Original Research Article

The Effects of Glossopharyngeal Nerve Block for Post Operative Pain Relief after Tonsillectomy

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Abstract

Introduction: The tonsillectomy is one of the most common ambulatory surgical procedures done on children. The most common cause of morbidity following tonsillectomy is postoperative discomfort.**Aims:** To investigate the effects of a Glossopharyngeal nerve block on postoperative pain management in Tonsillectomy patients under general anesthesia.**Materials and methods:** The research included 50 individuals who were undergoing elective tonsillectomy surgery. They were split into two groups of 25 people each. The Glossopharyngeal Nerve was blocked with 0.25 percent Levo-bupivacaine in Group A, while Paracetamol was administered intravenously in Group B. Hemodynamics were measured during the intraoperative period, recovery period, and postoperative period using a 10cm VAS and monitoring the MAP, PR, and pulse rate at 0, 2, 4, and 6 intervals.**Results:** In terms of patient characteristics, operation type, and anesthetic duration, there were no statistically significant differences between the groups. During the intraoperative, recovery, and early postoperative periods, Glossopharyngeal nerve block with 0.25 percent Levobupivacaine provides greater analgesia than Paracetamol IV. Hemodynamic stability was seen in both groups. Paracetamol i.v. had a greater rate of increase in pulse rate and MAP in the intraoperative and early postoperative phase than Glossopharyngeal nerve block with 0.25 percent Levobupivacaine.**Conclusion:** Because of its high analgesic quality and antipyretic action, paracetamol administered every 6th hourly parenterally can be utilized for intraoperative and postoperative analgesia (mild to moderate pain).

Keywords: Glossopharyngeal nerve block, Levo-bupivacaine, Paracetamol

Introduction

The tonsillectomy is one of the most common ambulatory surgical procedures done on children[1]. The surgery produces severe pain on the first postoperative day. Postoperative pain is the principle cause of morbidity after tonsillectomy. The patient's ability to return to school or work following release from the hospital, as well as their overall happiness with the surgery, may be harmed by this pain. Pain relief can be achieved through a variety of methods. The purpose of this study is to see how effective the presurgical glossopharyngeal nerve block is as a postoperative analgesic in children who have tonsillectomy.Preincisional, peritonsillar infiltration with 0.25% Levobupivacaine before surgery was effective than i.v PCM infusion in reducing early post-tonsillectomy pain. It was clear that combining a glossopharyngeal nerve block with 0.25 percent levobupivacaine decreased postoperative pain and morbidity significantly more than either procedure alone. The ninth (IX) pair of cranial nerves is the glossopharyngeal nerve. It emerges from the sidewalls of the upper medulla, just rostral to the Vagus nerve, from the brainstem.

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The motor division of the glossopharyngeal nerve comes from the embryonic medulla oblongata's basal palate, whereas the sensory division comes from the cranial neural crest.The pure S (-) enantiomer of bupivacaine, levobupivacaine, has emerged as a safer alternative to its racemic parent for regional anesthesia. In pharmacodynamics tests, it showed reduced affinity and severity of depressive impact on myocardial and central nervous vital centers, as well as a better pharmacokinetic profile. Occupational toxic effects are typically reversible with minimum treatment and have no catastrophic consequence, according to reports of toxicity with 0.25 percent levobupivacaine. The purpose of this study was to determine the effects of a Glossopharyngeal nerve block for postoperative pain management in Tonsillectomy patients who were under general anesthesia[2].

Materials and Methods

In 50 patients receiving elective Tonsillectomy under general anesthesia, a prospective randomized controlled trial is being conducted. These are divided into two groups of 25 patients each. After departmental ethics committee clearance and signed informed consent. Patients between the ages of 15 and 20 years old, of both sexes, with no systemic diseases are chosen and placed into two groups, each with 25 patients. 'A'received Glossopharyngeal nerve block with 0.25% levobupivacaine and patients in group 'B' received i.v PCM 15ml/kg over 10 min before the surgery.

