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A Comparison between Acetaminophen Suppository and Caudal Anesthesia in Relieving Pain after Pediatric Surgery

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ABSTRACT

Purpose: Our aim was to provide a simple, non-invasive, low cost, and practical method to be used by nurses and technicians in a low hazardous, safe, and painlessness anesthesia.

Materials and Methods: In a prospective blind clinical trial 40 children between 4 and 6 months who were candidated for subumbilical elective surgeries were recruited. They were randomly divided into two groups. Bupivacain 0.25% was prescribed in the control group according to Armitage formula (0.5- 1 ml/kg); while, supp. Acetaminophen was administered in the subject group by a dosage of 30-40 mg/kg.

Results: There was no statistically significant difference in the pain score of the two groups within 2 hours postoperatively, but higher pain score was reported in subject group during the third and forth hours.

Conclusion: Caudal anesthesia with bupivacaine has better painless period postoperatively.

KEY WORDS: acetaminophen suppository, caudal anesthesia, pediatric surgery

INTRODUCTION

Pain relieving is regarded as one of the basic issues in pediatric anesthesia during the operation and postoperatively. Pain is one of the major factors of children's agitation immediately after surgery, a matter which is particularly seen in infants and little children who are unable to communicate properly and do not receive an appropriate dosage of analgesic drugs.[1] Postoperatively, pain would be followed by some physiologic complications manifested in human body systems and organizations. Pain, under the age of five could affect physical and mental status and even might associate with a high level of somatization.[2]

Acetaminophen has an active metabolite known as phenacetin that provides analgesic and antipyretic effects. The mechanism of action is not well known. The analgesic effect of Acetaminophen may be due to its fair inhibition of prostaglandin in CNS.[3]

This drug has no anti-inflammatory effects, and heightening pain threshold is considered as its analgesic mechanism.[3] Its normal dosage is 30-40 mg/kg used in divided dosages but in children under 12 years old is 1.5 gr/ m2/day. Hypersensitivity to this medication is known as its contradiction. In case of rectal bleeding, the drug should not be administered.

The use of narcotics, regional anesthetics, analgesics such as NSAIDS, and probably non-pharmaceutical ways are considered as pain relieving methods during and after surgery.[4] Since even one dose of narcotics could increase postoperative vomiting and may followed by some complications such as sedation and respiratory depression, it is necessary to avoid prescription of even one dose of narcotics.[5]

In addition to their limited effect in controlling

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pain, NSAIDS have their own specific complications such as GI bleeding and exacerbation of asthmatic crises.

Among regional approaches, painlessness by caudal anesthesia is regarded as the most common method in pediatric anesthesia, which is mostly applied in circumcision, hypospadiasis, club foot, herniorrhaphy, urogenital, and anal surgeries, and also generally subumbilical operations.(6)

Despite its advantages, caudal method has several disadvantages including:

- An experienced specialist is needed to perform this method. Nonetheless, approximately 10% of cases ended in failure.(6)
- This method cannot be practical in the case of regional infection.(1)
- Painlessness would be obtained just for a limited time.
- It is impractical in major malformations of sacrum, myelomeningocele and meningitis.(6)
- Among local anesthesia methods, toxicity risk of local drugs in this method (preceded by intercostal method) would be higher than other methods which is due to intravenous or intraosseous injections.(6)
- Intrathecal injection can also be done but hypotension can also occur in less than 8-year-old children.(6)
- Postoperative urination might be delayed and vomiting is reported in 30% of cases.(6)

Accordingly, there has not been any ideal method for children painlessness during and after anesthesia. In this study, we attempted to find a simple and practical method to be used by nurses and technicians in a low cost, less hazardous, and safe anesthesia with little pain.

METERIALS AND METHODS

Forty children between 6 month and 4 years who were candidated for subumbilical elective operations with ASA class I and II were included in this blind clinical trial regardless of sex.

Those with CNS disorders, excessive hemorrhage, and tachycardia during the surgery and those who received narcotics postoperatively were excluded from the study.

Patients were connected to ECG monitoring device and pulse oxymeter for the detection of probable hypoxia, arrhythmia due to intravascular injection of Bupivacaine, and tachycardia caused by pain, which indicates the failure of procedure. Precordial stethoscope was also fixed for them.

All patients were given similar premedication and oral Midazolam (0.3 mgr/kg) and Atropine (0.02 mgr/kg) were prescribed 30 minutes before surgery.

All patients were anesthetized deeply by Sodium Thiopental (6mg/kg), Halothane with a Maximum concentration of 2%, and N2O gas 50% to 70% without muscle relaxants.

Laryngeal mask airway was applied appropriately to their age and patients were randomly selected using random table assignment.

