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Original Research Article

Pediatric Surgery: The Safety of Post-Operative Epidural Analgesia

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Abstract

Background: Early ambulation and discharge as well as a reduction in the requirement for both narcotic and non-narcotic analgesics have been linked to regional analgesia. It produces profound analgesia with little change in physiology. The psychological conditions during this pain-free phase are excellent for the healing child and family. Additionally, since most blocks have a fairly predictable duration of action, it is possible to carefully time the administration of a second analgesic medication to take effect when the block wears off. When general anesthesia is technically challenging or linked to a higher risk of morbidity and death, regional anesthesia can also be helpful.

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: Following the procedure, the patient wakes up pain-free, the child is much easier to handle, and the attendants' worry decreases significantly as the patient lies comfortably following the procedure. Using an epidural block can help prevent many of the negative consequences of general anesthesia when it is the only anesthetic approach employed.

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

Introduction

The main objective of most regional blocks in pediatric patients is to provide postoperative analgesia. It is likely that a child who wakes up after a regional block would never suffer the same amount of agony that a child who wakes up in pain will. A child who wakes up without pain is considerably easier to manage than one who wakes up with pain. [1]

Early ambulation and discharge as well as a reduction in the requirement for both narcotic and non-narcotic analgesics have been linked to regional analgesia. It produces profound analgesia with little change in physiology. The psychological conditions during this pain-free phase are excellent for the healing child and family. Additionally, since most blocks have a fairly predictable duration of action, it is possible to carefully time the administration of a second analgesic medication to take effect when the block wears off. When general anesthesia is technically challenging or linked to a higher risk of morbidity and death, regional anesthesia can also be helpful. In children with a history of malignant hyperthermia, neuromuscular, metabolic, cardiac, or chronic lung disease, or in emergency scenarios where patients are at danger of aspirating stomach contents into their lungs, regional anesthesia may be a better option than general anesthesia. In trauma instances where the neurological evaluation is still incomplete and the vital signs are erratic, regional anesthesia offers analgesia without interfering with neurologic monitoring (especially when there is a concomitant head injury). [2]

The goals of elective surgery are not the same as those of an emergency. Among the several anesthetic methods accessible is regional anesthesia. It results in a speedy anesthetic recovery while continuing to have a strong analgesic effect for up to 24 hours following surgery. [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 an- aesthesia 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.O±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

While pediatric patients were not routinely treated with regional anesthetic, there is currently a growing interest in this approach. Epidural anesthesia can be used for procedures on the abdomen and lower limbs. Better post-operative analgesia and a reduced requirement for further anesthetics are two advantages of regional anesthesia. [5]

It wasn't until the middle of the 1970s that general anesthesia was acknowledged to have disadvantages that needed to be taken into account when used alone. The numerous advantages of regional anesthesia were openly reaffirmed once more, and they began slowly before exploding. The availability of less traumatic devices and toxic local anaesthetics, along with significant scientific advancements in anatomy, physiology, and pharmacology as they relate to the use of local anesthetics for children in particular, all contributed to the subsequent redevelopment and acceptance of regional anesthesia. [6]

At a time, when the agent of choice for paediatric anaesthesia was chloroform, the introduction of spinal anaesthesia [7] produced a considerable reduction in morbidity and mortality. Notable benefits included restricting anesthesia to the area that needed to be operated on, relaxing muscles, and avoiding an overly distended stomach. However, the most noteworthy benefit was the near complete lack of vomiting during the recovery phase, which coincided with a swift return to regular feeding. The extended duration of post-operative analgesia and the corresponding decrease in opioid use also impressed Gray. [8]

Growing criticism around the use of procedures like spinal anesthesia in children coincided with the introduction of neuromuscular blocking drugs and halothane to pediatric anesthesia practices. [9] A few writers went on to praise the method.Some argued that "spinal anesthesia in children has been and still is frowned upon by the majority of anaesthetists and surgeons," while others said that "spinal anesthesia is an excellent method for children." [10]

It was suggested that general anesthesia should replace all types of local anesthesia for major surgery in the wake of the Woolley and Roe case.

The need to give local anesthetics and opioids in an epidural sac for post-operative analgesia first sparked a resurgence of interest among pediatric anesthetists. [11]

Conclusion

following surgery, the patient wakes up pain-free, the child is much easier to handle, and the attendants' worry decreases significantly as the patient lies comfortably following the procedure. Using an epidural block can help prevent many of the negative consequences of general anesthesia when it is the only anesthetic approach employed. Since the majority of patients in this age bracket are uncooperative, there are very few side effects or difficulties from the treatment itself. Light general anesthesia might be used in addition before the procedure.

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