



Comparison of Caudal Block vs. Penile Block in Terms of Surgical Incision Response for Circumcision and Postoperative Analgesia Requirements

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Authors' contributions

This work was carried out in collaboration among all authors. Author MAB designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors AUR and AM managed the analyses of the study. Author MIA managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Circumcision is a frequently performed surgery in children worldwide. For circumcision, penile and caudal epidural blocks are commonly used. Nerve blocks not only decrease the systemic analgesia requirements intra-operatively but also increase the length of pain relief postoperatively. The aim of the present study was to compare the surgical incision response in circumcision, in children with a caudal block and penile block. We also compared the systemic analgesic requirements postoperatively in both groups.

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Materials and Methods: The study was conducted in pediatric patients. Total of 30 samples (n = 30) was taken and divided into two groups of 15 each. The group A received caudal block and group B received penile block. The blocks were performed after general anesthesia. We tried our best to eliminate all the factors which can lead to tachycardia (such as hypoxia, light plane of anesthesia, hyperthermia and hypothermia, hypercarbia, hypovolemia etc). The patients were keenly observed for change in heart rate on incision, the heart rates were recorded before and at incision (surgical incision response) in both groups. The postoperative consumption of the pain killers were also noted in both the groups.

Results: We observed that the patients in group A with caudal block did not show any significant surgical response, whereas in group B patients with penile block showed increased heart rate at the incision. There was no complain of pain in group A in the recovery period. Whereas complains of pain were recorded in most of the children in group B, hence pain killers were given to the patients in this group.

Conclusion: Our data proved that the caudal block was better than the penile block in terms of pain relief.

Keywords: Caudal block; penile block; comparative study; circumcision; pediatric study; clinical study.

1. INTRODUCTION

Circumcision is a procedure in which there is surgical removal of the skin covering the tip of the penis. Males are usually born with a hood of skin called the foreskin covering the glans penis. Circumcision originated about 15,000 years ago being performed for religious, ritualistic and cultural reasons and it was not until the Nineteenth century that the procedure was "Medicalised" [1]. There are also many medical relative indications for circumcision, including the prevention of penile and cervical cancer, the prevention of sexually transmitted infection and prevention of urinary tract infection [1]. In some studies from the literature we learnt that there was no difference in the caudal and penile block. Few others studies reported penile block to be better than the caudal block. In our pilot study it was observed that there was negligible surgical incision response in children with caudal block as compared to penile block, so we designed a hypothesis that caudal block was better than the penile block. Our aim was to conduct the study to collect clinical data in support of our hypothesis.

2. METHODS

Before conducting the study ethical approval was taken from the institutional as ethical committee, South Tipperary General Hospital Clonmel, Co Tipperary, Republic of Ireland. Total of 30 patients were taken. All the patients were between the age group of 3 to 9 years and their weight was 13 to 26 kg. These patients visited the South Tipperary General Hospital Clonmel,

Co Tipperary, Republic of Ireland. The total time duration of the study was of 4 months, all the possible precautions were taken during the study. No patients were harmed or injured during the study. All the circumcisions were performed by expert surgeons, in the presence of an anesthesiologist, with the proper concern of the parents and the surgery was performed only according to the will and wish of the parents.

The total sample size split into two groups of 15 patients each. After anesthesia with LMA caudal block was performed in one group and another group received the penile block. Local anesthesia was calculated on the basis of actual body weight, 0.5 ml/kg b.w was given. Local anesthetic used was cirocane 0.5%. Variable used for pain during the study were heart rate. Pre-incision heart rates and heart rate at the time of incision were recorded. Level of CO₂, O₂, MAC (anesthetic vapors), temperature regulated within the physiological range. The children with infection in the lower back and around the perineal area, with spinal deformities, history of allergy due to local anesthetics and children above 15 years were excluded from the study.

Statistical analysis: The SPSS 12.0 software program was used for statistical analysis. Data are presented as the mean \pm standard deviation (SD). The Mann-Whitney U test was used for comparison of the two groups. The Friedman test was performed for repeated measurements at consecutive time intervals.

3. RESULTS

We compared the surgical incision response in groups A and B relative to the pre-incision heart rate and we found that the children with caudal block showed negligible increase in heart rate as compared to the children with penile block. (Graph 1)

The table is showing average age of the pediatric patients, the patients undergone caudal and penile block respectively and requirement of post operative analgesics in both the groups. It was seen that patients undergone caudal block do not require any post operative analgesic, whereas patients with penile block require post operative analgesics.

Showing comparison of heart rate before the incision and at the time of incision. Where group A (caudal block) showing least deviation in the heart rate of the patients, whereas in group B (penile block) showing major deviation in heart rate before incision and at the time of surgical incision.

