Original Article

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Anaesthesia Section

Effect of Ultrasound-guided Pterygopalatine Fossa Block on Postoperative Pain Relief in Paediatric Adenotonsillectomy under General Anaesthesia: A Randomised Controlled Trial

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ABSTRACT

Introduction: Adenotonsillectomy is a surgical procedure which involves removal of the adenoids and tonsils. Even though adenotonsillectomy is considered a day care procedure it is often associated with significant postoperative pain. An early and clear-headed recovery necessitates an effective postoperative pain management without any sedation related side-effects.

Aim: To examine the effectiveness of ultrasound-guided Pterygopalatine Fossa (PPF) block in children undergoing adenotonsillectomy.

Materials and Methods: The present randomised, double-blinded, controlled study was performed on 60 paediatric patients aged 6-16 years scheduled for adenotonsillectomy under general anaesthesia, in Bangalore Medical College and Research Institute, Bangalore, Karnataka, India. Children were randomly allocated to receive either a bilateral suprazygomatic PPF block with 0.2% ropivacaine (Group R) or 0.9% normal saline (Group C). Pain levels were evaluated postoperatively using the modified Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) scale, Statistical analysis was performed with independent sample t-tests and Chi-square tests.

Results: Sixty children between the ages 6-16 years were selected for the study. Group R had significantly longer duration of analgesia compared to Group C. The time to first analgesia (Group R-524±188.5 min vs Group C-92.8±95.3 min, p=0.0005). Also, there was statistically significant lower paracetamol consumption (27.4±8.1 mg/kg vs 53.3±7.23 mg/kg, p=0.0005) and shorter recovery time (7.8±1.0 min vs 15.9±4.1 min, p=0.0005) in children who received the block with ropivacaine. Also, Group R exhibited consistently lower pain scores at all post-extubation time points (p<0.001) and a significant reduction in sevoflurane consumption. These findings show effective pain control and improved perioperative outcomes.

Conclusion: Ultrasound-guided suprazygomatic PPF block with ropivacaine is an effective technique for postoperative pain management in paediatric adenotonsillectomy patients, providing longer-lasting pain relief, faster recovery, lower pain scores, and stable perioperative haemodynamics, making it a beneficial addition to multimodal analgesic regimens.

Keywords: Adenoids, Pterygopalatine ganglion, Ropivacaine, Ultrasonography

INTRODUCTION

Adenotonsillectomy is a surgical procedure, which involves removal of the adenoids and tonsils. It is often done in children with recurrent throat infections which leads to significant disordered breathing and sleep apnoea. Even though Adenotonsillectomy is considered a day care procedure it is often associated with significant postoperative pain [1]. This significant acute postoperative pain may lead to excessive crying, tachycardia and dehydration. The traditional methods of postoperative pain relief like opioids may lead to dizziness, confusion, nausea and vomiting, further delaying postoperative recovery. An early and clear-headed recovery necessitates an effective postoperative pain management without any sedation related side-effects.

In this endeavour many methods have been practised for postoperative pain relief, like local anaesthetic soaked pledgets in the tonsillar fossa, peritonsillar infiltration with local anaesthetics nebulisation with local anaesthetic with or without adrenaline to reduce oedema and inflammation, corticosteroids, gargling with Lignocaine viscous, so on and so forth. Any pharmacological intervention is associated with its own spectrum of adverse effects.

Many non-pharmacological methods have also been tried like cold packs, usage of only harmonic scalpel and resumption of oral intake with ice cold liquids or ice creams [2].

However surgical trauma can cause severe inflammation, nerve irritation, and muscle spasms, leading to significant postoperative pain. Inadequate pain control can result in complications such as dehydration, dysphagia and delayed recovery, effective pain management is therefore essential to ensure a smooth and quick recovery [3]. The pursuit of a pain free child at the end of adenotonsillectomy has continued over the past few years. Systemic opioids commonly used for postoperative pain management can increase the risk of respiratory complications, such as airway obstruction, respiratory depression, nausea and vomiting, so close monitoring is essential for at least 24 hours postoperatively, potentially delaying recovery and hospital discharge [4].

