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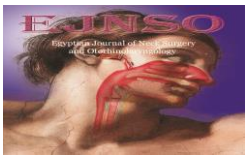

Glossopharyngeal Nerve block on post-tonsillectomy pain among Egyptian children.

Bassem Saied Abdallah Saied [1]; Abdelrahim Ahmed Abdelkarim [1]; Mina Maher Raouf [2]; Ahmed Adel Sadek [1]

1. Otorhinolaryngology Department, Faculty of Medicine, Minia University. Minia. Egypt
2. Anesthesia, ICU and pain management. Faculty of Medicine – Minia University. Minia. Egypt

Abstract:

Objective: To demonstrate glossopharyngeal nerve block by local anesthetics on post-tonsillectomy pain management

Patients and Methods: Two hundred and ten children aged seven to fifteen underwent elective tonsillectomy after parents documented agreement, divided into two equal groups—one hundred and five candidates in each chosen group, from Minia university hospital, otorhinolaryngology outpatient clinic. Group A: received glossopharyngeal nerve block (intra-oral approach), using bupivacaine 0.5% (1mg/kg divided in both sides) immediately after endotracheal intubation (pre-incisional). Group B: received 5 ml sterile saline on each side. Chronic tonsillitis was the indication of tonsillectomy in our study.

Results: Glossopharyngeal nerve block can decrease postoperative pain scores. VAS (Visual Analogue Scale) was higher in group B, compared to group (A) up to 24 hours postoperative. Time for the first need for pain killer was delayed in the group (A) compared to group (B), ($P < 0.0001$). The postoperative dose of rescue analgesia consumed in group (A) was lower than in the control group ($P < 0.0001$). The time of first oral intake was prolonged in the group (B) compared to group (A)($P < 0.0001$). Patients that needed additional analgesia represented 30 % of the group(A) and 62 % in the group (B). The pattern of sleep during the first post-operative night was good in the group (A) in comparison with group (B) ($P = 0.003$). No secondary hemorrhage was reported in both groups

Conclusion: Glossopharyngeal nerve block with bupivacaine (0.5%) significantly reduces postoperative analgesic use, and delays the time for the first need for a rescue pain killer.

Keywords: Glossopharyngeal Nerve, Analgesia, Tonsillectomy, Pain, Bupivacaine

Introduction

Safe and effective postoperative pain killer does not only reduce pain and associated morbidities but also facilitates early oral intake so preventing dehydration which in turn increase postoperative pain. [1 2, 3]

Pain following tonsillectomy is a main complaint in children. [4, 5]

Acute pain causes physical discomfort, anxiety, and behavior problems, and high-quality pain management promotes functional recovery. [4, 6]

We performed glossopharyngeal nerve block to hasten analgesia and pay off pain. Many routes were used for

Corresponding author ; ahmeda.sadik3030@gmail.com

control of pain that follow tonsillectomy. These included pharmacological and non-pharmacological. [7-9]

Patients and methods:

After obtaining local ethical committee approval (59;4/2021) and clinical trial registration number (NCT05109416) , two hundred and ten child from age seven to fifteen years underwent elective tonsillectomy after parent documented agreement, divided into two equal groups.

One-hundred and five candidates in each chosen from Minia university hospital otorhinolaryngology out-patient clinic who were eligible for elective tonsillectomy.

Group A: received glossopharyngeal nerve block (intra-oral approach) by bupivacaine 0.5% concentration (1mg/kg divided in both sides) immediately after endotracheal intubation.

Group B: received 5 ml sterile saline in each side

Both groups received 15 mg/Kg intra-operative paracetamol infusion.

Both groups received paracetamol by the following protocol (10 -15 mg/Kg per dose) (Maximum: 5 doses in 24 hour oral or rectal) during post-operative period.

Inclusion criteria:

After parents written consent ,the age of patients recruited in this study was (7-15) years old , complained from Chronic tonsillitis(Paradise Criteria) , Chronic tonsillitis causing persistent enlarged juglo-diagastric lymph nodes, persistent halitosis not responsive to medical treatment.

Exclusion criteria:

1. Parent's refusal.
2. Obstructive sleep apnea.
3. Concomitant cardiac or pulmonary congenital anomaly

Pre-anesthetic evaluation and routine pre-operative laboratory investigations were done for all patients.

We explained the technique and purpose of the study also possible risks to the parents of the children. Parents asked to sign informed written consent.

For all patients, a standard medical protocol was used.

Surgery was done by the same surgeon with the same technique.

