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Original Research Article

Comparison of Propofol and Sevoflurane for Maintenance of Anesthesia with Respect to Effectiveness and Safety in Pediatric Patients Undergoing Short Surgical Procedures

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Abstract:

Background: Pediatric anesthesia requires agents that provide rapid recovery, hemodynamic stability, and minimal adverse effects during short surgical procedures. Propofol and Sevoflurane are commonly used anesthetic agents with distinct pharmacological properties.

Aim: To compare the effectiveness and safety of Propofol and Sevoflurane for maintenance of anesthesia in pediatric patients undergoing short surgical procedures.

Methodology: This prospective randomized controlled study included 80 children (2–12 years, ASA I–II) undergoing elective short surgeries. Patients were randomized into Group P (Propofol, n=40) or Group S (Sevoflurane, n=40). Intraoperative hemodynamic parameters, oxygen saturation bispectral index, postoperative recovery quality, and adverse events were evaluated. Statistical significance was set at $p<0.05$.

Results: Baseline characteristics were comparable between groups. Sevoflurane provided significantly better intraoperative hemodynamic stability, lower BIS scores, faster eye opening, extubation, verbal response, and shorter PACU stay (all $p<0.001$). Group S also demonstrated higher Modified Aldrete scores, lower PAED and pain scores, greater parental satisfaction, and longer time to first analgesic requirement ($p<0.05$). Adverse events were comparable between groups without significant differences.

Conclusion: Both agents were safe and effective; however, Sevoflurane demonstrated superior hemodynamic stability, faster recovery, and better postoperative recovery quality, making it the preferred maintenance anesthetic for pediatric short surgical procedures.

Keywords: Propofol, Sevoflurane, Pediatric anesthesia, Hemodynamic stability, Recovery profile, Short surgical procedures.

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Introduction

Pediatric anesthesia is a specialized and difficult field of anesthesiology, mainly because children have different physiological, anatomical and psychological characteristics than adults. Airway anatomy, metabolic rate, cardiovascular responses, and drug pharmacokinetics vary among children and have a significant impact on anesthetic management. Additionally, heightened anxiety, lack of cooperation, and variable responses to anesthetic agents further complicate perioperative care in this population. Therefore, it is important to maintain an optimal balance between adequate depth of anesthesia, hemodynamic stability, rapid recovery, and minimal postoperative complications. With ongoing advancements in anesthetic techniques and pharmacology, the selection of an appropriate anesthetic agent continues to play a pivotal role in determining perioperative outcomes, especially in pediatric patients undergoing short surgical procedures [1].

Of the different anesthetic agents available, Propofol and Sevoflurane have become popular choices for maintaining anesthesia in children. These agents have very different pharmacokinetic and pharmacodynamic properties, which affect their clinical uses and effects. Propofol is an intravenous anesthetic agent that is well known for its rapid onset, short duration and ease of titration. It helps to induce and maintain anesthesia smoothly and is especially appreciated for its quick and lucid recovery. Furthermore, it has intrinsic antiemetic properties that make it an important factor in decreasing the incidence of postoperative nausea and vomiting (PONV) in

pediatric patients. Although these benefits exist, Propofol is also known to cause dose-dependent cardiovascular depression, including hypotension and bradycardia. These effects may be particularly pronounced in children, especially those with limited physiological reserves or underlying comorbidities [2].

Sevoflurane, however, is a volatile inhalational anesthetic agent that has become a mainstay of pediatric anesthesia. It has a non-irritating smell, low blood-gas solubility coefficient and a quick onset of action, making it particularly suitable for inhalational induction in uncooperative or anxious children. Sevoflurane provides accurate control of anesthetic depth and is frequently used to maintain hemodynamic stability during surgery. Moreover, it allows for quick recovery from anesthesia, which is crucial for surgeries of short duration. But it is not without its restrictions. Sevoflurane has been associated with emergence agitation, an increased incidence of PONV in some patients, and, rarely, with malignant hyperthermia. Such potential complications require careful patient selection and monitoring during its use [3].

Several factors can affect the choice of Propofol versus Sevoflurane for maintenance of anesthesia, such as the length and nature of the surgical procedure, patient-specific factors, institutional protocols, and the anesthesiologist's experience. Propofol has the benefits of less PONV and smoother recovery profiles, while Sevoflurane has the advantages of ease of administration, good tolerability during induction, and relatively stable intraoperative hemodynamics. Although they are commonly used, there is no consensus about the superiority of one agent over the other, especially for short surgical procedures in children [4].