Inclusion Criteria: Patients In the age group15 to 20 yrs and ASA Grade I OR II

Exclusion Criteria: Patients with abnormal liver and renal function tests, H/O hypersensitivity to NSAIDS, a fever of more than 99.6 degrees Fahrenheit, and who are taking concomitant medicines (anticonvulsants, corticosteroids, or antihistamines) that may interfere with pain assessment.

NIBP, pulse oximeter, $EtCO_2$, and temperature were all monitored. Paracetamol 15mg/kg i.v. over 10 min as infusion, 0.25 percent Levobupivacaine 5cc into each tonsillar pillar. All of the patients are divided into two groups at random. Patients in this group A , For all patients,a conventional general anesthetic approach with endotracheal intubation and regulated breathing was planned. All patients had a pre-anesthetic check-up, and baseline investigations were recorded as needed. After transferring the patient to the operating theatre's waiting room, i.v cannulation was performed 15 minutes ahead of schedule. Antisialogogue, antiemetic, and antacid medications were administered intravenously, including Glycopyrrolate 4mcg/kg, Ondansetron 10mcg/kg, and Rantac 2mg/ kg. Patient was linked to NIBP, pulse oximeter 22 probe, and electrocardiographic leads when he arrived in the operating room (limb lead-2). PR, BP, and SpO_2 were measured at the start. After preoxygenating the patient, induction with Propofol 2 mg/kg was given, followed by endotracheal intubation with Inj. Suxamethonium 2 mg/kg and a suitable size oral cuffed, portex endotracheal tube using a Macintosh laryngoscope blade. Following intubation, anesthesia was maintained with oxygen at 33%, nitrous oxide at 66%, and sevoflurane at 1.5-2 percent. At a rate of 14 breaths/min and 8ml/kg tidal volume, IPPV was administered using a circle absorption system coupled to a datexohmeda anesthetic work station. The $EtCO_2$ was kept at 30-35 mm Hg. Glossopharyngeal nerve block by Intraoral approach was done after positioning and placing the Boyle Davis mouth gag. Patients were monitored during anesthesia using continuous ECG, NIBP, $EtCO_2$ and pulseoximetry. IV fluids were administered intraoperatively in accordance with the procedures, blood loss, and urine output. Fluid treatment included Ringer lactate and Dextrose NS. During the intraoperative phase, vital data was collected at the time of induction, intubation, and every 15 minutes thereafter. Pulse rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure were all measured. The procedure took around 45 minutes for all of the patients.The neuromuscular blockade was reversed after surgery using Neostigmine 60mcg/kg and Glycopyrrolate 1mcg/kg. During the recuperation phase, vital information was captured. PR, SBP, DBP, and MAP were all measured. After verifying a sufficient degree of awareness and intact reflexes, patients were moved to the post-anesthesia care unit. In the postoperative phase, the patients were monitored for analgesia and hemodynamics for 6 hours. The time to request rescue analgesia in the post-anesthesia care unit was observed.The visual analogue scale was used to measure postoperative discomfort. During the postoperative phase, vital data was collected at 2-hour intervals. The key statistics included PR, BP, and temperature. If the VAS Score was greater than 3 or on demand, rescue analgesia of inj. PCM at 15mg/kg i.v was administered. The two groups' observations and results were compared and analyzed.

At the moment of induction, following intubation, and every 15 minutes until the procedure was finished, recordings were made at various times during the intraoperative period. Patients in both groups were monitored for 6 hours after surgery and recordings were taken at 0, 2, 4, 6, - hour intervals during recovery (as soon as the patient was shifted). We considered the haemodynamic effects preoperatively, intra operatively and during recovery, the postoperatively analgesic effect of these drugs. SPSS software version 17.0 was used to analyze the data. The effectiveness of the medication was determined using appropriate statistical techniques. The mean and standard deviation of various parameters in distinct groups are used to express descriptive results. The degree of significance was determined using the probability value (p-value). Significant was defined as a p value of less than 0.05, while highly significant was defined as a p-value of less than 0.01[3-5].