After induction of anesthesia and positioning of the patient, infiltration was done through two techniques. [10, 11]

A. The palatoglossal fold approach

We swept the tongue to the opposite side. Infiltrating the local anaesthetic using spinal needle (a 25-gauge), lateral to anterior pillar at its base, 0.5 cm depth.

B. The palatopharyngeal fold approach

In the posterior pillar of tonsil (middle point), as lateral as possible piercing using spinal needle (A 25-gauge). After careful aspiration, the retropharyngeal mucosa at 0.5 cm depth.

In each side, 2-5 mL of 0.5 bupivacaine was injected over the span of three minutes.

Pain score was assessed using a visual analog scale (VAS), and the time of the first need for pain killer was recorded.

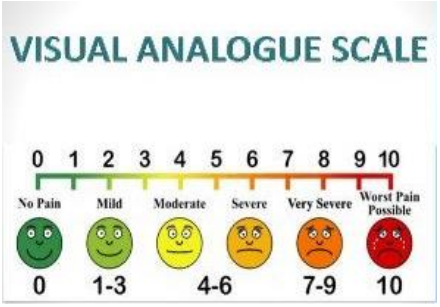

Figure 1 (Visual analogue scale)

Results

225 patients aging (7-15 years old) were included in our study , splitter into two groups , group (A) that received local anesthesia and group (B) that received saline 0.9 .The age of patients ranged from 7 -15 years old in both groups.

There is no significant difference regarding the age distribution in both groups.

The post-operative complications were comparable between both groups as nausea, abdominal pain and otalgia (P = 0.001, 0.507, 0.110 respectively). The time for the first call for pain killer was significantly prolonged in patient that infiltrated with bupivacaine compared to patient that infiltrated with saline (P < 0.0001). The dose of post-operative analgesia consumed by group (A) was significantly lower than the control group (P < 0.0001). (Table 4)

The time for the first oral intake was prolonged in the control group compared to group (A) (P<0.0001). Patients that needed additional analgesia represent 30 % of study group and 62 % in control group. Pattern of sleep during first post-operative night was good in study group in comparison with control group (P= 0.003).

No secondary hemorrhage was reported in both groups.

Table1: Socio-demographic characteristics of the studied population.

Characteristic	Study group (n=105)	Control group (n=105)	P- value
Age(years) Median ± IQR.	11.00 ± 4.00	9.00 ± 5.5	0.0001
Gender Male Female	60(57.1%) 45(42.9%)	61(58.1%) 44(41.9%)	0.889
Weight (kilogram) Median ± IQR	20.00 ± 0.00	24.00 ± 15.00	0.0001
Height(centimeter) Mean ± SD	128.79± 16.96	127.19 ± 17.67	0.008

Table 2: Operative details of the studied population

Characteristic	Study group (n=105)	Control group (n=105)	P- value
Duration of surgery (minutes) Median ±IQR	24.00 ± 3.00	24.00 ± 3.00	0.725
Complication due to the maneuver Positive Negative	0(0.0%) 105(100.0%)	0(0.0%) 105(100.0%)	----

Table 3: Post-operative pain monitoring over a 48 hour period using Visual Analogue score of the studied population

Characteristic	Study group (n=105)	Control group (n=105)	P- value
VAS at 1 mint Post-operative Median ± IQR	20.00 ± 10.00	30.00 ± 10.00	<0.0001*
VAS at 10 mint Post-operative Median ± IQR	30.00 ± 10.00	80.00 ± 20.00	<0.0001*
VAS at 20 mint Post-operative Median ± IQR	40.00 ± 10.00	70.00 ± 20.00	<0.0001*
VAS at 30 mint Post-operative Median ± IQR	40.00 ± 10.00	60.00 ± 20.00	<0.0001*
VAS at 2 hour Post-operative Median ± IQR	30.00 ± 10.00	50.00 ± 20.00	<0.0001*
VAS at 6 hour Post-operative Median ± IQR	30.00 ± 10.00	40.00 ± 10.00	<0.0001*
VAS at 12 hour Post-operative Median ± IQR	20.00 ± 10.00	30.00 ± 10.00	<0.0001*
VAS at 24 hour Post-operative Median ± IQR	10.00 ± 10.00	30.00 ± 20.00	<0.0001*

