



## POST OPERATIVE ANALGESIA FOR CIRCUMCISION IN PAEDIATRIC PATIENTS: COMPARISON AMONG PENILE BLOCK, DICLOFENAC SODIUM SUPPOSITORY AND LIGNOCAINE JELLY APPLIED LOCALLY

### KEYWORDS

Penile block, Dorsal nerve root block, Bupivacaine, Lignocaine, Diclofenac sodium, Visual Analogue Score

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### ABSTRACT

In present scenario, the anesthesiologist is not only concerned with peri operative care of patient, but also plans for the post-operative pain management. Pain management is an essential component of care provided by paediatric anaesthesiologists. Prospective, randomized controlled study was carried out to evaluate the better option for pain relief in 60 children between age group of 2 to 12 years of ASA I & II undergoing circumcision divided in to three groups of 20 patients. All patients were given General anaesthesia and they received penile block with 0.5% Bupivacaine 2 mg/kg (group A), Diclofenac sodium suppository 2-3 mg/kg (group B) and Lignocaine jelly 2%, 1-2 ml application over operative site. Intraoperative and post operative vitals, duration of surgery, post operative analgesia, Visual Analogue Score and any side effects were observed.

### INTRODUCTION

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage".

Usually penile surgeries lead to moderate to severe post-operative pain. In children this pain leads to excessive crying, restlessness agitation. So it is very difficult to manage child post operatively by nurses and parents. Circumcision is considered as day care surgery so early ambulation and rapid recovery is of prime importance.

Many anaesthetic techniques have been recommended, including administration of parenteral narcotics, non steroidal anti inflammatory drugs, caudal block, ring block at base of penis, topical anesthesia and dorsal nerve block.

Rectal administration of drugs in children is a safe and convenient route. Diclofenac and acetaminophen are commercially available in a pediatric suppository formulation<sup>10,11</sup>. Caudal block is very effective, but performing a central block for minor surgery is controversial<sup>1</sup>. Topical anesthesia with use of any of available preparation of lignocaine (Spray, ointment, jelly) is simple, safe and can be repeated

Baleman advocates penile blockade as a simple and equally effective alternative<sup>2</sup>.

This study was undertaken to evaluate better option for pain relief in children after circumcision.

### AIMS AND OBJECTIVES

To study different methods of post operative analgesia for circumcision.

- To compare & evaluate the post-operative analgesic effect of penile block, Rectal Diclofenac Sodium Suppository and Lignocaine jelly (2%).

### REVIEW OF LITERATURE

Misconceptions about pain in children were common, including belief that children do not feel pain & if felt, it is not remembered. Reasons for this includes – treatment often ignored, inadequate

pharmacological information and assessment of pain is quite difficult. Superficial operations on the penis, especially circumcision, usually cause moderate to severe postoperative pain. Pain management is an essential component of care provided by pediatric anaesthesiologists. In children, even the definition of pain has been debated (Anand and Craig, 1996), pain is a complex constellation of unpleasant sensory, perceptual, and emotional experiences and certain associated autonomic, psychological, emotional, and behavioral responses.

In 1983, **P.M. Yeoman et al**<sup>15</sup> had conducted a prospective blind trial to compare the analgesia and adverse effects produced by caudal block with blockade of the dorsal nerves of the penis in 38 boys undergoing elective circumcision. The degree and duration of postoperative analgesia was similar in both the groups, more than 40% of patients were completely pain free for more than 6 hours. However, the caudal block had a higher incidence of motor blockade. They concluded that a penile block was a satisfactory alternative to caudal blockade with regard to postoperative analgesia and offered specific advantage of no motor blockade.

In 1988, **M.E Bone and D. Fell**<sup>2</sup> conducted a study to compare the effectiveness of Diclofenac suppository and Inj. Papaveretum in the management of pain and restlessness after tonsillectomy in children. In their opinion, Diclofenac offered the advantage of less respiratory depression, less requirement for post-operative analgesic and a patient remained awake and calm in early post-operative period as compared to Papaveretum.

### MATERIAL AND METHOD

After receiving the institutional ethical committee approval, 60 children between age group of 2 to 12 years of ASA I & II undergoing circumcision were enrolled in this study. Thorough pre-anesthetic check-up and routine investigations were carried out. Parents were explained about procedures and informed consent was obtained. Patients were kept nil by mouth (NBM) as per guidelines before the scheduled surgery and were randomly allocated in one of the following three groups of 20 patients each.

In group A:

Penile block with Bupivacaine plain 0.5% 2 mg/kg at 2 O'clock & 10 O'clock positions at root of penis.

**In group B:**

Diclofenac sodium suppository 2-3 mg/kg was inserted per rectally.