Showing pre incision heart rate, heart rate at the time of circumcision and changes in heart rate in both the groups. Where the group B with penile block showing increased heart rate with major variations. Where P value of heart rate at the time of circumcision is 0.0005, which is highly significant.

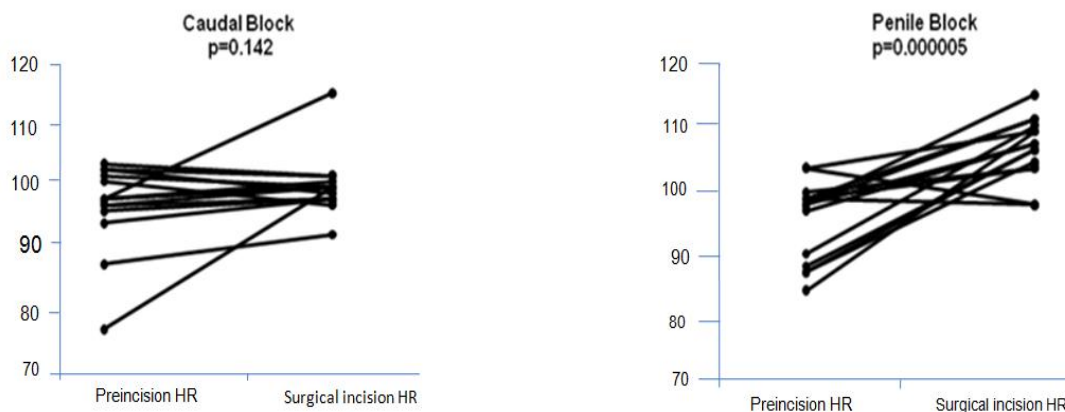
Another considerable factor studied was number of patients receiving postoperative analgesics. In group A (patients with caudal block) requirement of postoperative analgesics was negligible. It can also be seen that no patients complained about any kind of pain after circumcision. Whereas in group B (patients with penile block) postoperative analgesics were required or it can be seen that patients with penile block complained about pain, hence analgesics were provided and the parents were also unhappy (Table 1).

Graph 2 is showing pre incision heart rate, heart rate at the time of surgical incision and changes in heart rate in both the groups. Whereas group B with penile block showed increased heart rate with major variations. Where the P value of heart

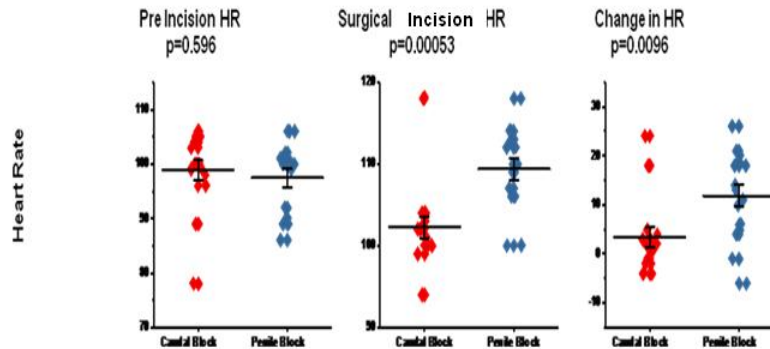
Table 1. Showing data of patients with respect to age (mean), caudal block, penile block and patients receiving post operative analgesics

S no.	Age in years (mean)	Caudal block (%)	Penile block (%)	Requirement of post operative analgesic	
				Caudal block	Penile block
1	3	50	50	No	Yes
2	4	50	50	No	Yes
3	5	50	50	No	Yes
4	6	50	50	No	Yes
5	7	100	0	No	Yes
6	8	50	50	No	Yes
7	9	100	0	No	Yes

Graph 1.



Graph 2.



rate at the time of incision is 0.0005, which is highly significant. Hence graph 2 and Table 1 infers, that caudal block is better for analgesia than penile block in pediatric circumcision. Because increase in heart rate is directly proportional to the magnitude of pain, provided the other factors responsible to tachycardia are well controlled. These results were proved by Table 1 where postoperative analgesics were not required in the caudal block.

4. DISCUSSION

Secular circumcision is helpful for the decreased probability of sexually transmitted infections and urinary tract infections, it is a common practice in the United States [2]. The medical benefits are reflected in the large prevalence of the procedure. In 2012, it was studied that circumcision was performed 13.9 times more often than the second most common pediatric surgery such as appendectomy [3,4,5,6,7,8,9, 10,11].

