

Comparison of Caudal Block and Nalbuphine for Pain Management in Children

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Abstract

Background: To compare pain scores in patients undergoing inguinal herniotomy after caudal block and intravenous nalbuphine.

Methods: In this randomized controlled trial a total of 100 patients of age 4-12 years undergoing inguinal herniotomy were included. They were divided into two groups (50 patients in each group); Group A included Caudal block and Group B included patients who received Nalbuphine. Patients in group A were given caudal block while in group B were given nalbuphine 0.1-0.3mg/kg. Pain scores were calculated at 0,1,2,4 and 8 hours. Requirement for rescue analgesia was calculated. All the data were analyzed by SPSS version 16.

Results: The mean age of patients were found as 4.15 ± 3.32 years in group A and 4.88 ± 3.18 years in group B. All the other demographics were comparable in both groups. The mean pain scores were less in nalbuphine group at 0,1,2 and 4 hours, however it was significant at 0 and 1 hour. The requirement of rescue analgesia was less in group B than group A (14% vs 34%, $p < 0.05$). The only side effect was observed was vomiting in 12% of patients in group B while in none of patient in group A.

Conclusion: Nalbuphine is better than caudal block for pain management in children undergoing inguinal herniotomy.

Key Words: Inguinal, Herniotomy, Nalbuphine, Caudal block

Introduction

Post-operative pain management in children is essential as it alleviates the pain as well as anxiety of the parents regarding post-operative pain. There are some options which are being used currently by paediatric surgeons. However there is no consensus over a single best method. Post-operative pain management had always been a major concern of parents as well as paediatric surgeons. Contrary to the ancient notion that children don't feel pain, many studies have focused on the importance of good pain management in children. According to a study,

children in surgical ward feel more pain than children in medical ward and prevalence was found to be 44% and 13% respectively. ¹ In another study it was found that about 64% of pediatric patients after surgery experience moderate to severe pain while 29% experience mild pain. ²

Studies have suggested that painful experiences during childhood even during infancy, may lead to long term psychological effects. ³ Therefore pediatric surgeons, anesthetists and pharmacologists had been in a continuous search to locate a safe and effective analgesic for children. Nalbuphine had been used by adult as well as pediatric surgeons for post-operative pain control from a long time as it has offered excellent post-operative pain control. ⁴ But in children, it is certainly associated with some side effects, the most dangerous being respiratory depression. This side effect limits its usage in pediatric age group. ⁵ In day care procedures, like herniotomy in children, even caudal block may be used as it can alleviate the pain of the pediatric patient in an effective way. ^{6,7}

Patients and Methods

This randomized controlled trial was conducted at Paediatric Surgery Department, Khairu-nisa Hospital, Lahore. The total duration of the study was 1 year, from July 2014 to June, 2015. All the patients undergoing herniotomy with age of 4-12 years were included in the study. Our exclusion criteria included: patients having respiratory and neurological disorders; mentally retarded, patients already on analgesics; and patients with known allergies to these drugs. They were randomly divided into two groups. Group A included Caudal Block; and Group B included patients who received Nalbuphine. In group A patients, after herniotomy and before extubating the patient, caudal block was introduced by giving Bupivacaine 0.25% according to body weight. In patients in group B, immediately after herniotomy, nalbuphine was given intravenously 0.1-0.3 mg/kg according to body weight. Patients were shifted to post-operative ICU where pain scores were measured at 0,1,2,4 and 8 hours. Also any side effect of the drugs was noted and taken care of. For pain measurement

Faces Pain scale was used. If any patient developed pain score ≥ 4 , patient was given Tramadol 0.5mg/kg and it was noted.

Results

A total of 100 patients were included in the study, fulfilling the inclusion and exclusion criteria. They were randomly divided into group, 50 patients being in each group. The mean age of patients in group A was 4.15 ± 3.32 and in group B was 4.88 ± 3.18 years. In group A, there were 38 males (76%) and 12 females (24%). In group B, 44 patients (88%) were male while 6 patients (12%) were female. Also in all patients side of involvement of inguinal hernia was noted and it was found that in group A 34 patients (68%) had right side involved 11 patients (22%) with left side while 5 patients (10%) had bilateral inguinal hernia.