Non-opioid multimodal agents, such as acetaminophen, dexamethasone, dexmedetomidine, and ketorolac, offer alternative options with varying effects and side-effects, including a risk of postoperative bleeding. Local and topical methods, like peritonsillar injection, have limited application due to inconsistent pain relief and potential complications, including bleeding, intravascular injection, vocal cord paralysis, and airway obstruction [5]. The adenotonsillar region is innervated by a complex neural network involving the tonsillar branches of glossopharyngeal nerve and the lesser palatine branch of the maxillary division of the trigeminal nerve. Historically, regional anaesthesia was rarely used for adenotonsillectomy [6-8]. Maxillary nerve blocks have been approached through various routes, each with its own drawbacks. The infrazygomatic approach for trigeminal neuralgia carries risks, including maxillary artery puncture and orbital or skull penetration [8]. The palatine nerve block requires identification of the first molars, making it challenging in infants. In contrast, the suprazygomatic approach to the PPF is a safer and more accessible option, particularly in children, with reduced complication risks [9].

However, Suprazygomatic Maxillary Nerve Block (SZMNB), also known as the PPF block {Sphenopalatine Ganglion (SPG) block} has emerged as a feasible option. This technique involves administering local anaesthesia to block the maxillary nerves, thereby reducing sensation in the tonsils, uvula, adenoids, and soft palate. By selectively targeting the posterior pharynx while sparing the glossopharyngeal nerve, this block preserves essential airway reflexes, such as coughing and swallowing [10]. Studies have shown that injecting local anaesthetics into the PPF provides effective postoperative pain control, enhances recovery, and reduces complications. Notably, this approach has been found to eliminate the need for postoperative morphine in paediatric patients undergoing cleft repair surgery [11-13]

The present study examined the effectiveness of ultrasound-guided PPF block in children undergoing adenotonsillectomy, focusing on postoperative pain management and recovery. The primary objective was to assess time for first analgesia requirement (Inj. Paracetamol) while secondary goals included, total analgesic requirements within 24 hours post-surgery, time for rescue analgesia, intraoperative haemodynamics, and complication if any.

MATERIALS AND METHODS

The present randomised, double-blinded, controlled trial was conducted from April 2024 to September 2024 (over a period of 6 months) at Victoria Hospital, affiliated to Bangalore Medical College and Research Institute, Bangalore, Karnataka, India,after obtaining Ethical committee approval (BMCRI/EC/11/23-24, dated 27/07/2023) and study was registered prospectively with the Clinical Trials Registry-India (CTRI/2024/04/066145, dated 23/04/2024). The sample size was determined based on a prior study by Abdelghafar EM et al., [14] where the bilateral PPF block was performed via ultrasound-guidance using 4 mL of bupivacaine 0.25% in Group A and 4 mL 0.9% saline in Group B, the mean with standard deviations of postoperative analgesic (incremental i.v. dose of 0.07 mg/kg nalbuphine) requirements in 24 hours in study group and control group were 10±2 and 20±5, respectively, assuming a decrease in postoperative analgesic requirement by 25% in a group with 95% confidence interval and 80% power, 25.6 patients per group were required with a 1:1 allocation ratio (two-tailed), considering a 15% dropout rate, 30 patients per group were enrolled.

Inclusion and Exclusion criteria: The study included 60 patients aged between 6-16 years, ASA physical status I & II, posted for elective adenotonsillectomy under general anaesthesia, after obtaining parental informed consent. Upper respiratory tract infections, bleeding disorders, skin lesions at the block site, local anaesthetic hypersensitivity and parental refusal were excluded from the study.

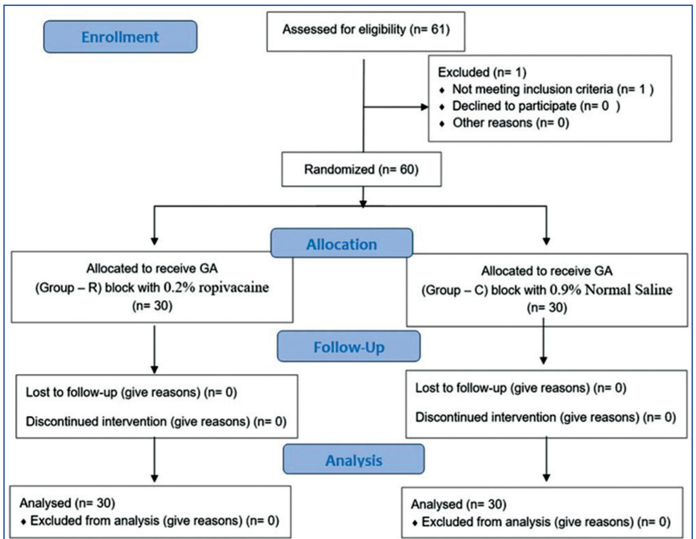
Study Procedure

The study was conducted in accordance with the Declaration of Helsinki (2013) and good clinical practice guidelines and manuscript follows CONSORT guidelines.

