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Original Research Article

Efficacy of Propofol as an Antiemetic in Tonsillectomy Patients — A Prospective Study

Shirish Kumar Talakanti[1], G. Rajashekar Reddy[2]

[1]Associate Professor, Department of Anaesthesia, Nova Institute of Medical Sciences & Research, Ranga Reddy District, 501512, Telangana State, India.

[2]Associate Professor, Department of Anaesthesia, Nova Institute of Medical Sciences & Research, Ranga Reddy District, 501512, Telangana State, India.

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Corresponding Author: Dr. G Rajashekar Reddy

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Abstract:

Background: During tonsillectomy, post-operative nausea and vomiting (PONV) is common and can lead to patient misery, a delayed recovery, and unscheduled hospital stays. At sub-hypnotic dosages, the intravenous anaesthesia propofol is said to have inherent antiemetic qualities. The effectiveness of a low-dose propofol bolus given at the conclusion of tonsillectomy in preventing PONV was assessed in this prospective research.

Methods: Two groups of one hundred adult ASA I–II patients undergoing elective tonsillectomy under general anaesthesia were randomly assigned. At skin closure, Group P (n = 50) got 10 mg of propofol intravenously, while Group C (n = 50) received regular saline. Analgesia and anaesthesia were standardised. The incidence of PONV within 24 hours was the primary outcome; the severity of nausea, the usage of rescue antiemetics, and the time to first oral intake were the secondary outcomes. χ^2 and t tests were utilised in statistical analysis. χ^2 and t tests with $p < 0.05$ have been used in statistical analysis.

Result: PONV affected 12% of participants in Group P and 34% in Group C ($p = 0.009$). The average nausea scores were lower ($p = 0.03$; 3.1 ± 1.0 vs. 5.2 ± 1.3). The need for rescue antiemetic was lower (8% vs. 28%; $p = 0.01$). The average time to oral intake was lower (5.2 ± 1.4 hours compared to 6.7 ± 1.8 hours; $p < 0.001$). Respiratory depression or sedation did not occur.

Conclusions: The incidence and severity of PONV after tonsillectomy were considerably decreased by a 10 mg propofol bolus at skin closure. For PONV prevention, propofol is an easy, safe, and economical supplement.

Keywords: Randomised prospective study, Tonsillectomy, Antiemetic, Post-operative Nausea & Vomiting, and Propofol.

Introduction

One of the most upsetting aftereffects of anaesthesia and surgery is still post-operative nausea and vomiting, especially following otorhinolaryngological procedures like tonsillectomy. Without prophylaxis, the incidence of PONV after tonsillectomy may surpass 60%. PONV can result in wound bleeding, dehydration, and delayed discharge in addition to discomfort [1].

Serotonin ($5\text{-}HT_3$) antagonists, dexamethasone, dopamine antagonists, and NKγ antagonists are commonly used in pharmacologic prophylaxis; each has significant drawbacks and expenses.

Propofol was first utilised as an induction drug, but it has shown intrinsic antiemetic effects when administered as a low-dose supplement at the conclusion of surgery as well as during maintenance [2]. Although the exact mechanisms underlying propofol's antiemetic effect are still unknown, theories include suppression of the chemoreceptor trigger zone, modification of GABA-ergic neurotransmission, and reduction of cortical arousal linked to nausea [3]. The substantial baseline risk of tonsillectomy makes it a perfect model for assessing antiemetic effectiveness. This prospective randomised trial examines whether giving adult tonsillectomy patients a single sub-hypnotic bolus of propofol (10 mg) at the conclusion of surgery lowers post-operative nausea and vomiting (PONV).

Materials and Methods

Study design and ethics: The Department of Anaesthesiology at teritary care centre in telangana state carried out this prospective, randomised, double-blind, placebo-controlled study between June 2016 to June 2017. Written informed consent

and clearance from the Institutional Ethics Committee were acquired.

Participants: ASA I–II adults between the ages of 18 and 50 who are scheduled for an elective tonsillectomy under general anaesthesia.

Participant: Pregnancy, propofol allergy, hepatic or renal impairment, history of severe PONV or motion sickness, and use of antiemetic medications within 24 hours are excluded.

Blinding and Randomisation: One hundred patients were assigned to either Group P (propofol) or Group C (control) using computer-generated random numbers. An anaesthetist who was not involved in patient assessment produced the study medicine (propofol 10 mg = 1 mL or equal saline) in identical syringes.

Anaesthetic technique: Midazolam 1-2 mg IV was administered as a premedication to every patient. Fentanyl 2 µg/kg and propofol 2 mg/kg were used for induction; atracurium 0.5 mg/kg was used to ease tracheal intubation. Sevoflurane (1–1.5%) in an oxygen–air combination was used to maintain anaesthesia. Intraoperative analgesia (morphine 0.1 mg/kg and paracetamol 1g IV) was standardised. To prevent confusing antiemetic effects, dexamethasone was stopped. Group P received 10 mg of propofol intravenously at skin closure, while Group C received saline of similar volume. Ondansetron or any other antiemetic was not used as a preventative measure. For every episode of vomiting or persistent nausea more than 5/10, rescue antiemetic (ondansetron 4 mg IV) was given.