**In group C:**

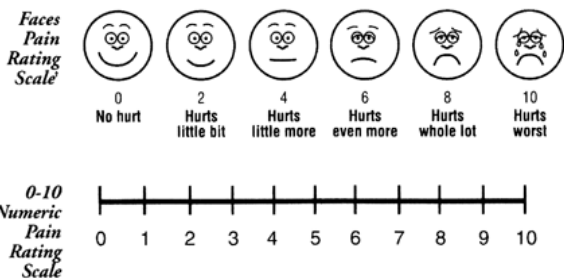
At the end of operation, Lignocaine jelly 2%, 1-2 ml was applied at the site of operation.

Pre-operative vitals – Temperature, Pulse rate, Systolic blood pressure and Oxygen saturation rate were recorded. All patients were pre-medicated with Inj. Glycopyrrolate 0.004-0.01 mg/kg and Inj. Midazolam 0.04-0.07 mg/kg I/M, 30 minutes prior to surgery. After securing I/V line, Inj. Isolyte- P / 5% Dextrose was started at the rate of 4-5 ml/kg I/V. General anaesthesia was administered to all patients. After pre-oxygenation with 100% Oxygen for 3-4 minutes, patients were induced with Inj. Ketamine 1-2 mg/kg I/V and maintained with 1/3rd of induction dose of Ketamine intermittently as & when required and 100% Oxygen via face mask. Intra operatively vitals were monitored at every 5, 10, 15, 20 and 30 mins.

Postoperatively patients were assessed for pain by a single independent blind observer using pediatric objective pain scale in age group of 2 to 6 years and by visual analogue scale in age group of 6 to 12 years, at every 10 minutes for 30 minutes; every hourly for 6 hours and then every six-hourly for 24 hours post operatively.

Pain free period was recorded as time from the termination of general anaesthesia to the time the children started crying or complained of pain.

When the pain score of 7 or more was observed on two successive observations of Pediatric Objective pain scale, and pain score of 4 or more was observed according to Visual analogue scale, the rescue analgesia in form of Acetaminophen syrup (in sugar syrup) or tablet (10-15 mg/kg) was given.



The statistical analysis was performed by ANOVA multiple comparison test. A value of p < 0.05 is considered significant and p < 0.001 is considered highly significant while p > 0.05 is considered insignificant.

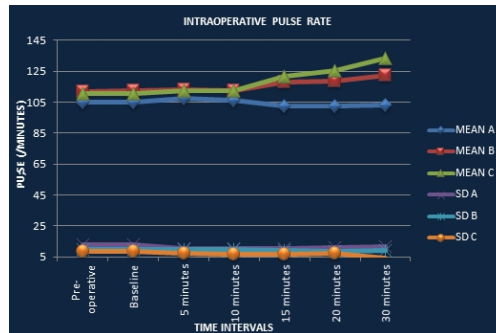
**OBSERVATION AND RESULT**

The present study was conducted in 60 children of ASA I & II with age ranging 2 to 12 years.

After induction with general anaesthesia, Penile block was given with Bupivacaine plain 0.5% 2 mg/kg at 2 O'clock & 10 O'clock positions at root of penis in group A, and in Diclofenac sodium suppository 2-3 mg/kg was inserted per rectally in group B while in group C, Lignocaine jelly 2%, 1-2ml applied locally at the operative site.

Demographically all the patients were comparable in all groups. (p > 0.05)

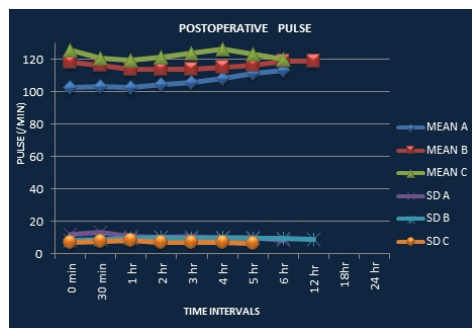
O<sub>2</sub> saturation was stable throughout the surgery in all groups. (p > 0.05)



**CHART 1: INTRAOPERATIVE PULSE RATE**

Baseline pulse in group A was 104.7 ± 12.77, in group B was 112.4 ± 9.51 and in group C was 110.7 ± 8.37 mins. No significant change in pulse rate was observed in all three groups during first 10 mins of induction (P>0.05).

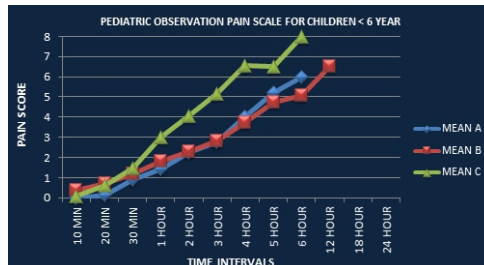
After 10 mins of induction, the mean pulse rate gradually raised from 112.6±9.45 to 122±9.09 mins in group B and from 112.4±6.7 to 133.6±4.1 mins in group C till the end of surgery and it was statistically significant as compared to group A (p<0.05) as it was stable throughout the surgery.