Results

Table 1: Bio-physical Profile and pre op vitals of both groups A and B

Parameter	Group A		Group B		t-value	p-value
	Mean	SD	Mean	SD		
Age (yrs)	16.6	1.7	16.68	2.3	0.137	0.892
Weight (kg)	47.16	5.9	47.7	8.2	0.295	0.769
Pre OP PR (/min)	83.24	5.6	82.4	4.96	0.562	0.57
Pre OP MAP (mm of Hg)	73.6	5.2	74.3	4.9	0.44	0.66

The mean age, weight, Pre OP Pulse rate and mean arterial pressure in groups has no statistical difference.

Table 2: Pulse rate (per min) comparison in two groups at different time interval intra operatively

Time	Group A		Group B		t-value	p-value
	Mean	SD	Mean	SD		
Induction	98.12	7.2	97.68	6.7	0.22	0.82
Intubation	104.1	6.4	103.28	5.5	0.49	0.62
15 min	83.3	4.2	101.2	8	9.7	<0.001
30 min	82.76	4.6	101.8	6.8	11.5	<0.001
45 min	83.7	5.8	102.7	7.7	9.7	<0.001

Pulse rate was compared at different time interval intra operatively it was observed that, Mean pulse rate at 15 minutes was significantly lower in group A 83.3 /min compared to group B 101.2 / min ($p<0.001$). Mean pulse rate at 30 minutes was significantly lower in group A 82.7 /min compared to group B 101.8 / min ($p<0.001$). Mean pulse rate at 45 minutes was significantly lower in group A 83.7 /min compared to group B 102.7 / min ($p<0.001$).

Table 3: MAP (in mm Hg) comparison in two groups at different time interval Intra operatively

Time	Group A		Group B		t value	p value
	Mean	SD	Mean	SD		
Induction	81.72	9.04	82.7	5.7	0.46	0.64
Intubation	90.16	6.8	90.44	4.6	0.17	0.86
15 min	69.5	3.3	87.28	4.54	15.78	<0.001
30 min	67.96	2.9	86.88	4.3	17.99	<0.001
45 min	67.16	3.19	86.76	3.5	20.58	<0.001

Mean arterial pressure was compared at different time intervals intra operatively it was observed that Mean arterial pressure at 15 minutes was significantly lower in group A 69.5 mm Hg compared to group B 87.28mm Hg (p<0.001). Mean arterial pressure at 30 minutes was significantly lower in group A67.96 mm Hg compared to group B 86.68 mm Hg (p<0.001). Mean arterial pressure at 45 minutes was significantly lower in group A 67.16 mm Hg compared to group B 86.76 mm Hg (p<0.001).

Table 4: Pulse rate (per min), MAP (in mm Hg) comparison in two groups at the Time of recovery

	Group A		Group B		t value	p value
	Mean	SD	Mean	SD		
PR (per min)	77.76	5.3	83.84	4.9	4.1	<0.001
MAP (mm Hg)	66.32	3.26	86.64	2.3	25.23	<0.001

At recovery PR and MAP was recorded it was observed that the mean PR in group A was 77.76 which was significantly lower compared to group B 82.16 (p<0.001). The Mean arterial Pressure in group A was 66.32 which was significantly lower compared to Group B (p <0.001).

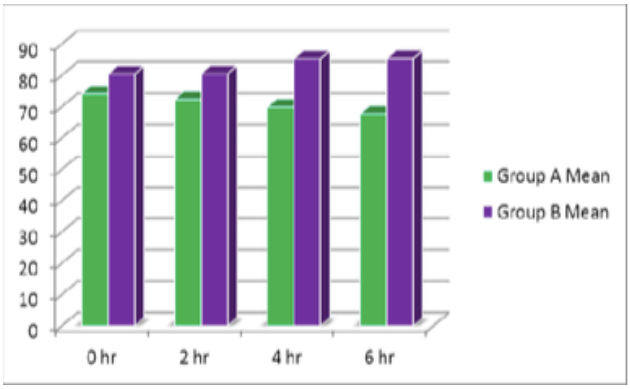

Fig 1: Pulse rate (per min) comparison in two groups at different time Interval post operatively

Pulse rate was compared at different time interval post operatively it was observed that, Mean pulse rate at 0hr in group A was 74.12 significantly lower compared group B 80.44 (p<0.001). At 2hrs Mean pulse rate in group A was 72.28 significantly lower compared to group B 80.48 (p<0.001). Mean pulse rate at 4hr in group A was 69.84 significantly lower than the mean pulse rate in group B 85.3 (p<0.001). Mean pulse rate at 6hr was 67.72 significantly lower than the mean pulse rate in group B 85.48 (p<0.001).

