



COMPARISON OF POSTOPERATIVE ANALGESIC EFFICACY OF PENILE BLOCK, CAUDAL BLOCK AND TOPICAL ANAESTHESIA FOR CHILDREN UNDERGOING CIRCUMCISION.

Urology

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ABSTRACT

Background:- Penile surgery is an important constituent in pediatric urology and circumcision is a widely performed procedure. Managing postoperative pain is thus vital.

Methods:- In this prospective observational study, 90 patients in age group 1 to 12 years underwent circumcision. Patients were divided in 3 groups receiving penile, caudal and topical block. Pain measurement was done by FLACC (Face, legs, activity, cry, consolability) pain score at 5 minutes, 30 minutes, 1 hour and 2 hours postoperatively and compared and statistical tested.

Results:- Patients in penile block group had significantly lower pain score at 30 minutes compared to other two groups.

Conclusion:- Penile and caudal nerve block are both equally effective but the ease of application and fewer complications of penile block would make it a preferable choice. The discretion of choosing between the two in children should be left on the attending anaesthesiologist, their comfort and skill.

KEYWORDS

Circumcision, Phimosis, Penile Block, Analgesia, Topical Block, Caudal Anesthesia

INTRODUCTION:-

Circumcision is one of the most frequently performed penile surgeries for various reasons. It is a painful intervention in pediatric surgery.

Postoperative pain may lead to crying and agitation, which may, in turn, increase the chances of bleeding (1). Effective pain control has been accepted as an ethical, moral and physiological necessity (2). Pain management techniques should be reliable, easy to administer, safe with minimal risk of adverse effects to the patient and have a rapid recovery. Some of the commonly used methods are penile block, caudal block, penile ring infiltration, topical local anaesthetic application and administration of paracetamol (3).

The most non-invasive, easy to administer yet effective method of postoperative pain relief after circumcision is topical analgesia. Topical applications such as lignocaine, EMLA (eutectic mixture of local anaesthetics) can be repeated in the postoperative period and applied in the form of a spray, gel or ointment. However, the efficacy of these simple techniques as well as comparisons with caudal and penile blocks has not been evaluated adequately (4).

Measurement of pain in pediatric population is difficult, specially with infants as they are non-verbal, and it is mainly obtained by observation of some characteristics and habits like facial expressions and motor movements. This has formed the basis of pain scoring systems in children. For older children, self-reporting is the gold standard for pain assessment.

AIM:

To compare the efficacy of three analgesic procedures for postoperative pain relief: penile block, caudal block and topical anaesthesia administration for circumcision.

MATERIALS AND METHODS:

We conducted a prospective, observational study at Lokmanya Tilak Municipal Medical College and General Hospital (LTMGH), Mumbai between December 2018-December 2019 for a period of 1 year. Our study comprised of 90 patients who were sampled by consecutive convenience. Parameter studied was pain score. The study was started after Ethical Committee clearance and was completed after fulfillment of closure criteria of the study. Informed written consent was obtained

from all the patients' parents.

Inclusion criteria:

All paediatric patients (between 1 to 12 years of age) who underwent circumcision for phimosis in the Department of Paediatric Surgery at LTMGH.

Exclusion criteria:

1. Patients with infective lesions over the groin
2. Patients who were not fit for general anaesthesia
3. Patients who underwent circumcision with another procedure

Method:

Preoperatively, patients were allocated three groups by consecutive convenience. Group 1 included patients who received topical block, group 2 consisted of penile block patients and group 3 were those who received caudal block.

Caudal block was given by the anesthesiologist after the induction of general anesthesia in lateral decubitus position. Under all aseptic precautions, a scalp vein needle of appropriate size was passed through skin and the sacrococcygeal ligament, overlying the sacral hiatus and 0.5 mL/kg of 0.25% bupivacaine injected.

Penile block was performed by injection of 0.2 mL/kg 0.25% bupivacaine by 24 gauge needle. This was given before the procedure under the superficial fascia to the triangular hiatus (symphysis pubis, membranous layer of superficial fascia, corpus cavernosus).

Topical anaesthesia was given with lignocaine 10% spray with 10mg/puff upto a maximum dose of 5mg/kg immediately after the procedure

The primary outcome was the assessment of postoperative pain intensity and rescue analgesia in the postoperative period.

Pain evaluation was performed at the postoperative 5th and 30th minutes and the first and second hours. All patients were evaluated in the pediatric recovery room by two different blinded observers. All children were observed and recorded for pain, sedation, and side effects (nausea, vomit, agitation, penile hematoma, bleeding, motor

block, urinary retention).

For postoperative pain, the FLACC Pain Scale (FLACC: A behavioral scale for scoring postoperative pain in young children) (Table 1) was used.