Supp. Acetaminophen 40 mg/kg was given in the subject group and caudal anesthesia in lateral position was applied to the other.

A maximum of 20 cc of Bupivocaine 0.25% was used according to Armitage formula 0.5-1 ml/Kg to induce blockage to high lumbar- high sacral areas (Single-shot caudal block). Niddle number 23 gauge was used in all the cases accurately.

Patients' breathing was automatic, although, they were given assisted ventilation occasionally. Post- operatively, patients' pain score was evaluated every one hour for four hours by a trained nurse who was unaware of the used method of anesthesia and painlessness. FLCAC pain score was used to estimate the pain (table 1).

TABLE 1. *Pain Score (FLCAC)*

Pain score Giterion	O	I	2
F(face)	*No special mood or laughing could be seen*	*Sometimes he frowns and pulls himself back*	*He frowns repeatedly and press his mandibles on each other*
L(Legs)	*Normal position of legs in rest*	*He is unease and agitated and he contracts his legs a little*	*He kicks his legs & moves up and down*
C(Crying)	*No Crying (conscious, sleepy)*	*He moans or cry's and sometimes sufferers from pain*	*He always moans & cry's or screams*
A (Activity)	*He sleeps calmly with normal activity and moves with ease*	*He moves toward back & forth , right & left & feels uncomforted*	*His limbs are bent & his muscles are contracted with sudden movement*
C(Consol ability)	*He is calm & comfort*	*He becomes calm by embracing and pampering him*	*It is difficult to console him & make him comfort*

RESULTS

Six girls and 14 boys were included in the subject (Acetaminophen) group and 6 girls and 14 boys comprised the control (caudal) group (fig.1). The mean ages were 19 months and 21 months in subjects and control groups respectively.

At the first hour the maximum level of pain score in both groups did not exceed 4. Four patients had 2-4 score in the case group; while, 3 cases felt 2-4 score in the control group. Eighty two percent of patients had no remarkable pain at the first hour but 18% of them felt little pain that eased off (fig. 3, 4).

At the second hour a significant number of patients had <2 pain scores in both groups and there was no statistical difference between them and one patient in the subject group had a score in the range of 2-4 (fig. 2, 4).

Fifteen percent in the case group and 5% in the control group had 2-4 pain scores in the third hour postoperatively (fig. 3). As indicated in table 2, patients gained a cumulative score of 16 in the subject group and 3 in the control group from which a significant statistical difference between the two groups could be notified that might be due to the decrease of plasma level of Acetaminophen regarding its half-life.

Thirty percent of subject group had 2-4 pain score and 5% felt >4 pain score, while, 90% of control group had <2 score (table 2).

Total score of 20 studied patients was 28 in the case group and 8 in the control group, which indicates a significant discrepancy between the two groups and emphasizes that decreasing plasma level of Acetaminophen has resulted in higher pain scores.

TABLE 2. *Pain score table of the subject and control groups at the four postoperative hours*

Fourth hour	Third hour	Second hour	First hour	Control group	Fourth hour	Third hour	Second hour	First hour	Subject group
0	0	0	0	1	4	3	0	1	1
5	0	0	0	2	1	1	0	0	2
3	3	0	0	3	5	2	0	0	3
0	0	0	2	4	0	1	0	0	4
0	0	0	0	5	0	0	0	0	5
0	0	0	0	6	0	0	0	0	6
0	0	0	0	7	0	0	0	0	7
0	0	0	4	8	3	3	0	0	8
0	0	0	0	9	0	0	1	4	9
0	0	0	0	10	0	3	0	0	10
0	0	0	0	11	0	0	3	4	11
0	0	0	4	12	1	1	0	0	12
0	0	0	0	13	0	0	0	0	13
0	3	0	0	14	4	0	0	3	14
0	0	0	0	15	3	0	1	4	15
0	0	0	0	16	0	0	0	0	16
0	0	0	0	17	0	0	0	0	17
0	0	0	0	18	4	0	0	0	18
0	0	0	0	19	3	2	0	0	19
0	0	0	0	20	0	0	0	0	20
0.4	0.15	0	0.7		1.4	0.75	0.25	0.8	Mean X
1.273	0.67	0	1.04		1.82	1.07	0.695	1.58	Standard Deviation
8	3	0	10		28	16	5	16	Total

