ORIGINAL RESEARCH PAPER

Anesthesiology

KEY WORDS: Post tonsillectomy pain relief, Glossopharyngeal nerve block,

A PROSPECTIVE RANDOMISED CONTROL STUDY ON GLOSSOPHARYNGEAL NERVE BLOCK FOR POST-TONSILLECTOMY PAIN RELIEF IN CHILDREN AGE 7-12 YEARS.

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ABSTRACT

BACK GROUND AND AIM: The purpose of this study was to compare the efficacy of 0.25% bupivacaine infiltration in the base of anterior tonsillar pillar. for post op pain relief in children aged 7-12 administered after tonsillectomy by submucosal infiltration.

MATERIALS AND METHODS: In this prospective study sixty healthy patients in the age group of 7-12 years belonging to ASA-Grade1 , scheduled to undergo elective bilateral tonsillectomy surgery for chronic tonsillitis under general anaesthesia, with surgery lasting to 20-40 minutes were included. Follwing surgery and effective hemostasis the control group was infiltrated 0.25% bupivacaine in the base of anterior tonsillar pillar. Pain score was monitored with the help of mCHEOPS (modified Children Hospital Eastern Ontario Pain Score) scale at 0,1,2,3,4,5,6,7&8 hours.

RESULTS: The immediate post-op pain relief as measured the mean pain score at 0 hours in the study group was statistically significant[0.5±0.6] to control group[1.8±1.8] with (p=0.0001).The pain relief provided by the block in the first hour in study group was statically significant [1.1±0.9] to control group [6.4±1.6] with (p<0.0001).The duration of pain relief for the study group was significantly higher than the control group[4.5±0.9] to [1.1±0.5] with (p<0.0001).

The heart rate is significantly lower in the study group compared to the control group for upto 5 hour duration (104.4 ± 6.0 to 107.4 ± 5.8) p=0.05. The heart rate correlates with the post op analgesia provided in the group which received bupivacaine infiltration.

There was no complication observed following infiltration in either groups.

CONCLUSION: Glossopharyngeal nerve block with 0.25% bupivacaine provides better post -tonsillectomy pain relief in post operative period.

INTRODUCTION:

Tonsillectomy was described by Penn in 1952 as "... an operative procedure which ... may lead to apathy on the part of the physician Postoperative pain and its sequelae are amongst universal complaints of the patients. The rapid advances in anaesthetic and surgical techniques have left this factor as one of the most distressing aspects of the entire procedure." He also emphasized that post-tonsillectomy pain in children remains a most difficult management problem.

Postoperative pain can delay the patient's return to a normal level of physical activity even after minor ambulatory surgical procedures. Although opioid analgesics are highly effective in decreasing pain in the early postoperative period, their use may be associated with unwanted side effects (e.g., itching, nausea and vomiting). Local anaesthetics are popular adjuvants during outpatient procedures because they can provide perioperative analgesia without opioid-related side effects.The oropharynx and the tonsillar fossae are exquisitely sensitive. They are well innervated locally by the branches of the trigeminal and glossopharyngeal nerves and are highly represented in the somatic cerebral cortex. Many treatment modalities for post tonsillectomy pain have been used, ranging from systemic opioids to different surgical techniques, even radiation.A previous study utilizing lidocaine 1% topical spray, 4 mg × kg-1 evenly distributed on the tonsillar beds, showed considerable improvement in pain scores in the immediate postoperative period after tonsillectomy when compared with codeine 1.5 mg × kg-1 im.

Bupivacaine should be more effective because of its longer duration of action. In addition, it has been suggested that the topical use of this local anaesthetic following tonsillectomy was effective in reducing postoperative pain.The purpose of this study was to compare the efficacy of bupivacaine 0.25% infiltration in the tonsillar fossa for post op pain relief in children aged 7-12 when administered after tonsillectomy by submucosal infiltration.