All patients underwent a comprehensive pre-anaesthesia evaluation on the day prior to study enrolment. The day of surgery, patients' fasting status and informed consent were re-verified. Upon arrival in the operating room, standard monitoring modalities were applied and intravenous access was secured using a 22-gauge catheter. An infusion of Dextrose Normal Saline (DNS) was initiated, with rate and volume determined according to individual fluid requirements. Premedication and the conduct of general anaesthesia adhered strictly to institutional protocols. Premedication with intravenous (i.v) glycopyrrolate (4 µg/kg) and midazolam (0.02 mg/kg) for intraoperative analgesia fentanyl (1.5 µg/kg i.v.) was used and propofol (2 mg/kg i.v.) as induction agent and atracurium (0.5 mg/kg i.v.) to facilitate tracheal intubation with endotracheal tube of appropriate size. A pharyngeal pack was inserted, and patients were maintained on volume-controlled mechanical ventilation, targeting an End-tidal Carbon Dioxide ($EtCO_2$) of 32-34 mmHg.

Anaesthetic depth was monitored utilising entropy analysis (Entropy module, Datex-Ohmeda S/5 Avance™ workstation, GE Healthcare). Sevoflurane (initial concentration 2%) was delivered in a 50:50 mixture of air and oxygen to maintain a target Minimum Alveolar Concentration (MAC) of 0.7-0.9, with subsequent adjustment to keep State Entropy (SE) values between 40 and 60, maintaining a Response Entropy (RE) to SE difference of less than 10. If the RE-SE difference was more than 10, fentanyl (1 µg/kg i.v.) was administered as additional dose. Intraoperatively, basic ASA monitoring done with recordings documented at baseline, at induction, and every five minutes post-intubation until the end of surgery. Additional data collected encompassed end-tidal anaesthetic gas concentrations, MAC, and total sevoflurane consumption, as measured by anaesthesia gas module of anaesthetic delivery unit-GE Datex-Ohmeda S/5™.

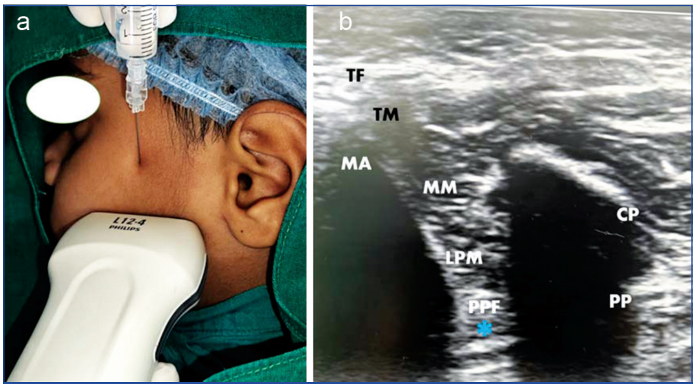
Randomisation and allocation concealment involved serially numbered, sealed envelopes with group assignments determined by computer-generated sequences in a 1:1 ratio [Table/Fig-1] prepared using the online software www.randomization.com by the primary investigator. Group R received a bilateral suprazygomatic PPF block with 0.2 mL/kg of 0.2% ropivacaine (max 4 mL) [15], while control group (Group C) received a bilateral suprazygomatic PPF block with 0.2 mL/kg of 0.9% normal saline (max 4 mL). To avoid any bias all the blocks were performed by a one operator- an experienced senior Anaesthesiologist with more than 10 years of expertise in the field. To maintain blinding, the Anaesthesiologist administering the block was unaware of subsequent intraoperative details, while patients, guardians, and the Anaesthesiologist managing anaesthesia and collecting data were blinded to group allocation.