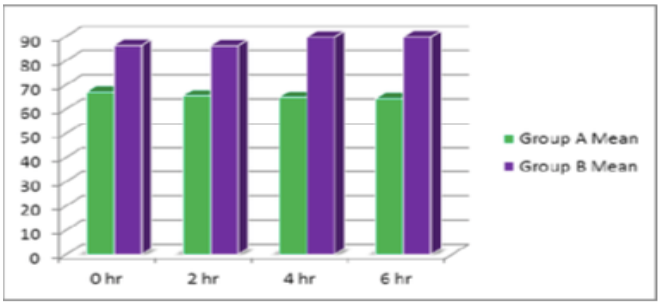

Fig 2: Mean Arterial Pressure (mm Hg) comparison in two groups at different Time interval post operatively

Mean Arterial pressure was compared at different time interval post operatively it was observed that, Mean arterial pressure at 0 hour in group A was 67.08 significantly lower than the mean arterial pressure in group B is 86.28 (p<0.001). At 2 hours mean arterial pressure in group A was 65.48 significantly lower than the mean arterial pressure in group B is 86.16 (p<0.001). Mean arterial pressure at 4 hours in group A was 64.88 significantly lower than the mean arterial pressure in group B is 89.76 (p<0.001). Mean arterial pressure at 6 hours in group A was 64.32 significantly lower than the mean arterial pressure in group B is 89.84 (p<0.001).

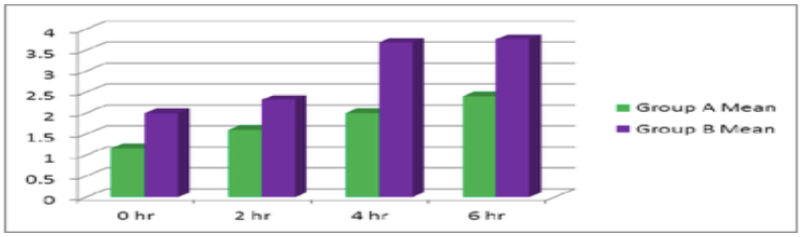

Fig 3: Comparison of pain scores according to VAS in two groups at Different time interval postoperatively

The VAS score was used to assess pain at various time intervals following surgery. It was observed that the mean VAS score at 0 hr in group A was 1.16, significantly lower than group B 2.0 ($p < 0.001$). The mean VAS score at 2hr in group A was 1.6, significantly lower than group B 2.32 ($p < 0.001$). The mean VAS score at 4 hours was significantly lower in group A, 2.0 compared to group B, 3.68 p (<0.001). The mean VAS score at 6hrs was significantly lower in group A, 2.4 compared to group B, 3.76 ($p < 0.001$).