**CHART 2: POST OPERATIVE PULSE RATE**

Immediate post operatively mean pulse rate was 102.7 ± 11.81 in group A, 118.3 ± 8.52 in group B and 125.7 ± 7.35 mins in group C.

Mean pulse rate in group B (~ 118 mins) and group C (~ 123 mins) remained significantly higher than group A (~ 108 mins) at different intervals throughout post operative period till rescue analgesia was administered (P<0.05).



**CHART 3: PEDIATRIC OBJECTIVE PAIN SCALE FOR PATIENTS < 6 YEAR OF AGE**

In immediate post operative period the pain score in group B was 0.36 ± 0.5 compared to 0.08 ± 0.28 in group C and 0 in group A but difference was not significant (P>0.05). There was mild pain in first half an hour after surgery in group B (1.18 ± 0.40) and in group C (1.46 ± 1.05) but no rescue analgesia was required.

Up to 5 hours of surgery, though pain score remained significantly higher in group C (mean pain score ~ 4.89) compared to group A (mean pain score ~ 2.96) & group B (mean pain score ~ 3.13), no rescue analgesia was required (P<0.05).

Mean time for rescue analgesia was at 6 hrs in group A (mean pain score 6.0 ± 1.0), at 12 hrs in group B (mean pain score 6.50 ± 0.55) and at 5 hrs in group C (mean pain score 6.50 ± 0.71).

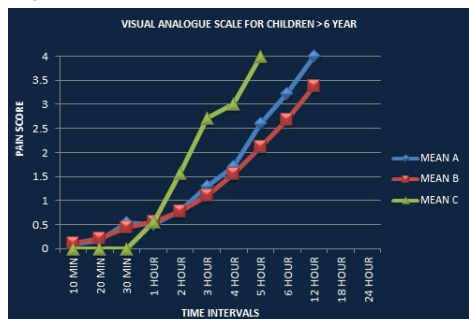


CHART 4: VISUAL ANALOGUE SCALE FOR PATIENTS ≥ 6 YEAR OF AGE

Comparing VAS in immediate post operative period, the pain score in group B was 0.11 ± 0.33 compared to 0.09 ± 0.30 in group A and 0 in group C which was not significant (P>0.05).

There was mild pain in first half an hour after surgery in group A (0.55 ± 1.21) and in group B (0.44 ± 0.53) but no rescue analgesia was required. No pain observed in group C (0). After two hours of surgery, though pain score remained significantly higher in group C (mean pain score ~ 2.58) compared to group A (mean pain score ~ 1.45) & group B (mean pain score ~ 1.27), no rescue analgesia was required (P<0.05). Mean time for rescue analgesia was at 6 hrs in group A (mean pain score 3.22 ± 0.67), at 12 hrs in group B (mean pain score 3.38 ± 0.52) and at 4 hrs in group C (mean pain score 3.0 ± 0.89).

TABLE 1: DURATION OF ANALGESIA

TIME	GROUP A (MEAN ±SD)	GROUP B (MEAN ±SD)	GROUP C (MEAN ±SD)	P VALUE
DURATION (HOURS)	6.83 ± 2.09	12.35 ± 1.93	4.1 ± 0.91	P < 0.05

The average effective pain free period in group A (Penile block) was 6.83 ± 2.09 hours, in group B (Diclofenac sodium suppository) was 12.35 ± 1.93 hours and in group C (Lignocaine jelly) was 4.1 ± 0.91 hours. The difference was highly significant among all three groups (P < 0.001).

The duration of analgesia was significantly longer with Diclofenac sodium suppository.

TABLE 2: SIDE EFFECTS

PARTICULARS	GROUP A	GROUP B	GROUP C
NO ORAL INTAKE	NIL	NIL	NIL
VOMITING	NIL	NIL	NIL
ALLERGIC REACTION	NIL	NIL	NIL
NOT ABLE TO PASS URINE	NIL	NIL	NIL
ABSENT NORMAL MOBILITY	NIL	NIL	NIL
DISTURBED SLEEP	NIL	NIL	NIL
HEMATOMA	NIL	NIL	NIL

None of the patients in any group had any complications like vomiting, allergic reaction, and difficulty in micturition, absence of normal mobility, disturbed sleep or hematoma at site of injection.