(VAS) Visual Analogue score

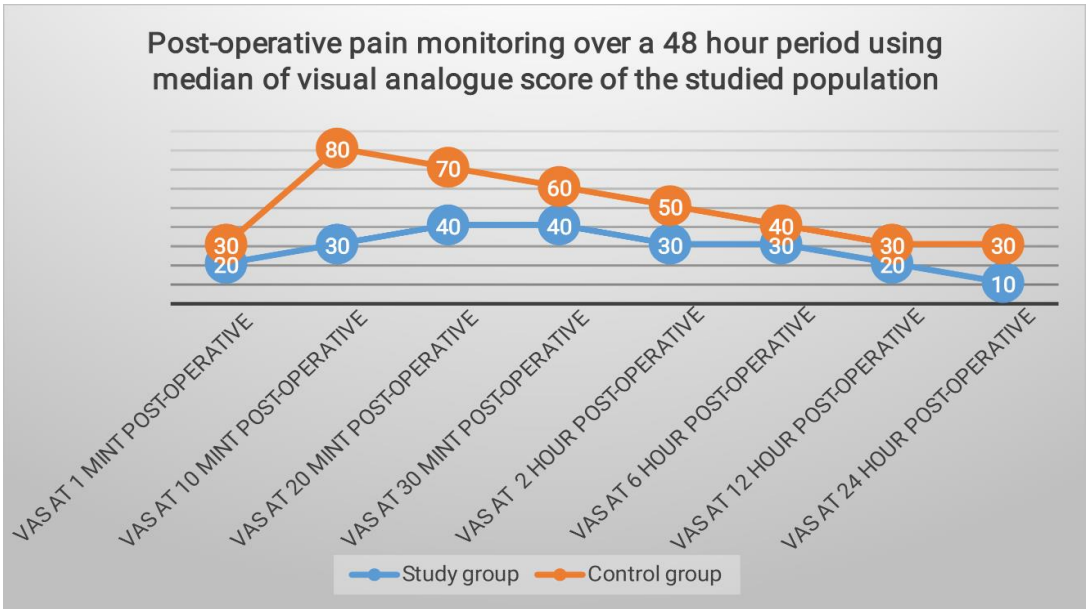

Figure 2: Post-operative pain monitoring over a 48 hour period using median of visual analogue score of the studied population.

Table 4: Post-operative monitoring of the studied population

Characteristic	Study group (n=105)	Control group (n=105)	P- value
Nausea Positive Negative	 4(3.8%) 101(96.2%)	 19(18.1%) 86(81.9%)	 0.001*
Abdominal pain Positive Negative	 10(9.5%) 95(90.5%)	 13(12.4%) 92(87.6%)	 0.507
Otalgia Positive Negative	 15(14.3%) 90(85.7%)	 24(22.9%) 81(77.1%)	 0.110
First time to need analgesic (minutes) Median ± interquartile range	 70.00 ± 70.00	 20.00 ± 11.00	 <0.0001*
First time for oral intake (hours) Median ± interquartile range	2.00 ± 3.00	6.00 ± 2.00	<0.0001*
Total consumption of acetaminophen (mg/kg) Median ± interquartile range	 2.00 ± 2.00	 10.00 ± 8.00	 <0.0001*
Need of additional analgesic Positive Negative	 30(28.6%) 75(71.4%)	 62(59.0%) 43(41.0%)	 <0.0001*
Pattern of sleep during first post-operative night slept well worse than normal good dreams bad dreams	 58(55.2%) 40(38.1%) 1(1.0%) 6(5.7%)	 33(31.4%) 64(61.0%) 1(1.0%) 7(6.7%)	 0.003*
Secondary hemorrhage post-operative Positive Negative	 1(1.0%) 104(99.0%)	 0(0.0%) 105(100.0%)	 1.000