Discussion

This study was undertaken to observe the efficacy of Glossopharyngeal nerve block with 0.25% Levobupivacaine and i.v Paracetamol infusion for intraoperative haemodynamic stabilisation and postoperative pain relief in elective tonsillectomy. There was no significant difference in age, weight, preoperative pulse rate, blood pressure, or temperature between the two groups. Patients were split into two groups of 25, each with 25 patients. After intubation and 15 minutes before surgery, Group A patients administered 0.25 percent Levobupivacaine to block the Glossopharyngeal Nerve. For analgesia, Group B patients were given i.v. paracetamol as an infusion of 15mg/kg before operation. All of the patients were given antisialogogue, antiemetic, and antacid preoperatively, 15 minutes before induction.Regardless of the group, all patients had the same anesthetic technique: general anesthesia with endotracheal intubation and controlled breathing. The average operation time for all of the patients was about 45 minutes. During the intraoperative and postoperative periods, patients in Group A got no analgesic, whereas patients in Group B received paracetamol infusion as rescue analgesia on demand or if the VAS was greater than 3 and for breakthrough pain. Before the operation, all patients in Group A got an intraoral block, whereas patients in Group B received the first dose of the analgesic medication paracetamol infusion 15 minutes before the procedure began.Patients were between the ages of 15 and 20 when they were chosen. The age differences between the two groups were nearly statistically insignificant. Group A had a mean age of 16.6(1.7) while group B had a mean age of 16.68(2.3). The average weight difference between the two groups was likewise statistically insignificant. In group A, the mean weight was -47.16(5.9), whereas in group B, it was -47.7(8.2). The difference in preoperative average heart rate and blood pressure is similarly negligible. Group A had a preoperative pulse rate of 83.24(5.6) while group B had a pulse rate of 82.4 (4.96). Group A had a mean preoperative MAP of 73.6(5.2) while Group B had a mean preoperative MAP of 74.3(4.9).The hemodynamics of all of the patients was monitored during surgery and recovery. Induction, intubation, and then 15,30,and 45 minutes of recording were all done. Pulse rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure were all measured. The obtained parameters were statistically analyzed using the unpaired' test, with a p value less than 0.05 deemed significant. Intraoperatively and throughout recovery, pulse rate and mean arterial pressure were recorded at 15, 30, and 45 minute intervals. When compared to the GPN Block group, the paracetamol group saw a substantial increase in PR and MAP.The 10 cm VAS was used to measure subjective pain reduction at 0, 2, 4, and 6 hours after surgery. PR and MAP were recorded in the post-operative period at 0, 2, 4, and 6 hours, in addition to pain ratings. At 0 hr, 2 hr, 4 hr, and 6 hr, mean VAS pain scores in the Glossopharyngeal nerve block group were substantially lower than those in the Paracetamol group. Most patients in (Paracetamol) group B had significantly greater pain scores after 6 hours due to analgesic effect regression, necessitating rescue analgesia. (If VAS is more than 3). At 0, 2, 4, and 6 hours after surgery, pulse rate and MAP measurements were taken. In comparison to group A, there was a substantial increase in PR and MAP in group B. At 4 and 6 hours postoperatively, there was a substantial rise in PR and MAP in group B. The mean pain scores in the paracetamol group were substantially greater than those in the GPN block group at 4 and 6 hours. This is owing to the differences in pharmacokinetic characteristics of both medicines, as well as the short duration of action of paracetamol against the prolonged duration of action of 0.25 percent Levobupivacaine (up to 48 hours), which causes sustained activity over longer periods of time. Most patients in the paracetamol group had considerably greater pain ratings by 6 hours, necessitating rescue analgesia (if VAS>3). At 0, 2, 4, and 6 hours after surgery, pulse rate, MAP, and temperature were recorded. At 0 and 2 hours, there was a substantial increase in pulse rate and MAP in the Paracetamol group compared to the Levobupivacaine group. The paracetamol group showed a substantial rise in PR and MAP at 4 and 6 hours postoperatively.Also the patients in the Glossopharyngeal nerve block group had minimal tonsillar-bleed apart from giving a bloodless surgical field to the surgeon owing to lesser vasodilating properties of 0.25% Levobupivacaine used for the block. The findings of this study show that both Levobupivacaine and Paracetamol are effective and well tolerated, and that the quality of analgesia provided by a Glossopharyngeal nerve block with Levobupivacaine is superior to that provided by Paracetamol i.v. during the intraoperative, recovery, and early postoperative period. The Effects of Glossopharyngeal Nerve Block on Postoperative Pain Relief after Tonsillectomy was recorded in a study by Hee-Pyoung Park et al, which coincides with the same outcomes as the research [2].The effect of glossopharyngeal nerve block with ropivacaine on immediate postoperative pain relief after tonsillectomy in adult patients: A-390 was documented in a study by Jeon, Y.T. Park et al[3].The effect of glossopharyngeal nerve block with ropivacaine on immediate postoperative pain relief after tonsillectomy in adult patients:A-390, which correlates with the same results as our study.Clinical Evaluation of Glossopharyngeal Nerve Block For Preemptive Analgesia after Tonsillectomy was published in the Internet Journal of Healthcare Administration.[4] The amount of obtunded gag reflex was highly associated with the analgesic effect of GNB[4].In his study, Glossopharyngeal Nerve Block for Pain Relief After Pediatric Tonsillectomy: Retrospective Analysis and Two Cases of Life-Threatening Upper Airway Obstruction from an Interrupted Trial, Bean-LijewskI[5] concluded that GNB after tonsillectomy may be associated with life-threatening UAO and tachycardia with hypertension due to inadvertent neural blockade of the vagus nerve.In the study done by Rawal N[6] –Acute pain services revisited – good from far, far away – in regional anaesthesia pain medicine has stated that even today, many patients do not receive adequate postoperative pain relief due to staff failures to routinely assess pain and pain relief stresses the importance of tackling Breakthrough pain and also highlights that regional nerve blocks can be used to treat Breakthrough pain. Pain that arises between regularly planned doses of pain medication is referred to as breakthrough pain18. Breakthrough pain is a painful sign that requires immediate attention. Most chronic pain patients, including those in palliative care and hospice, are given medicine to address breakthrough pain on an as-needed basis[1]. BTP medication is often quick acting and has a brief duration of effect (usually providing relief for two to four hours). There was no necessity for analgesic use or recording of breakthrough pain in the 25 patients in study group A with glossopharyngeal nerve block.In contrast to the current findings, El-Hakim et al. looked at 92 adult patients who had tonsillectomy and found that a 0.5 percent bupivacaine glossopharyngeal nerve block was ineffective in decreasing early post-tonsillectomy discomfort[7]. In compared to the saline and no block groups, participants in the bupivacaine group reported more acute pain the morning following surgery. Furthermore, the three groups had identical pain scores and painkiller usage throughout the postoperative period. This study, on the other hand, was conducted on adult patients, which might explain the disparity between its findings and those of the current study. In addition, Violaris and Tuffin looked studied the impact of topical bupivacaine (0.5 percent) or normal saline infiltration on postoperative pain in adult tonsillectomy patients[8,9].They discovered that topical bupivacaine