[Table/Fig-1]: Consolidated Standards of Reporting Trials (CONSORT) flow diagram for participant enrolment. Group R (ropivacaine) Group C (Control) n: number of patients

The suprazygomatic approach for PPF block was performed under ultrasound (US) guidance, similar to Cometa MA et al., method [16]. In Group R, the PPF block was performed just before surgical procedure in anaesthetised children, who were positioned supine with their head turned to the opposite side. The ultrasound-guided suprazygomatic approach to PPF block was performed using a Philips Affinity-30 machine equipped with a high-frequency linear probe (4-12 MHz). The probe was positioned inferior to the zygomatic arch over the maxilla at a 45° inclination relative to both the horizontal and frontal planes [Table/Fig-2a]. Following anatomical identification, a 50 mm, 25-gauge needle was introduced using an out-of-plane approach. Although visualisation of the needle tip was feasible, it may be subtle with fine-gauge needles.

The needle was advanced towards greater wing of the sphenoid bone up to a depth of 15-20 mm, then redirected to access the PPF at a depth of 35-45 mm. The direction and depth of needle advancement remained generally consistent across paediatric age groups. After needle placement, the hub was left open to atmospheric pressure for 10-15 seconds to assess for inadvertent vascular puncture by observing for blood return. If no blood was observed, intravascular placement was excluded and 0.2 mL/kg of 0.2% ropivacaine (Group R) or 0.2 mL/kg of 0.9% normal saline (Group C) (not exceeding a total dose of 4 mL) was injected under real-time ultrasound guidance [Table/Fig-2b]. The spread of injectate within the PPF, and occasionally into the infratemporal fossa, was visualised. The procedure was then repeated contralaterally.



[Table/Fig-2]: a) Probe position and landmark for needle placement; b) Ultrasonographic View: Maxilla (MA) anteriorly, Coronoid Process (CP) of Mandible posteriorly, Pterygoid Process (PP) deep, with needle tip (*) passing through Temporal Fascia (TF), Temporal Muscle (TM), and Lateral Pterygoid Muscles (LPM).

After surgery, the inhalational agent was discontinued, pharyngeal pack removed and neostigmine (0.05mg/kg) and glycopyrrolate (0.01 mg/kg) was used to reverse the neuromuscular blockade. Patients were extubated after adequate clinical and neuromuscular recovery; the postoperative recovery was assessed using Modified Aldrete scoring [17], and shifted to the Post-Anaesthesia Care Unit (PACU). Vital signs and postoperative pain were monitored by a blinded assessor, Pain intensity was evaluated using the modified Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) [18], (crying, facial expressions, verbalisations, torso movement, and leg position and touch permitting scores from 0 (no pain) to 10 (most severe pain) at predetermined intervals- on admission to the PACU postoperatively then every 15 minutes. Patients with an mCHEOPS score ≥4 received intravenous paracetamol (15 mg/kg), provided at intervals of at least 6 hours as. Subsequent pain scores were reassessed after 15-20 minutes following administration to evaluate analgesic efficacy and if pain persisted Inj. Tramadol 2 mg/kg was administered as rescue analgesia and total dose of Inj. Tramadol required per day was recorded. Primary outcomes measured included time for first paracetamol requirement, total dose of paracetamol required per day (mg/kg), time for first rescue analgesia (Inj.Tramadol), total dose of rescue analgesia (mean) required per day (mg/kg), Secondary outcomes measured included, mean sevoflurane consumption (mL), changes in haemodynamic and adverse effects if any, within 24 hrs were recorded.

Adverse effects were monitored, including hypotension (MAP decrease >20% from baseline) was managed with i.v. fluids and/or ephedrine 5 mg boluses. Bradycardia (HR <60 bpm) was treated with i.v. atropine 0.5 mg and vomiting, managed with i.v. ondansetron. Other monitored complications included hypoxia (SpO_2 <90%), intense coughing, hypersalivation, laryngospasm, and any unexpected adverse events during the postoperative period.

STATISTICAL ANALYSIS

Data analysis was conducted using IBM Statistical Package for Social Sciences (SPSS) Statistics Version 29.0. There was no missing primary outcome data, categorical and continuous variables were summarised using descriptive statistics, including frequency, percentage, mean, and standard deviation. Continuous variables were compared between groups using independent sample t-tests, while categorical data were analysed using Chi-square tests (or Fisher's-Exact test for small cell frequencies). A probability value (p-value) of 0.05 was considered statistically significant.