MATERIAL AND METHODOLOGY:

Sixty healthy patients in the age group of 7-12 years belonging to ASA-Grade1, scheduled to undergo elective bilateral tonsillectomy surgery for chronic tonsillitis ,surgery lasting to minimum 20-40 minutes were included in the study. The study was conducted after ethics committee approval and obtaining consent from relevant persons. All patients are assessed pre-operatively for anaesthetic fitness.

EXCLUSION CRITERIA: Patients refusal,Uncorrected bleeding diathesis,Difficult airway,History of upper and lower respiratory tract infection,History of sleep-apnea,ASA Grade [2,3,4.]

METHODOLOGY: Patients were allotted randomly two groups:group 1(STUDY) and group 2 (CONTROL) with 30 patients in each group. Standard monitoring was instituted in all patients with ECG monitor, precordial stethoscope, NIBP.

PREMEDICATION: Inj. pentazocine lactate [300 mcg/kg] and inj.atropine sulphate [10 mcg/kg] IV was given to all patients pre-operatively after securing of IV line.

INDUCTION: All patients were induced with inj.thiopentone sodium[5mg/kg] IV. Tracheal intubation was facilitated with inj.suxamethonium Hcl [2 mg/kg] and patients were intubated with appropriate sized cuffed endo-tracheal tube nasally.

MAINTANANCE: Anaesthesia maintained with nitrous oxide, oxygen[70/30] and controlled ventilation done throughout the surgery with inj.atracurium besylate[500mcg/kg] titrated doses.

PROCEDURE:

MATERIALS REQUIRED: 0.5% Bupivacaine vial,25G spinal needle,5cc syringe,Artery forceps,Normal saline.Under aseptic precautions the tip of the spinal needle is bent to 3mm with artery forceps. 0.25% Bupivacaine was loaded in the syringe to a volume of 4ml.After bilateral tonsillectomy and complete hemostasis, Glossopharyngeal nerve block was performed in all patients with 25G spinal neele, tip bent to 3mm at the base of both the anterior pillars of the tonsillar fossa by the anaesthetist.Group I received 0.25% Bupivacaine 2ml/ fossa.Group II received Normal saline 2ml/ fossa.Precaution was taken to prevent inadvertent intra vascular puncture by negative aspiration for blood before injecting the drug in the base of the tonsillar pillars.

RECOVERY: After complete recovery patients were reversed with injection neostigmine (50mcg/kg) and inj atropine sulphate (10mcg/kg) and after thorough oral suctioning patient prior to extubation.

POST-OPERATIVE PERIOD: After recovery patients were kept in post op ward where vitals signs are monitored and pain scores assessed. Pain score was monitored with the help of **mCHEOPS (Modified Children Hospital Eastern Ontario Pain Score)** scale at 0,1,2,3,4,5,6,7&8 hours.

The **mCHEOPS** scale is as follows:

SCORE	0	1	2
CRY	NONE	CRY,MOANING	SCREAM
FACIAL	SMILING	COMPOSED	GRIMACE
VERBAL	POSITIVE	NONE OR OTHER COMPLAINTS	PAIN COMPLAINTS
TORSO	NEUTRAL	SHIFTING,TENSE UPRIGHT	RESTRAINED
LEGS	NEUTRAL	KICKING, SQUIRM DRAWN UP	RESTRAINED

RESCUE ANALGESIA:

Children monitored in the post operative ward for the vital parameters and receivedrescue analgesia in the form of syrup paracetamol(15mg/kg) if the pain scorewas more than 5.

Children were monitored for the following specific complications like Upper airway obstruction,Bleeding,Hematoma formation at the site of infiltration,Nausea and vomiting,

Bradycardia.

STATISTICAL ANALYSIS:

The Mean and Standard Deviation are calculated for the variables in the two groups.The confidence limits of the values obtained are calculated.The probability value (p-value) was calculated using Pearson's Chi square test. Chi square test with Yates correction, Fisher's exact test[2-tail], Mann-whitney –u –test and student's independent t test as required.

OBSERVATION:THIS IS A PROSPECTIVE RANDOMISED CONTROL STUDY.The study was conducted in Govt.Chengalpattu Medical college between April 2016 to September 20163. Sixty patients who were to undergo elective tonsillectomy in the age group of 7-12 years were included in the study. They were randomly divided in to two groups I &II.