Table 1: Comparison of pain score in two groups

	Group A (Caudal Block)	Group B (Nalbuphine)	p- Value
0 hour	0.82 ± 0.80	0.12 ± 0.328	0.00
1 hour	1.24 ± 0.938	0.70 ± 0.580	0.001
2 hour	1.58 ± 1.679	1.06 ± 1.095	0.88
4 hour	1.56 ± 1.248	1.14 ± 1.088	0.68
8 hour	1.04 ± 0.946	1.14 ± 0.728	0.553

Table 2: Requirement of rescue analgesics and side effects in two groups

	Group A (Caudal Block)	Group B (Nalbuphine)	p- Value
Patients requiring rescue analgesic	17	7	0.017
Time for rescue analgesia(In hours)	4.647 ± 2.177	6.571 ± 0.543	0.423
Vomiting	0	6	--
Pruritis	0	0	--
Respiratory depression	0	0	--

In group B, there were 21 patients (42%) with right side, 26 patients (52%) with left side and 3 patients (6%) with bilateral involvement. Pain scores of the patients was noted at 0 hour, 1 hour, 2 hour, 4 hour and 8 hours p- value was significant (<0.05) in both groups at 0 hour and 1 hour but at 2,4 and 8 hour it was not significant (Table 1). Also mean pain scores in group B were less than group A at all readings except at 8 hours (Figure 1).In group A, 17 patients (34%) needed rescue analgesic while in group B, 7 patients (14%) needed rescue analgesic and P-value was 0.017.

Mean time for requirement of rescue analgesic was 4.647 ± 2.177 hours in group A while 6.571 ± 0.543 in group B and P-value was 0.423 (Table 2). Vomiting as a side effect was noted in 6 patients (12%) in Nalbuphine group while no side effect was noted in caudal group.

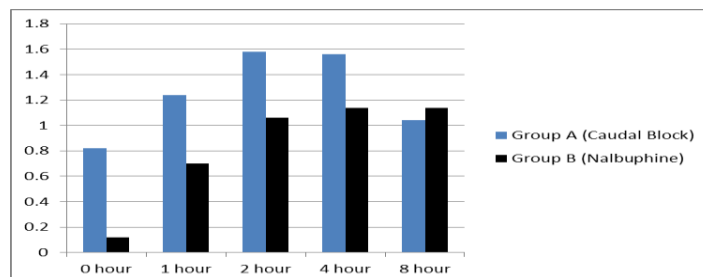


Figure 1: Comparison of pain score in both groups

Discussion

Inguinal herniotomy is one of the most commonly electively done procedures in children. The estimated prevalence in preterm and full term infants is 10% and 1-5% respectively. ⁸ It is usually done as a daycare procedure; however most of the pediatric surgeons now recommend admission of the child for overnight if age is less than 6 months.⁹ As it is a clean case, so usually patient is kept on ‘nothing per oral’ status for a short time. Oral pain killers are allowed immediately after allowing feed in post-operative period. So the main problem of pain control in these patients is in the immediate 4-6 hours post-operative period. Therefore we planned this study and compared pain control of two regimens for 8 hours post-operatively.

In this study we found the gender ratio as 4.5:1 for male and females respectively. It was probably due to smaller sample size in the current study. In most of the larger series, the reported ratio varies from 3:1 to 10:1.^{10,11} In this study we found that the mean scores at all occasions was less in Nalbuphine group than caudal group. However, this difference was statistically significant only at 0 and 1 hours. In a meta-analysis by Schnabel et al, it was found that most of the studies conducted at nalbuphine were low grade studies and authors were unable to draw any conclusion regarding superiority of nalbuphine over other treatment methods.⁵

Assessment of post-operative pain in children is difficult as children are unable to explain their feelings in infantile age particularly. Therefore in children, no scale is considered as universal, rather many scales are prevailing and being used in literature. ¹² We have used FACES pain scale in our study which is a verified scale for pain assessment in children with the age

range of 3-12 years.^{13, 14} That's why we had included only patients with age range of 4-12 years in our study. In this study we had found that 17 patients in caudal block group while 7 patients in nalbuphine group required rescue analgesic and it was statistically significant ($p < 0.05$). In a meta-analysis by Shanthanna et al, caudal block showed less requirement for rescue analgesic than non-caudal techniques in children during post-operative period.¹⁵ The reason for this contradiction to our results may be that the authors had not found any trial comparing two techniques.