RESULTS

Both groups were comparable in demographics (age, sex, weight, and height) with no significant differences as summarised in [Table/Fig-3].

Variables	Group R (n=30)	Group C (n=30)	p-value
Age (years)	10±2.2	10±3.2	1.000
ASA(I/II)	28/2	27/3	0.64
Sex (M/F)	12/18	14/16	0.794
Weight (kg)	38.4±9.6	38.3±13.2	0.973
Height (cm)	140.1±8.3	139.5±9.8	0.799

[Table/Fig-3]: Demographic characteristics.
Data expressed as mean (SD) and Ratio (M/F) (Male/Female). SD: Standard deviation; n: number of patients. For continuous variables, a t-test was used; for sex, a Chi-square test was applied.

The comparative analysis between Group R and Group C demonstrated significant differences across various perioperative parameters [Table/Fig-4].

Variables	Group R (n=30)	Group C (n=30)	p-value*
Duration of surgery (min)	76.6±10.7	71.5±9.4	0.055
Duration of anaesthesia (min)	95±9.5	94.2±9.7	0.738
Duration of recovery (min)	7.8±1.0	15.9±4.1	0.0005
Duration of stay in the recovery room (min)	10.0±1.0	20.1±5.8	0.0005
Time for 1st analgesia (Inj. Paracetamol) (min)	524±188.5	92.8±95.3	0.0005
Total paracetamol requirement in 1st 24 hours (mg/kg)	27.4±8.1	53.3±7.23	0.0005
Time for rescue analgesia (Inj.Tramadol) (min)	634±80.50	246±104.34	0.0005
Mean dose of rescue analgesia in 24 hours (mg/kg)	2.63±1.06	6.84±2.36	0.0005
mCHEOPS Score			
After 5 min of Extubation	0.50±0.90	8.13±1.63	<0.001
After 10 min of Extubation	0.30±0.60	7.58±1.58	<0.001
1 h	0.07±0.25	6.39±1.76	<0.001
4th h	0.00±0.0	5.88±1.41	<0.001
8th h	0.30±0.60	4.86±1.59	<0.001
12th h	0.73±0.83	4.01±1.36	<0.001
18th h	0.87±0.78	2.97±1.27	<0.001
24th h	1.10±0.76	2.07±1.05	<0.001
Mean sevoflurane consumption (mL)			
30 min	4.2±0.8	4.9±1.05	0.0053

60 min	7.3±1.15	9.21±2.14	0.0001
90 min	11.18±1.86	13.24±2.68	0.0011

[Table/Fig-4]: Clinical characteristics of both the groups.
Data expressed as mean (SD). SD: Standard deviation; n: number of patients. Independent t-test for the mean difference between both groups. *p-value <0.05 was considered significant

Both groups were comparable in duration of surgery (p=0.055) and anaesthesia (p=0.738).The intervention group (R) showed significantly shorter recovery time (p=0.0005), recovery room stay (p=0.0005), and time to first paracetamol (p=0.0005), with lower total paracetamol (p=0.0005), rescue tramadol time (p=0.0005), and dose (p=0.0005) over 24 hours compared to control (C). mCHEOPS scores were markedly lower in Group R across all time points from five minutes post-extubation to 24 hours (p<0.001). Group R consumed less sevoflurane at 30 minutes (p=0.0053), 60 minutes (p=0.0001), and 90 minutes (p=0.0011).

Baseline HR [Table/Fig-5] and MAP [Table/Fig-6] values showed no significant difference between the groups. The subsequent readings of HR, Group C consistently exhibited higher heart rates at all measured intervals, The subsequent readings of MAP illustrates that Group C maintained consistently higher mean arterial blood pressure, no clinically significant adverse events observed within the 24-hour follow-up period in either group.