Group I received glossopharyngeal nerve block after tonsillectomy.
Group II received saline infiltration.
Both groups received syp.paracetamol in post-op period as rescue analgesia.

PHYSICAL CHARACTERISTICS:

The patients were statistically comparable with respect to Age,Sex,Weight,Height,Duration of surgery.This was comparable in both groups and found to be statistically not significant.

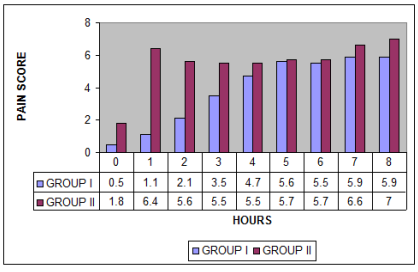
PAIN SCORE: Pain was assessed in the children who underwent tonsillectomy in the early post operative period and upto eight hours, hourly. The modified CHEOPS (mCHEOPS) was used to assess the pain. Rescue analgesic was given when the pain score was more than 5.

MEAN VALUES FOR PAIN SCORE

S. No	variable	time point (HR)	study group MEAN ± SD	control group MEAN ± SD	P -value
1.	Pain score	0	0.5±0.6	1.8±1.8	0.0001{s}
2.		1	1.1±0.9	6.4±1.6	<0.0001{s}
3.		2	2.1±1.1	5.6±0.7	<0.0001{s}
4.		3	3.5±1.0	5.5±1.2	<0.0001{s}
5.		4	4.7±1.3	5.5±1.2	0.002{s}
6.		5	5.6±1.0	5.7±1.1	0.96{ns}
7.		6	5.5±0.6	5.7±1.1	0.84{ns}
8.		7	5.9±0.6	6.6±0.7	0.0001{s}
9.		8	5.9±0.9	7.0±0.9	<0.0001{s}
	TIME #		4.5±0.9	1.1±0.5	<0.0001{S}

*Mann-whitney u- test was used to calculate the P-value

INFERENCE: The immediate post-op pain relief as measured the mean pain score at 0 hours in the study group was statistically significant[0.5±0.6] to control group[1.8±1.8] with (p=0.0001).The pain relief provided by the block in the first hour in study group was statically significant [1.1±0.9] to control group [6.4±1.6] with (p<0.0001).The duration of pain relief for the study group was significantly higher than the control group[4.5±0.9] to [1.1±0.5] with (p<0.0001).



HEMODYNAMIC CHARACTERISTIC

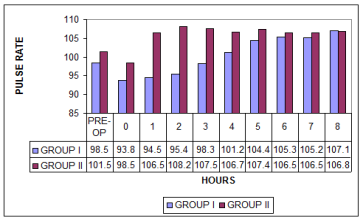
The pulse rate was measured pre-operatively and post operatively 0 to 8 hours with 1hour interval and was taken for statistical work up. This is shown in the table

S. No	variable	time point (hr)	study group MEAN ± SD	controlgroup MEAN ± SD	p -value
1.		Pre-op	98.5±6.4	101.5±7.2	0.09{ns}
2.	Pulse rate#	0	93.8±5.4	98.5±6.8	0.005{s}
3.		1	94.5±5.1	106.5±6.9	<0.0001{s}
4.		2	95.4±5.6	108.2±6.5	<0.0001{s}
5.		3	98.3±5.7	107.5±6.1	<0.0001{s}
6.		4	101.2±5.9	106.7±5.3	<0.0001{s}
7.		5	104.4±6.0	107.4±5.8	0.05{s}
8.		6	105.3±5.6	106.5±7.2	0.50{ns}
9.		7	105.2±4.4	106.5±6.2	0.39{ns}
10.		8	107.1±3.8	106.8±6.9	0.80{ns}

#Students independent t-test was used to calculate the p-value .

INFERENCE:There is statistically significant difference (p<0.0001) in the mean pulse rate between the group from the 0 to 5 hour which correlates with the immediate post operative period and the duration of analgesia.

