. It produces quick recovery from anesthesia while maintaining a potent analgesic effect in the post operative period that can extend from 3-24 hours.[3]

The present study has been undertaken to know the efficacy safety, advantages & disadvantages of the technique of epidural anaesthesia in paediatric age group.

Material and Methods

The present study was carried out on sixty in the department of Anaesthesia. The study was carried out on Thirty paediatric patients admitted in surgical and orthopaedic units of the tertiary care hospital.

Subject of Study:

The aim of the study was to see the efficacy, safety and cardiorespiratory stability under epidural anaesthesia in children undergoing various lower abdominal and lower limb surgical interventions:

Material:

- The material comprised of
- 21 G spinal needle
- Glass syringes
- Pulse oximeter for the measurement of oxygen saturation.
- Sphygnomanometer with paediatric size cuff for blood pressure measurement.
- Local anaesthetic- Lignocaine hydrochloride with adrenaline.

Selection of Patients:

The patients of either sex selected for study were those kept for operation by the department of surgery and orthopaedics as a routine or emergency case. The patients selected were of ASA Grade I and Grade Il, between the age group of I to 12 years, undergoing lower abdominal, perineal or lower limb surgery.

Exclusion criteria:

- Patients with respiratory disorder
- Patients with cardiovascular disorder
- Patients with neurological disorder
- Patients with disease of spine
- Patients with skin lesion at the site of lumbar puncture.
- Patients with any bleeding disorder.

All the patients were categorized in two groups:

Group A: Comprised of children aged 1 to 5 years-given epidural anaesthesia With 21 G hypodermic needle

Group B: Comprised of children aged 6-12 years-given epidural anaesthesia with 21 G spinal needle.

Method:

Each patient was examined thoroughly before premedication & in- duction of

anaesthesia. Pulse rate, blood pressure respiratory rate and oxygen saturation was seen and recorded.

Premedication:

Group A patients were premedicated with- Inj. Glycopyrrolate I / 0.1 mg to 0.2 mg & Inj. Ketamine I / in the dose of 1 mg/kg.

Group B patients were premedicated with Inj. Glycopyrrolate I/V 0.1 mg to 0.2 mg & Inj. Diazepam I/V 2.5 mg to 5.0 mg or Inj. Thiopentone sodium I/V 2-3 mg/kg body weight After premedicating the child, the child was preloaded with isolyte P/Ringer lactate (5-7 ml/kg body weight).

Technique

The child was placed in lateral position with knee &hip flexed. Now the back of the child was prepared for epidural injection, using savlon, betadine and sprit. Taking all aseptic precautions, the intervertebral space was identified - the vertebrae corresponding with the highest point of iliac crest being L_4, or the space corresponding with highest point of iliac crest being L_{4-5}. Now after identification of L_{4-5} or L_{3-4} intervertebral space, the 21 G spinal or hypodermic needle, depending upon the age of the patient, was inserted in the desired intervertebral space and advanced. Just when the tip of the needle pierced the subcutaneous tissue the advancement was stopped and a frictionless & leakage free glass syringe filled with 3-5 ml of air was attached to the needle. The needle was advanced into the epidural space by maintaining a pulsatile pressure with the thumb, to detect the loss of resistance. As the tip of the needle entered the epidural space piercing ligamentum flavum, there was a sudden loss of resistance and the piston moved freely forwards in the syringe.[4]

Local anaesthetic solution - 2% lignocaine hydrochloride with adrenaline in the dose of 7-10 mg/kg diluted to 1.5% was injected in the identified epidural space after negative aspiration test for cerebrospinal fluid or blood. Now the patient was immediately made supine and the surgery was allowed to proceed after the establishment of block.

Results

The present work "To see the efficacy, safety and cardiorespiratory stability under epidural anaesthesia in children undergoing various lower abdominal & lower limb surgical interventions" has been made on a series of 30 cases admitted in Medical College Hospital. The following observations have been made.

Table 1: Age, Sex Incidence

Age in year	No. of Male	No of Female	Total Number	% of Males	% of Females
1-5	7	02	9	77.77	22.23
6-12	16	05	21	76.19	23.81

The maximum number of cases studied, were in the age group of 6-12 years with the male female ratio of 3.3:1 Males predominated, being about 77%. There was significant difference in number of cases in both groups ($p<0.05$).

Table 2: Mean Weight of patients and mean dose requirement of Lignocaine hydrochloride with adrenaline on the basis of Weight in both groups:

Group	Mean Weight (Kg)±SD	Mean dose (Mg/Kg) ±SD (of 2% sol.)	Mean dose (Mg/Kg) ±SD (of 1.5% sol.)
A	9.75±2.84	8.0±0.72	6.85±2.41
B	22.59±6.96	9.0±0.59	14.11±5.19

Mean Weight in group A was 9.75 Kg with range of approximately 7 to 12 Kg and in group B the mean weight was 22.59 Kg with the range of approximately 15 to

29 Kg. The mean dose on the basis of weight, was 8.0 ± 0.72 mg/Kg in group A and 9.0 ± 0.59 mg/kg in group B. The mean volume of local anaesthetic solution (1.5%) came out to be 6.58 ±2.41 ml for group A and for group B it was 14.11±5.19 ml.

Discussion

Regional anaesthesia was not popular in paediatric patients, but now there has been growing interest for this technique. Epidural anaesthesia can be used for lower abdominal and lower limb surgeries. Regional anaesthesia provides the advantages of reduced requirements for other anaesthetic agents and excellent post operative analgesia.[5]

It was only toward the middle of the 1970's that general anaesthesia, used alone, was again seen as having limitations that needed con- sideration. Timidly at first then almost explosively, the numerous advantages of regional anaesthesia began to be openly reaffirmed again. The resulting redevelopment and acceptance of regional anaesthesia was amplified by the new availability of less traumatic devices and less toxic local anaesthetics, as well as by the considerable scientific advances in anatomy, physiology, and pharmacology as they applied to the use of local anaesthetics for all age groups and, specifically, for children.[6]

At a time, when the agent of choice for paediatric anaesthesia was chloroform, the introduction of spinal anaesthesia [7,8,9] produced a considerable reduction in morbidity and mortality. Other advantages of note were limitation of anaesthesia to the part to be operated on, muscular relaxation and avoidance of the over distended gut but, more significantly, during the postoperative period there was an almost total absence of vomiting, with an associated rapid return to normal feeding. Gray was also impressed by the long duration of post operative analgesia and the commensurate reduction in the use of opioids.

The introduction of neuromuscular blocking agents to paediatric anaesthetic practice [9] followed by halothane, coincided with a growing controversy over the use of techniques such as spinal anaesthesia in children. Some authors continued to extol the technique." spinal anaesthesia is an excellent method for children", while others contended that "Spinal anaesthesia in children has been and still is frowned upon by the majority of anaesthetists and surgeons” [10].

Following the Woolley and Roe case, it was proposed that all forms of local anaesthesia for major surgery should give place to general anaesthesia.

Resurgence of interest among paediatric anaesthetist was initially driven by the desire to administer local anaesthetics and opioids in epidural sac for post-operative analgesia [11].

Conclusion

The patient wakes pain-free after surgery is over - child is much easier to manage and at the same time the anxiety of attendants becomes much less a s the patient lies comfortably post-operatively. Many of the harmful effects of general anaesthesia when general anaesthesia is used as a sole anaesthetic technique, can be avoided by using epidural block. Side effects or complications of the technique itself are negligible as most of the patients in this age group are uncooperative, they can be supplemented with light general anaesthesia prior to the procedure.

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