Pediatric patients often undergo short surgical procedures, usually those under an hour. These include hernia repair, tonsillectomy, adenoidectomy, and minor orthopedic or urological procedures. Such procedures require anesthetic agents that provide rapid induction, stable intraoperative conditions, and swift recovery to facilitate early discharge, especially in day-care or ambulatory surgical settings. Both Propofol and Sevoflurane have desirable properties in this context, but their relative effectiveness and safety are still under investigation [5].

Another important aspect of paediatric anaesthesia is the prevention and management of perioperative adverse events [6]. Children are particularly susceptible to complications such as hypotension, bradycardia, respiratory depression, airway-related issues, postoperative nausea and vomiting, and emergence delirium. These complications can impact the recovery process and can lead to longer hospital stays, higher healthcare expenses, and emotional distress for patients and their caregivers. Thus, the best anesthetic should provide sufficient analgesia and sedation, with a low incidence of these adverse effects and a smooth recovery process [7].

There have been several studies that have tried to compare the clinical efficacy and safety of Propofol and Sevoflurane in pediatric anesthesia. These studies have assessed parameters including hemodynamic stability, recovery time, incidence of PONV, and emergence parameters. The results have been variable and sometimes conflicting, however. Some studies have found better recovery and reduced PONV with Propofol, while others have found better ease of use and hemodynamic stability with Sevoflurane. The diversity of study populations, surgical procedures, anesthetic techniques, and outcome measures further hinders direct comparisons and generalizability of results.

In view of these factors, it is desirable to have well-designed studies to give more definite information on the comparative performance of these agents. The present study, conducted in Bihta, Patna, Bihar, India, aims to evaluate and compare the effectiveness and safety of Propofol and Sevoflurane for maintenance of anesthesia in pediatric patients undergoing short surgical procedures. By systematically assessing intraoperative parameters and postoperative recovery outcomes, this study seeks to contribute to evidence-based anesthetic practices and enhance the quality of pediatric perioperative care.

Methodology

Study Design: This study was designed as a prospective, randomized, controlled clinical trial aimed at comparing the effectiveness and safety of Propofol versus Sevoflurane for maintenance of anesthesia in pediatric patients undergoing short surgical procedures. Randomization was performed using a computer-generated random number table to minimize selection bias and ensure equal allocation of participants into two groups.

Study Area: This study was designed as Department of Anesthesiology, ESIC Medical College and Hospital, Bihta, Patna, Bihar, India.

Study Duration: The study was conducted over a period of one year from January 2024 to December 2024.

Study Participants: A total of pediatric patients scheduled for elective short surgical procedures were enrolled in the study.

Inclusion Criteria

- Children aged 2–12 years
- ASA (American Society of Anesthesiologists) physical status I and II
- Scheduled for elective short surgical procedures (e.g., hernia repair, tonsillectomy)

- Expected duration of surgery 60 - 90 minutes
- Written informed consent obtained from parents or legal guardians

Exclusion Criteria

- Known allergy or hypersensitivity to Propofol or Sevoflurane
- Presence of severe systemic illness (cardiac, respiratory, hepatic, or renal disorders)
- History or family history of malignant hyperthermia
- Children receiving sedative or hypnotic drugs prior to surgery
- Emergency surgical procedures

Sample Size: The total sample size for the study was 80 patients, who were randomly divided into two groups of 40 each:

- **Group P**: Received Propofol for maintenance of anesthesia
- **Group S**: Received Sevoflurane for maintenance of anesthesia

Procedure: Eligible patients were enrolled and randomized into two groups. A thorough preoperative assessment was conducted for all patients, including medical history, physical examination, and baseline vital parameters such as heart rate, blood pressure, oxygen saturation (SpO_2), and respiratory rate. All patients were premedicated with Midazolam (0.5mg/kg), Dexamethasone (0.15mg/kg) and Fentanyl (2µg/kg) 10 minutes prior to induction of anesthesia. Standard monitoring, including non-invasive blood pressure (NIBP), electrocardiogram (ECG), pulse oximetry, and end-tidal carbon dioxide ($EtCO_2$), was initiated before induction.

Induction of anesthesia was standardized in both groups using Propofol (2–3 mg/kg IV) Relaxation was achieved with Atracurium (0.5mg/kg) if patient was intubated. Airway management was achieved using either an appropriately sized endotracheal tube or a laryngeal mask airway (LMA), depending on the clinical requirement. For maintenance of anesthesia, patients in Group P received continuous intravenous Propofol infusion at a rate of 6–12 mg/kg/hour, while patients in Group S were maintained on Sevoflurane (1.5–2.5%) in a 50:50 oxygen-air mixture. Intraoperatively, intravenous paracetamol (15 mg/kg) was administered as an infusion for analgesia.