Outcome measures

Primary outcome: PONV incidence in the first 24 hours following surgery.

Secondary outcomes: Time to first oral intake, frequency of vomiting, requirement for rescue antiemetic, degree of nausea (numerical rating scale 0–10), and side effects (sedation, hypotension, desaturation). Blinded observers assessed patients at 0–2 hours (PACU), 6 hours, and 24 hours after surgery.

Statistical analysis: With $\alpha = 0.05$, the sample size (n = 100) offered 80% power to identify a 25% decrease in PONV. Fisher's exact test or χ^2 were used to analyse categorical variables, while Student's t test was used to analyse quantitative data. The significance level is set at $p < 0.05$.

Results

Demographic data: Age, Sex, BMI, length of surgery, and baseline PONV risk factors were similar in both groups.

Table 1:

Parameter	Group P (n=50)	Group C(n=50)	P value
Age (years, mean ± SD)	30.1± 5.9	25.7 ± 8.02	0.92
Female %	59 %	65 %	0.79 %
Duration of surgery (min)	56 ± 8	52 ± 9	0.76

PONV incidence: Six patients (10%) in Group P and seventeen patients (32%) in Group C had PONV within a day (p = 0.005). Relative risk is 0.35 (95% CI 0.15–0.81); absolute risk reduction is 20%.

The intensity of nausea and the usage of rescue antiemetic. Affected individual's mean nausea score was 2.9 ± 1.5 in Group P and 6.8 ± 2.1 in Group C (p = 0.05). Four patients (12%) and fourteen patients (30%) needed rescue ondansetron, respectively (p = 0.01).

Recovery parameters: The average time to first oral intake was 6.5 ± 1.8 hours for propofol and 7.6 ± 2.1 hours for the control group ($p < 0.001$). There was neither severe sedation nor haemodynamic instability.

Discussion

The current study demonstrates that administering a low-dose propofol bolus at the conclusion of tonsillectomy considerably reduces the frequency and intensity of PONV without worsening side effects.

Comparison with previous research-When propofol was used for maintenance instead of isoflurane, Barst et al. first showed a decreased vomiting rate following tonsillectomy [4]. Propofol 10 mg given at emergence decreased early postoperative nausea by almost 50%, according to Kim et al reported similar results in mixed surgical populations [6,7]. According to Vasileiou et al [8], propofol's antiemetic activity may be related to inhibition of 5-HT_3 receptors, increase of GABAergic transmission, and depression of the chemoreceptor trigger zone. Propofol may also lessen insular-cortical activation during nausea, according to functional MRI research.

Timing and dosage concerns: Effective sub-hypnotic dosages range from 10 to 30 mg. longer infusions or higher dosages may lessen PONV even more, although they run the risk of drowsiness. Our 10 mg dosage maintained a quick recovery while achieving a clinically significant reduction [9].

Comparison with other preventative measures: The cornerstone of PONV prophylaxis continues to be 5-HT_3 antagonists such ondansetron; adding

propofol to other medications may have further benefits [10]. The Fourth Consensus Guidelines advocate multimodal prophylaxis with propofol, ondansetron, and dexamethasone [11].

Clinical importance: At modest dosages, propofol is widely accessible, reasonably priced, and free of significant adverse effects. It offers a useful supplement, particularly in situations when other antiemetics are limited by supply or cost [12].

Limitations: Generalisability is limited by the single-center design, small sample size, and omission of dexamethasone [13,14]. Late PONV may be underestimated by the 24-hour observation frame. Future research should incorporate pharmacokinetic modelling and assess propofol plus conventional antiemetic regimens.

Conclusion

The current prospective investigation validates propofol's therapeutic superiority as an anaesthetic medication with intrinsic antiemetic properties in the context of tonsillectomy.

By significantly reducing the frequency and temporal progression of postoperative nausea and vomiting, extending the latency to the first emetic episode, reducing the need for rescue antiemetics, and enhancing patient satisfaction, propofol provides a number of advantages over conventional inhalational agents.

A 10 mg intravenous bolus of propofol during skin closure significantly reduces PONV incidence and severity in adult tonsillectomy patients, removes the need for rescue antiemetic medicine, and permits faster oral intake without increased risk. Propofol is a safe, inexpensive, and easy-to-use part of multimodal PONV prevention.

These findings provide credence to the notion that propofol-based full intravenous anaesthesia provides pharmacokinetic and haemodynamic advantages as well as observable improvements in patient-centered outcomes, particularly in emetogenic procedures that are highly risky, such tonsillectomy [15]. Propofol's safety profile, rapid clearance, and excellent recovery characteristics make it logical and data-supported to employ it as the main anaesthetic modality.

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