Conclusion

Nalbuphine is better than caudal block for post-operative pain management after inguinal herniotomy in children. However we recommend other options for pain management in children to undergo trial with larger sample size.

References

1. Groenewald CB, Rabbitts JA, Schroeder DR, Harrison TE. Prevalence of moderate-severe pain in hospitalized children. *Paediatric anaesthesia*. 2012;22:661-68.
2. Romsing J, Walther-Larsen S. Postoperative pain in children: a survey of parents' expectations and perceptions of their children's experiences. *Paediatric anaesthesia*. 1996;6:215-18.
3. Larsson BA. Pain and pain relief during the neonatal period. Early pain experiences can result in negative late-effects. *Lakartidningen*. 2001;98:1656-62.
4. Moyao-Garcia D, Hernandez-Palacios JC, Ramirez-Mora JC, Nava-Ocampo AA. A pilot study of nalbuphine versus tramadol administered through continuous intravenous infusion for postoperative pain control in children. *Acta Biomed*. 2009;80:124-30.
5. Schnabel A, Reichl SU, Zahn PK, Pogatzki-Zahn E. Nalbuphine for postoperative pain treatment in children. *Cochrane Database Syst Rev*. 2014;7:CD009583.
6. Cheon JK, Park CH, Hwang KT, Choi BY. A comparison between caudal block versus splash block for postoperative analgesia following inguinal herniorrhaphy in children. *Korean J Anesthesiol*. 2011;60:255-59.
7. Wang LZ, Hu XX, Zhang YF, Chang XY. A randomized comparison of caudal block by sacral hiatus injection under ultrasound guidance with traditional sacral canal injection in children. *Paediatric anaesthesia*. 2013;23:395-400.
8. Nazem M, Dastgerdi MMH, Sirousfard M. Outcomes of pediatric inguinal hernia repair with or without opening the external oblique muscle fascia. *Journal of Research in Medical Sciences*. 2016;20.
9. Blacoe D, Cunning E, Bell G. Paediatric day-case surgery: an audit of unplanned hospital admission Royal Hospital for Sick Children, Glasgow*. *Anaesthesia*. 2008;63:610-15.
10. Muha T Latif NL, Ahmed E, Dar S H. Is contralateral inguinal exploration justified in a child presenting with unilateral inguinal hernia. *PJMHS*. 2015;9:176-78.
11. Ein SH, Njere I, Ein A. Six thousand three hundred sixty-one pediatric inguinal hernias: a 35-year review. *Journal of Pediatric Surgery*. 2006;41:980-86.
12. Babl FE, Crellin D, Cheng J, Sullivan TP, O'Sullivan R, Hutchinson A. The use of the faces, legs, activity, cry and consolability scale to assess procedural pain and distress in young children. *Pediatr Emerg Care*. 2012;28:1281-96.
13. Wood C, von Baeyer CL, Falinower S, Moysse D, Annequin D, Legout V. Electronic and paper versions of a faces pain intensity scale: concordance and preference in hospitalized children. *BMC pediatrics*. 2011;11:87.
14. Savino F, Vagliano L, Ceratto S, Viviani F, Miniero R, Ricceri F. Pain assessment in children undergoing venipuncture: the Wong-Baker faces scale versus skin conductance fluctuations. *PeerJ*. 2013;1:e37.
15. Shanthanna H, Singh B, Guyatt G. A systematic review and meta-analysis of caudal block as compared to noncaudal regional techniques for inguinal surgeries in children. *Biomed Res Int*. 2014;2014:890626.

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