Analgesic techniques in circumcision include oral sucrose, topical anesthetic, systemic non-steroidal anti-inflammatory drugs (NSAIDs) or opioids, and regional anesthesia [8,9,10,11]. Non-pharmacological interventions like oral sucrose reduce the duration of cry during circumcision in children less than one year, but appear suboptimal to other anesthetics, as solitary use of oral sucrose is insufficient in treating surgical pain [8,9,11]. Regional blocks or peripheral nerve blocks were more effective, in comparison to topical local anesthetics, systemic NSAIDs and opioids. Serbulent GB, 2011, Allan MC, 2008 published a study and found the penile and caudal block to be equally effective for circumcision [12,13]. Many researchers published their study in support of penile block

and few found both the techniques to be equally beneficial for circumcision, but we found that caudal block is more effective for circumcision than penile block.

In this study, we compared the efficacy of DPNB and caudal block for circumcision cases under general anesthesia. Postoperative analgesic efficacy and supplementary analgesic needs of DPNB and caudal block were found and they were not similar. The ideal method of postoperative analgesia after circumcision requires very low complication and higher success rates. In the present study significant increments in heart rates were found in patients with the penile block as seen in graph 2. Here an increase in heart rate is directly proportional to the increase in pain. Whereas the patients with caudal block did not show any considerable change in heart rate, it indicates less or no pain (graph 2). Postoperative analgesics were also not required in patients receiving a caudal block as shown in Table 1.

The advantage of the study is that it can draw a clear pattern based on statistical evidence in the case of circumcision and strongly suggest caudal block over penile block, so that the patients may get better treatment with least pain, and without any postoperative analgesics. We recommend that caudal block is the better choice of pain relief over penile block for circumcision on the basis of our observational data, which supported our hypothesis. But there are few limitations in our study, these limitations include the factors such as low plane of anesthesia, hypoxia, hypothermia, hyperthermia, hypovolemia and low CO₂ level (hypocarbica), which can also cause tachycardia. In the children where we could not control these factors were excluded from the study.

5. CONCLUSION

On concluding our study caudal block yielded comparatively better results, which demonstrated better analgesic effect in children undergoing circumcision.

DISCLAIMER

This work was previously published as a book. The details of the published article are as below -

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REFERENCES

1. Padraig Malone, Henrik Steinbrecher. Medical aspects of male circumcision. *British Journal Medicin.* 2007;335(7631): 1206–1209.
2. Morris BJ, Bailis SA, Wiswell TE. Circumcision Rates in the United States: Rising or Falling? *What.* *Mayo Clin Proc.* 2014;89(5):677-86.
3. Witt WP, Weiss AJ, Elixhauser A. Overview of hospital stays for children in the United States. *Agency for Healthcare Research and Quality, Rockville;* 2012.
4. Shanthanna H, Singh B, Guyatt GA.s Systematic review and meta-analysis of caudal block as compared to noncausal regional techniques for inguinal surgeries in children. *BioMed Research International;* 2014.
5. Mak MY, Philip AE, Cho SC, Chan JTM. Postoperative analgesia in children day surgery circumcision: Comparison of three methods. *Annals of the College of Surgeons Hong Kong.* 2001;5:146-150.
6. Weksler N, Atias I, Klein M, Rosenzweig V, Ovadia L, Gurman GM. Is penile block better than caudal epidural block for postcircumcision analgesia? *Journal of Anesthesia.* 2005;19:36-39.
7. Denniston, G.C., Hodges, F.M. and Milos, M.F., Eds. *Genital Cutting: Protecting Children from Medical, Cultural and Religious Infringements.* (2013) Springer.
8. Lander J, Brady-Fryer B, Metcalfe JB, Nazarali S, Muttitt S. Comparison of ring block, dorsal penile nerve block and topical anesthesia for neonatal circumcision: A randomized controlled trial. *JAMA.* 1997;278:2157-2162.
9. Chambers FA, Lee J, Smith J, Casey W. Post-circumcision analgesia: Comparison of topical analgesia with dorsal nerve block using the midline and lateral approaches. *British Journal of Anaesthesia.* 1994;73: 437-439.
10. Al Qahtani R, Abu-Salem LY, Pal K. Effect of lidocaine-prilocaine eutectic mixture of local anaesthetic cream compared with oral sucrose or both in alleviating pain in neonatal circumcision procedure. *African Journal of Paediatric Surgery.* 2014;11:56-61.
11. Kassab M, Foster JP, Foureur M, Fowler C. Sweet-tasting solutions for needle-related procedural pain in infants one month to one year of age. *The Cochrane Database of Systematic Reviews.* 2012; 12:CD008411.
12. Serbulent GB. Comparison of postoperative analgesic efficacy of caudal block versus dorsal penile nerve block with levobupivacaine for circumcision in children. *Korean J Pain.* 2011;24(1):31-35.
13. Allan MC. Caudal epidural block versus other methods of postoperative pain relief for circumcision in boys. *Cochrane Database of Systemic Reviews;* 2008.

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