Time	Group R (n=30)	Group C (n=30)	p-value
Baseline	81.17±5.31	78.52±6.16	0.0795
5 min	91.77±6.3	102.4±19.62	0.0065
10 min	101.93±5.56	122.13±17.64	<0.001
15 min	105.47±5.61	134.03±15.07	<0.001
20 min	91.2±5.68	133.8±15.23	<0.001
25 min	81.4±5.81	134.4±15.45	<0.001
30 min	81.23±5.25	134.67±15.89	<0.001
45 min	81.97±5.29	135.87±12.16	<0.001
60 min	91.57±4.77	137.77±12.63	<0.001
At extubation	101.73±4.77	154.8±11.18	<0.001
Post-extubation 10 min	92.77±4.72	143.07±9.81	<0.001
1 h post-op	82.03±4.76	139.67±8.96	<0.001
4th h post-op	81.2±5.68	136.93±10.01	<0.001
8th h post-op	81.4±5.81	134.43±9.85	<0.001
12th h post-op	81.37±5.37	122.1±9.33	<0.001
18th h post-op	81.33±5.11	109.4±10.31	<0.001
24th h post-op	81±5.59	102.5±11.18	<0.001

[Table/Fig-5]: Changes in Heart Rate (HR) in both of the study groups.
Data expressed as mean (SD). SD: Standard deviation; n: number of patients; to calculate the mean difference between both groups unpaired two-sample t-test was used. *p-value <0.05 was considered significant

Time	Group R (n=30)	Group C (n=30)	p-value
Baseline	73.4±6.89	70.73±6.6	0.131
5 min	76.3±6.6	87.03±6.18	<0.001
10 min	85.73±6.03	96.73±7.03	<0.001
15 min	75.4±5.54	96.83±6.37	<0.001
20 min	76.47±5.67	96.2±6.12	<0.001
25 min	75.63±5.05	95.37±5.94	<0.001
30 min	76.4±6.52	94.7±5.12	<0.001
45 min	76.47±5.67	96.94±4.99	<0.001
60 min	75.4±5.92	94.02±5.43	<0.001
At extubation	85.83±6.24	102.3±4.98	<0.001
Post-extubation 10 min	86.67±6.71	102.5±6.02	<0.001
1 h post-op	75±6.51	96.47±6.55	<0.001
4th h post-op	76.33±7.18	93.73±4.92	<0.001
8th h post-op	75.87±6.24	90.37±5.57	<0.001
12th h post-op	75.53±6.55	87.97±5.08	<0.001
18th h post-op	74.67±5.8	85.63±4.3	<0.001
24th h post-op	75.43±6.02	82.73±4.93	<0.001

[Table/Fig-6]: Changes in the mean arterial blood pressure in the two studied groups.
Data expressed as mean (SD). SD: Standard deviation; n: number of patients; to calculate the mean difference between both groups unpaired two-sample t-test was used. *p-value <0.05 was considered significant

DISCUSSION

Recent studies emphasise opioid-sparing strategies, including non-steroidal anti-inflammatory drugs and regional anaesthesia for optimal pain management with minimal side-effects. Despite this, regional anaesthesia is not effectively used in multimodal analgesic regimens for adenotonsillectomy. Interestingly, traditional techniques such as maxillary nerve block in the PPF are making a comeback in paediatric care, there by confirming the saying "old is gold" and highlighting the possible advantages of revisiting established methods [19,20].

The PPF block poses technical challenges and safety concerns due to its complex anatomy and proximity to vital structures. The intraoral approach, considered the most difficult, carries a high-risk of complications and uncertain coverage. Both intraoral and infrazygomatic approaches have been associated with serious complications. In contrast, the suprazygomatic approach offers a favourable safety profile, particularly in children, by utilising the surrounding bony anatomy to guide needle placement and minimise risks. Initially, performed blindly for palate surgery without major issues in a study by Fell M et al., we opted for ultrasound-guided technique to enhance safety by visualising vascular structures and avoiding accidental puncture similar to the study by Ahmed MB et al., Furthermore, using a 5 cm long 25G spinal needle minimises risk by ensuring precise placement with minimal trauma [21,22]. This approach underlines the importance of adapting technique to anatomy and utilising technology to optimise patient safety in regional anaesthesia [23].