infusion did not reduce postoperative pain scores or analgesic use. According to the enlarged case report by Naja et al., these dismal results might be attributable to local anesthetics failing to reach sensory nerve ends[9].Bell et al. looked at how a bilateral glossopharyngeal nerve block affected postoperative analgesia in adults who had tonsillectomy or uvulopalatoplasty[10].With or without glossopharyngeal nerve block, they reported identical postoperative pain ratings. Furthermore, the tonsillectomy subgroup analysis indicated that the glossopharyngeal nerve block group had more postoperative discomfort than the non-block group. This disparity might be explained by the fact that their investigations were done on adult patients. In addition, Kountakis looked examined the effect of local infiltration of either bupivacaine (0.5%) or normal saline on post-tonsillectomy discomfort. There was no discernible difference between the two groups[11].This discrepancy might be explained by the fact that they used conventional tonsillectomy instead of bipolar diathermy in their research.

Conclusion

In our trial, the glossopharyngeal nerve block outperformed paracetamol in terms of analgesia quality, Breakthrough pain incidence, patient comfort, and time to request rescue analgesia. All patients in the paracetamol group required an extra dosage of analgesic (Paracetamol) within or before 6 hours, which was consistent with the pharmacokinetic profile. Glossopharyngeal nerve block provides analgesia for a longer amount of time. To conclusion, because of its high analgesic quality and antipyretic impact, paracetamol administered every 6th hourly parenterally can be utilized for intraoperative and postoperative analgesia (mild to moderate pain). Recent research shows that doctors can more successfully avoid postoperative pain and enhance the recovery profile following ambulatory surgery by combining preemptive, multimodal methods using centrally and peripherally acting analgesic medications, as well as non-pharmacological treatments. Finally, with the use of multimodal analgesic methods, "stress free" anesthesia with little postoperative discomfort should be possible for the majority of outpatients having ambulatory surgical operations.

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