Table 1: FLACC Pain Evaluation Scale

Categories	0	1	2
Face expression	No special expression	Slight frowning, grimace	Mop, teeth clenching
Legs	Normal position	Tight, stressful	Kick at any body
Activity	Calm	Turn around	Hop off, jerk
Crying	No cry	Groan, moaning	Shouting cry, with screams
Consolability	Relaxed	Consoled with hug or touch	Never consoled

Each of the five categories (F) Face, (L) legs, (A) Activity, (C) Cry, (C) Consolability is scored from 0-2, which results in a total score between zero and ten.

If the FLACC pain score was 5 or more, 1 mg/kg of intravenous paracetamol was given. Pain scores obtained at time intervals after intervention for additional analgesia were not taken into account for statistical analysis and interpretation.

All patients were given oral two hours after the operation, when the control of pain, consciousness, nausea, vomiting and surgical complications was completed and oral intake was allowed.

Ibuprofen (10mg/kg-orally) was given two hours post-surgery and patient discharged unless any complications occurred.

Statistical analysis: The statistical analysis was carried out using the SPSS 24.0 package program for Windows. For the numerical data, descriptive analysis with the mean and standard deviation were used. One-way ANOVA test was used for comparison of groups. P value of < 0.05 was used for statistical significance at 95% confidence interval.

RESULTS:-

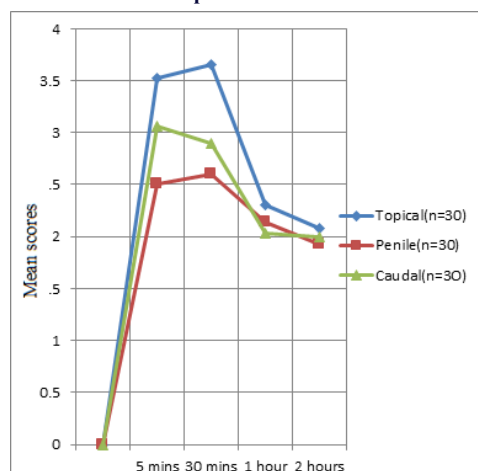
In our study, a total of 90 patients were included that were grouped to receive 3 different modes of anaesthesia for undergoing circumcision. Analgesic efficacy was compared with previously defined pain scores. 30 patients each received topical block, penile block and caudal block.(Table 2)

Table 2: Mean age, weight and operative time in each group.

	Topical(n=30)	Penile(n=30)	Caudal(n=30)
Age (years)	5.78±3.07	5.66±3.31	3.00±2.00
Weight (kgs)	17.23±7.52	16.88±7.65	11.65±4.42
Operative Time (Minutes)	20.66±3.65	20.66±3.88	20.83±3.73

Pain scores at different time intervals were compared (Figure1)

Figure 1 shows the trend of pain scores at different time intervals.



Mean pain scores at different time intervals were compared for statistical significance (Table 3)

Table 3: Mean pain scores at different time intervals.

Parameter	Topical(n=30)	Penile(n=30)	Caudal(n=30)	Pvalue
5min	3.53±1.48	2.50±1.48	3.06±0.94	0.013
30min	3.66±1.93	2.60±1.52	2.90±1.09	0.028
1hour	2.30±1.45	2.15±1.26	2.03±0.84	0.688
2hours	2.08±1.30	1.92±1.17	2.00±0.82	0.857

Mean scores in topical, penile and caudal group at 5 minutes was 3.53, 2.50, 3.06 respectively and the difference was statistically significant. At 30 minutes the score was 3.66, 2.60, and 2.90 with significantly less score in penile group. Scores at 1 hour and 2 hours were not statistically significant.

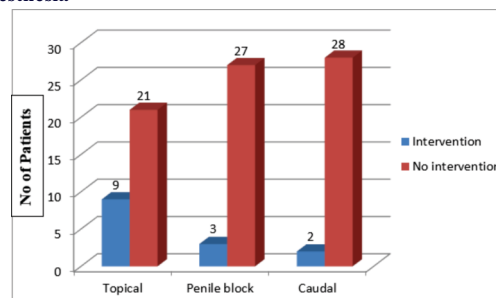
P value of 3 groups were compared at different times for statistical significance (Table 4)

Table 4: Comparison of P values of the three groups at different times intervals based on the pain score

Parameter	P Value			
	5 min	30 min	1 Hour	2 Hours
Topical Vs Penile	0.009	0.021	0.670	0.618
Penile Vs Caudal	0.085	0.383	0.665	0.760
Topical Vs Caudal	0.147	0.065	0.381	0.776

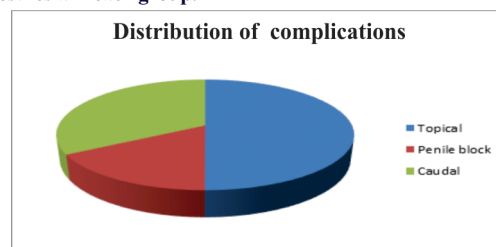
The difference between topical and penile block at 5 minutes and 30 minutes for pain scores was statistically significant.