Graphical Representation Of Haemodynamic Character



DISCUSSION

With the continued growth in ambulatory surgery, postoperative pain management has assumed an increasingly important role in providing for a smooth transition from the outpatient unit to the home environment. The traditional use of opioid analgesics for providing perioperative pain relief can be associated with an increased incidence of gastrointestinal side effects, in particular nausea and vomiting. The ability of these uncomfortable side effects to delay recovery after ambulatory surgery has stimulated the search for alternative methods of providing pain relief. Local anaesthetics are increasingly popular adjuvants during outpatient anaesthesia, and their efficacy in minimizing pain.

In this study children's undergoing tonsillectomy in the age group of 7-12 were divided intwo groups and one of the group received pain relief in the post operative period in the form of glossopharyngeal nerve block with bupivacaine while the other group was taken as the control group which received saline infiltration. The demographic variables of the two groups with respect to age, sex, weight, height and duration of surgery are compared and found as not statistically significant.

IMMEDIATE POST OPERATIVE PAIN RELIEF:

The mean pain score at 0 hour in the study group (0.5 ± 0.6) is significantly lower than the mean pain score at 0 hour in the control group (1.8 ± 1.8) p=0.0001 which is statistically significant. The mean pain score at 1 hour in study group(1.1 ±0.9) is significantly lower than the control group(6.4 ±1.6) p value<0.0001 which is statistically significant. Bissonnette et al achieved post tonsillectomy pain relief with glossopharyngeal nerve blok in the immediate post operative period and the results of our study are in concurrence with this.

DURATION OF ANALGESIA:

The duration of post operative analgesia in the group which received bupivacaine infiltration (study group) was statistically significant and higher than the control group (mean ± SD 4.5 ± 0.9 to 1.1 ± 0.9) with p value< 0.0001.Goldsher M et al concluded in his study that bupivacaine infiltrated in post tonsillectomy patients pain relief extended beyond the post operative period and the results of our study was in concurrence with this result.

HEMODYNAMIC PARAMETERS:

The heart rate is significantly lower in the study group compared to the control group for upto 5 hour duration (104.4 ± 6.0 to 107.4 ± 5.8) p=0.05. The heart rate correlates with the post op analgesia provided in the group which received bupivacaine infiltration.

COMPLICATIONS:

There was no bleeding or hematoma formation at the bleeding site probably due to use of fine gauge spinal needle(25 G) and having control over depth of insertion. No case had upper airway obstruction .The study conducted by **JD bean et al** had concluded that large volume and concentration of local anaesthetic given to block the glossopharyngeal nerve in the lateral pharyngeal space were sufficient to block the vagus nerve which can lead to severe upper airway obstruction and loss of protective reflexes. The strength of local anaesthetic used in this study was 0.25% and the total dose was 10 mg which did not exceed the toxic limit.

PAIN SCORING: Assessment of pain was studied with mCHEOPS in the post operative period. This is a behavioral based pain score which correlated with the duration of analgesia in our study. **Splinter WM et al** has concluded in his study that mCHEOPS is a valid and reliable tool in assessing pain in the age group of 2 to 11 years.

SUMMARY: Sixty patients who underwent elective tonsillectomy were randomly divided as GROUP I and GROUP II with 30 patients each.GROUP I received Glossopharyngeal block with bupivacaine infiltration and GROUP II received normal saline infiltration. mCHEOPS was used to assess pain score.In the immediate post operative period the mCHEOPS score was significantly lower in the study group when compared with the control group 0.5±0.6 to 1.8±1.8 which infers that the GROUP I received better immediate post operative analgesia than GROUP II.The duration of analgesia in the study group was 4.5±0.9 hours while in the control group it was 1.1±0.5 hours. There was no complication following infiltration in either groups.

In conclusion Glossopharyngeal nerve block with 0.25% bupivacaine in patients (age 7 – 12) who underwent Tonsillectomy provides better post -tonsillectomy pain relief in post operative period .

Financial support and sponsorship : Nil.
Conflict of interest: There are no conflict of interest

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