Ropivacaine's efficacy and safety in regional anaesthesia techniques in paediatric patients have been well-documented in several studies. Chiono J et al., showed that ropivacaine used for maxillary nerve block reduces total morphine consumption after cleft palate repair in children without any adverse effects [15]. A systematic review by Albazee E et al., confirmed the postoperative analgesic efficacy and safety of ropivacaine compared to placebo in paediatric tonsillectomy patients [24]. Furthermore, a comparative study by Nitin B et al., found that post-incisional infiltration of 0.75% ropivacaine provided better pain control compared to 0.5% bupivacaine in tonsillectomy patients, evidenced by lower pain scores, longer duration to rescue analgesia, and decreased total analgesic use [25].

Based on these results in paediatric patients, the authors selected ropivacaine in the present study over other local anaesthetics for its possible benefits in postoperative pain management.

The present study results indicate that ultrasound-guided suprazygomatic PPF block with ropivacaine significantly prolonged the time to first analgesia, these findings are similar to the study by Parthasarathy S et al., which concluded the effectiveness of pre-emptive bilateral nasociliary and maxillary nerve block in prolonging the time to first analgesia during nasal surgery under general anaesthesia [26]. Notably, their study found, the time to first analgesia was drastically prolonged in the treatment group, suggesting that pre-emptive administration of this nerve block technique is an effective strategy for minimising intraoperative opioid use and extending postoperative analgesia, therefore may be improving patient outcomes.

Time for rescue analgesia (Inj.Tramadol) was also delayed in patients receiving block with ropivacaine, our results were supported by the study by Neupane A et al., which investigated the efficacy of

SZMNB performed under ultrasound-guidance, for postoperative pain management in patients scheduled for Functional Endoscopic Sinus Surgery (FESS) [27]. Their results showed that patients in the block group required no rescue analgesia, whereas a greater number of patients in the control group required diclofenac as rescue analgesia within one hour and 1-6 hours postsurgery. This study highlights the effectiveness of ultrasound-guided SZMNB in providing effective postoperative pain relief for FESS patients, with a favourable safety profile, making it a valuable technique for pain management in this population. Similarly study by Lin C et al., on 60 paediatric patients (2 to 14-year-old) scheduled for intracapsular adenotonsillectomy here the study group received SZMNB administered bilaterally under general anaesthesia, resulted in clinically meaningful reductions of postoperative opioid consumption with a low risk of complications [13].

The authors observed that control group consistently exhibited higher heart rates and MAP at all measured intervals compared to Group R. While Group C's heart rate and MAP peaked around extubation and gradually decreased, Group R maintained a relatively stable and lower heart rate throughout the perioperative and postoperative periods. The present study findings are in similar to the study by Srinivas Y et al., who evaluated the efficacy of bilateral intranasal transmucosal SPG block on haemodynamics and recovery parameters in children scheduled for palatoplasty under general anaesthesia [28]. Their results demonstrated that SPG block with 0.5% bupivacaine significantly stabilised haemodynamics and promoted smoother recovery. These findings suggest that SPG block is an effective adjunct to general anaesthesia in paediatric palatoplasty, offering benefits in terms of reduced opioid use and improved perioperative outcomes. Yılmaz N et al., also concluded in their study that application of SZMNB during septoplasty surgery provides improved perioperative haemodynamic stability, reduced postoperative pain, and enhanced recovery quality [29].

These findings are comparable with results of other studies, highlighting the possible advantage of regional anaesthesia techniques in improving patient comfort and clinical management during surgery. The present study adds to the increasing evidence supporting the use of ultrasound-guided suprazygomatic PPF block as an effective method for improving postoperative pain management and better perioperative outcomes.

Limitation(s)

The results of the present study are subject to certain limitations that should be considered. First, the study had a sample size of 60 patients may be insufficient to detect rare adverse events. Secondly, short-term outcomes (24 hours postoperative) mean long-term efficacy unknown. Thirdly, the specialised expertise required for ultrasound-guided regional blocks and reproducibility may vary with operator skill. Further studies with large sample size are necessary to confirm the validity and applicability to diverse populations and clinical settings.

CONCLUSION(S)

Ultrasound-guided suprazygomatic PPF block using ropivacaine provides effective postoperative analgesia in paediatric patients undergoing adenotonsillectomy. This technique delivers prolonged pain relief, reduced pain scores, stable perioperative haemodynamics, decreased intraoperative anaesthetic requirements, and lower postoperative opioid consumption. This approach significantly improves clinical outcomes, making it a valuable addition to multimodal analgesic regimens.

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