Figure 2 shows analgesic requirement amongst various groups of anaesthesia



9 of 30 patients (30%) in the topical group had pain scores more than 5 requiring additional analgesia compared to 3 out of 30 (10%) in penile block and 2 of 30 (6.66%) in the caudal group of patients.

Figure 3: Percentage of postoperative complications related to anaesthesia in each group.



2 patients in the caudal group had urinary retention, 1 in penile block and 3 in topical anaesthesia group had minor bleeding which was controlled by compression.

None of the patients had any major complications like postoperative nausea, vomiting, penile hematoma, seizures, fever, motor block or lower limb numbness. No block failures were seen in our study.

DISCUSSION :-

As circumcision is a day-care surgery, it is mandatory to reduce postoperative pain with minimal sedation and motor block. The analgesic methods need to be reliable, effective and compatible with fast recovery and low incidence of complication.

Studies have shown regional techniques to be more effective than systemic opioids, non-steroid anti-inflammatory drugs, and acetaminophen for postoperative analgesia in circumcision (5).

The topical application of local anaesthetic has been used and studied

but it yet has not been adopted universally for postcircumcision analgesia(6).

Caudal nerve block can have uncommon complications like accidental intravenous or intramarrow injection, dural puncture, neuralgia and infection. Caudal block is a more expensive and time-consuming technique. Dorsal penile nerve block, although easier to perform, can have complications like edema ,anaesthetic toxicity, ischaemia of the penis and hematoma(7). Penile block does not require any special positioning and it reduces the adrenocortical stress response and behavioural distress. Penile block should be performed at the beginning of the operation for better efficacy.

In our study 10 % patients with penile nerve block and 6.6% with caudal block required additional analgesia.0.2 mL/kg and 0.5mL/kg of 0.25% bupivacaine was used for penile nerve block and caudal block respectively in our study.

Sfez et al. used 0.25 and 0.5 mg/ kg bupivacaine for penile nerve block, achieving equivalent analgesic effectiveness with both doses(8).

Weksler et al used 0.5%, 0.2mL/kg body weight of plain 0.25% bupivacaine for penile block and 1mL/kg body weight for caudal. They found penile and caudal block to be equally effective for postcircumcision analgesia(3) which was similar to our findings.

Beyaz et al also had similar results in terms of postoperative analgesic efficacy and supplementary analgesic needs of penile block and caudal block in their prospective randomized study(9).

In a study by **Sandeman DJ et al** mean failure incidence of penile nerve block was 3-10% and 30 % of patients with penile nerve block required additional analgesia which was more than our study showing 10 % and no block failures (10).

Serour et al indicated that edema occurred in 31 patients (12.4%), hematoma in twelve patients (4.8%) and vomiting in sixteen patients (6.4%) with penile block(11).

In our study 2 patients from caudal group had urinary retention, 1 in penile block and 3 in topical anaesthesia group had minor bleeding. None of the patients had any major complications.

Salgado Filho M et al. concluded in their study that local topical anesthesia with a eutectic mixture of 5% lidocaine and 5% prilocaine led to more hemodynamic changes than dorsal penile nerve block with greater need for analgesia at 1 hour in the local topical group.(12)

In comparison of eutectic mixture of local anesthetics(EMLA) cream with dorsal penile nerve block(DPNB) using lignocaine for circumcision in infants, **Mujeeb S et al** indicated equal pain control in both groups. EMLA was easy to apply but has increased cost; while DPNB required expertise(13).

Wang J et al ,in their metanalysis, found that DPNB was significantly more effective than EMLA in pain relief as indicated by pain scores in infants during circumcision which was similar to our study where 30 % of the patients in topical group required additional analgesia compared to 10 % in penile block with the difference being significant. No major complication from topical group was seen in our study.(14)

CONCLUSION:-

From our study we conclude that topical block is less effective for postoperative analgesia but rarely has any complications. Penile and caudal nerve block are both equally effective but the ease of penile block application with fewer complications would make it a preferable choice. The discretion of choosing between penile block or caudal block for circumcision in children should be left on the attending anaesthesiologist, their comfort and skill.

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Conflict of Interest- Nil

Declarations- Nil
Sponsor- None

Ethical Approval-Institutional Ethical Committee clearance was obtained before the start of the project

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