DISCUSSION:

Postoperative pain relief has become a subject of utmost concern for

anaesthesiologists nowadays particularly in paediatric age group. The fear of pain can lead to physiological and psychological effects along with long term post-operative disturbances like aggression, crying, regressive behaviour, night cries, poor bladder control, eating and sleeping problems in children. Therefore various pharmacological adjuncts are being researched to relieve pain and avoid all these consequences.

In this study we compared the effect of penile block, Diclofenac sodium suppository & Lignocaine jelly for post-operative analgesia, after circumcision in paediatric patients. Study was conducted in 60 patients of ASA I & II with age ranging from 2 to 12 years. Patients were randomly divided into three groups of 20 in each as follows:

- GROUP A: Penile block with 2mg/kg, 0.5% Bupivacaine
- GROUP B: Diclofenac sodium suppository 2-3 mg/kg
- GROUP C: Lignocaine jelly 2%, 1-2 ml locally

In present study in all three groups, the difference in mean pulse rate at different interval starting from pre operatively to 10 mins intraoperatively showed no statistical significance (P>0.05). But after 10 mins of induction, mean pulse rate was remained stable in group A compared to group B and group C, which was statistically significant (P < 0.05).

Throughout post operative period, mean pulse rate in group B (~ 118 mins) and group C (~ 123 mins) remained significantly higher than group A (~108 mins) at different intervals till rescue analgesia was required (P < 0.05).

P.M.Yeoman et al (1983)<sup>15</sup> had conducted a prospective blind trial to compare the analgesic effect of caudal block and dorsal nerve block of penis in 38 boys undergoing elective circumcision. According to them effect of the effect of both types of block appeared to wane after 3 to 4 hours. They did not noticed significant change in pulse rate associated with removal of foreskin. These findings were co-inside with present study.

Frederick J. Goulding (1981)<sup>7</sup> and his colleagues tried penile block with Bupivacaine 0.5 % for postoperative pain relief in all types of penile surgery in 50 patients, one group received penile block + GA while another group received only general anaesthesia. They concluded that penile block obviated the need for analgesia within first 6 hours. Similarly in our study, penile block provided effective analgesia for 6-7 hours.

Sylaidis P and O' Neill T J (1998)<sup>12</sup> studied effect of Diclofenac (1 mg/kg) analgesia following cleft palate surgery in twenty children between age of 6 month to 9 years. They concluded that usage of twice daily rectal suppositories of Diclofenac had provided smooth, well controlled post operative analgesia, obviating the need for opiates and thus able to be discharged early. In our study we observed longer duration of analgesia with Diclofenac sodium suppository (~12 hours). The result was comparable to our study.

Dalens B et al (1989)<sup>4</sup> performed penile block via sub pubic space in 100 children between ages of 3 months to 16 years undergoing surgery of the penis under light general anaesthesia. All patients were given penile block via sub pubic space using 0.2 ml/kg of 1% Lidocaine plain (Group A) and 0.5% Bupivacaine (Group B). According to them 0.5% Bupivacaine provided significantly longer postoperative analgesia. (~24 hours). In contrast to this study, we observed that Bupivacaine (0.5%) had effective analgesia for 6-8 hours only.

In present study, side effects like no oral intake, vomiting, allergic reaction, difficulty in micturition, absence of normal mobility, disturbed sleep or hematoma at site of injection were not observed in any of the groups.

**Thara Tree - Trakarn and his co-workers (1987)<sup>13</sup>** evaluated the efficacy of repeated application of lignocaine jelly in obviating post circumcision pain in seventy – nine healthy men (17-65 years) and boys (3-12 years). They found that in the recovery room, 70% of patients in the children-lignocaine group had no pain up to 4-6 hours, while only 20% of the children-placebo group had no pain up to 1-2 hours. They concluded that repeated application of lignocaine jelly on the circumcision wound was highly effective, safe and convenient method to obviate post-circumcision pain in children during the early post operative period. The result was comparable to our study as duration of analgesia with lignocaine jelly was 4-5 hours.

#### SUMMARY & CONCLUSION

Penile block gives satisfactory pain relief in immediate post operative period for 5-6 hours while Diclofenac sodium suppository inserted post induction shows higher pain score for initial half an hour but no need for analgesics up to 8-14 hours but some patients may require analgesic in immediate post operative period. Lignocaine jelly (2%) applied at operative site after completion of surgery provides post operative analgesia for 4- 5 hours. Thus, Diclofenac sodium suppository is superior to Penile block and Lignocaine jelly(2%) in respect to duration of analgesia but in immediate postoperative period Penile block or Lignocaine jelly application appeared to be better in terms of low pain score.

So we recommend combination of Penile block and Diclofenac suppository as an ideal technique to provide post operative analgesia in Paediatric patients undergoing penile surgery.

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