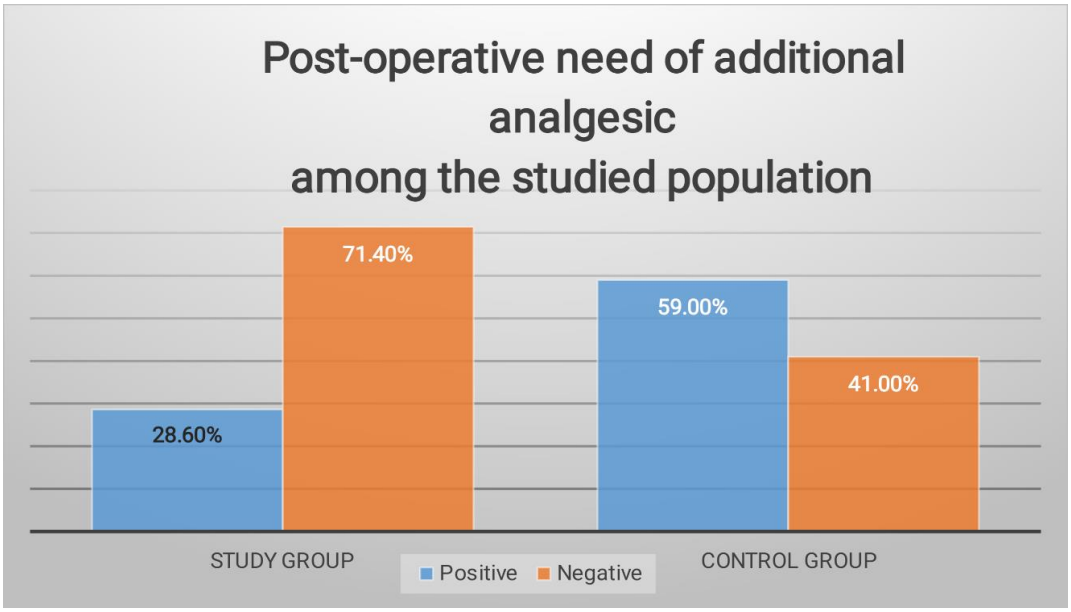

Figure 3: Post-operative need of additional analgesic among the studied population**.**

Discussion :

Tonsillectomy represents one of commonest surgeries performed to children and it is associated with significant post-operative pain. Pain is an important cause of morbidity after tonsillectomy. This pain hinder oral intake, leading to a higher risk of dehydration, secondary infection, dysphagia and hemorrhages. [12, 13]

Pain control following tonsillectomy is a great challenge for both otorhinolaryngologists and anesthesiologists. Different options for pain control have been tried post tonsillectomy even pharmacological and non-pharmacological. [14, 15]

It is important to reduce morbidity and hospital stay that is an important nowadays during the pandemic of COVID-19. It is difficult to quantify and assess pain due to its variability among patients.

Glossopharyngeal nerve is the main responsible for pain transmission following tonsillectomy. Local anesthesia is infiltrated at most sensitive area of glossopharyngeal nerve distribution especially in posterior approach instead of peritonsillar space where local anesthetic does not reach whole sensory distribution area , it is one the corner stones of our study.

Bupivacaine is used as an efficient method for alleviating post-tonsillectomy pain. Lower pain scores were shown in group (A) in comparison to the saline group within the first 24 hour.

Haytoglu et al. [16] , Erdogan et al. [17] also recommend infiltration of bupivacaine in oral surgeries for post-operative pain reduction.

Yucel and Özdoğan [18] concluded that glossopharyngeal nerve block has a practically safe and effective form of analgesia post-operatively in different times 2hrs, 4hrs, and 6hrs. And also no need for rescue analgesia over 24hrs.

Bhatia and Patel [19], concluded that Bupivacaine infiltration in peritonsillar area had better pain control for 6 to 8 h post operatively

Zhang et al. [20], found that pre-incisional infiltration of local anesthetic caused significant decreasing in pain scores following tonsillectomy.

Vlok et al. [21] conducted that bupivacaine group had less need for analgesia. Also pain relief was of longer duration in comparison with the other group. This is explained by the phenomenon of neuroplasticity.

Sun et al. [22] stated that infiltration of bupivacaine at peritonsillar is an efficient route for decreasing pain following tonsillectomy.

All these previously conducted studies keep up with our study results

On the other hand: Ihvan et al. [23] reported that pain scores were lower in first 3-6 h following tonsillectomy. In our study pain control continued 24 hours after surgery not only first 3 – 6 hours. This difference may be due to the different sites of injection; in peritonsillar infiltration local anesthetics cannot reach the nerve terminals.

Bell et al [24] stated that glossopharyngeal nerve block in adult patients has no significant difference as regard pain relief following post tonsillectomy.

Our study includes children 7-15 years instead of adult. When bupivacaine was topically used (spray), did not affect pain score Violaris and Tuffin. [25] As local anesthetics cannot reach sensory nerve terminals, as explained. [26]

Kountakis et al. [27] conducted that there was no great difference in pain scores between bupivacaine injection group and saline group .but the sample size was small in this study (34 patients).

Bean-Lijewski, [28] stated that bupivacaine infiltration might lead to upper airway problems , Other studies do not confirm this finding.

Conclusion:

The ideal analgesic should be effective, safe and easy to administer. Glossopharyngeal nerve block through pre-incisional infiltration of bupivacaine (0.5%) appears to be effective, safe and easily applicable method against early postoperative pain following tonsillectomy in children.

Causing lower pain scores, also delays time for the first need for rescue pain killer and decreases dose of consumed analgesics by patients.

Limitation of this study:

As regard limitations in our study:

1- The study was carried out on a small segment of population.
2- The population of our study belonged to a specific area of the country. So a national level of studies is needed recommended.
3- Vital parameters like PR, BP and SPO2 were not analyzed. These are important indicators of pain whose values could correlate well with FPS-R scores

Conflict of interest: There is no conflict of interest

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