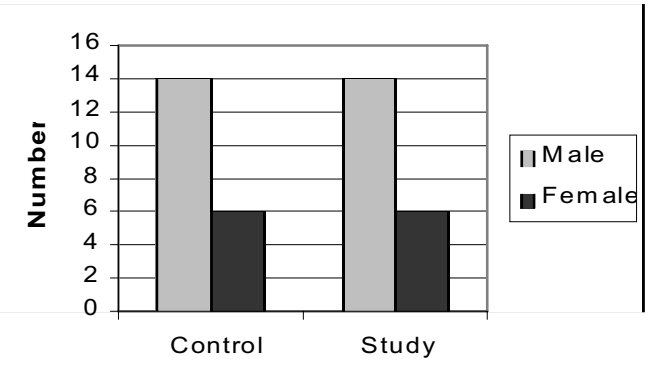

FIG. 1. The frequency of genders in the subject and control groups

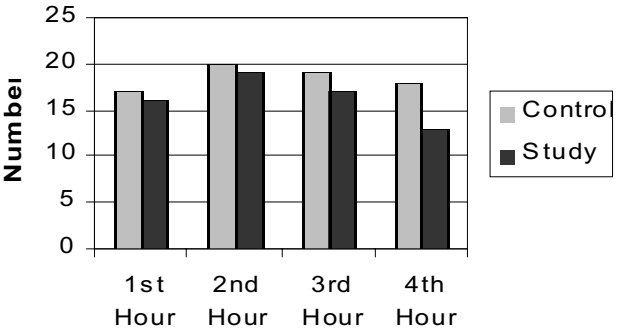

FIG. 2. The frequency of <2 pain scores at the first to the fourth postoperative hour in the subject and the control group

DISCUSSION

In accordance with previous studies, Bupivocaine 0.25% compared to its lower concentrations provides a better painlessness and is of no risk in subumbilical surgeries; hence, the same concentration was used in this study.[7]

Earlier studies show that prophylactic Acetaminophen could decrease pain in surgical procedures mild to moderately.[10, 11] In this study, the same finding was observed too.

In a study comparing Diclofenac to Bupivocaine, pain incidence and intensity in Diclofenac group were higher than Bupivocaine group at the first hours; however, in this study no difference was noted at first hours, but pain

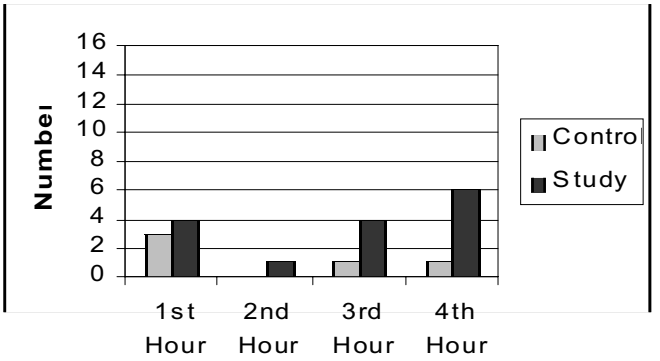

FIG. 3. The frequency of 2-4 pain scores at the first to the fourth postoperative hour in the subject and the control group

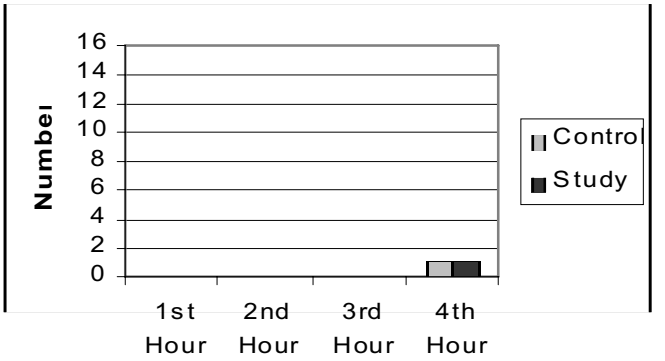

FIG. 4. The frequency of >4 pain scores at the first to the fourth postoperative hour in the subject and the control group

incidence and intensity increased more in case group later on.[8]

Regarding that in an investigation painlessness duration in surgical operations with caudal anesthesia exactly before the beginning of short period surgeries did not differ, in this study caudal anesthesia was performed before the beginning of surgery in this study.

Regarding the results obtained from statistical analysis of both groups and their pain score comparison at the first and the fourth hours, and also considering the resultant P value, we can conclude that there was statistically no significant difference in the pain score of both groups at the first and the second hours. Moreover, it can be hypothesized that there is no difference between using caudal anesthesia and supp. Acetaminophen concerning postoperative pain intensity at the first and the second hours. However, considering P value in the comparison of both groups' pain score at the third and the fourth hours, it can be concluded that pain level in the subject group was higher than the one in the control group.

CONCLUSION

Generally, it can be concluded that the children who received caudal Marcaine for postoperative painlessness, experienced a better and longer painlessness; yet, if caudal anesthesia is impossible (due to anatomic problems of sacrum, local infection, medication lackness, etc.), at least a supp. of Acetaminophen could be helpful in pain relieving at the first few postoperative hours.

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