Monitoring of vital parameters was performed intraoperatively at regular intervals to assess hemodynamic stability. Depth of anesthesia was assessed clinically and, where available, supported by BIS monitoring. At the end of the surgical procedure, anesthetic agents were discontinued. Neuromuscular blockade, if used, was reversed with Neostigmine (0.05 mg/kg) and Glycopyrrolate (0.01 mg/kg). Patients were observed for recovery parameters including time to spontaneous eye opening, response to verbal commands, and extubation.

Postoperative monitoring was continued in the recovery room. The quality of recovery was assessed using the Modified Aldrete Score, and emergence agitation was evaluated using the Pediatric Anesthesia Emergence Delirium (PAED) Scale. Any adverse events such as hypotension, bradycardia, nausea, vomiting, or agitation were recorded. Primary outcomes included hemodynamic stability and recovery characteristics, while secondary outcomes included incidence of adverse effects and overall recovery quality.

Statistical Analysis: All collected data were entered into a Microsoft Excel sheet and analyzed using SPSS software version 27.0. Continuous variables (e.g., heart rate, blood pressure, recovery time) were expressed as mean ± standard deviation (SD) and compared using the unpaired Student's t-test. Categorical variables (e.g., incidence of adverse events) were expressed as frequency and percentage and analyzed using the Chi-square test or Fisher's exact test as appropriate. A p-value < 0.05 was considered statistically significant.

Result

Table 1 presents the demographic and baseline characteristics of patients in Group P (Propofol) and Group S (Sevoflurane), each comprising 40 patients. The mean age, weight, and height were comparable between the two groups, with no statistically significant differences ($p > 0.05$). Similarly, the gender distribution was nearly equal, with a slight male predominance in both groups, and no significant difference ($p = 0.642$). The distribution of ASA physical status (I/II) was also similar between the groups ($p = 0.617$). Overall, the baseline characteristics were well matched, indicating that both groups were comparable and suitable for outcome comparison without significant demographic bias.

Table 1: Demographic and Baseline Characteristics of Patients

Parameter	Group P (Propofol, n=40)	Group S (Sevoflurane, n=40)	p-value
Age (Mean ± SD, years)	6.4 ± 2.2	6.7 ± 2.0	0.598
Weight (Mean ± SD, kg)	20.1 ± 4.3	20.9 ± 4.1	0.402
Height (Mean ± SD, cm)	114.8 ± 6.5	116.9 ± 6.9	0.331
Gender (Male/Female)	22 / 18	24 / 16	0.642
ASA Physical Status (I/II)	28 / 12	30 / 10	0.617

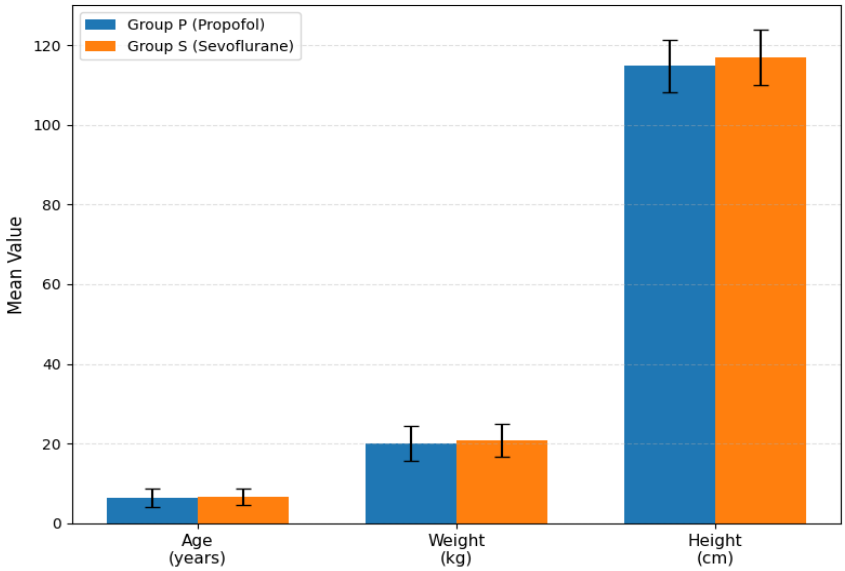


Figure 1: Demographic and Baseline Characteristics of Patients

Table 2 presents the hemodynamic parameters before, during, and after surgery in patients receiving propofol (Group P) and sevoflurane (Group S). Baseline heart rate, mean arterial pressure (MAP), SpO_2, and bispectral index (BIS) scores were comparable between the two groups ($p>0.05$). During surgery, Group S demonstrated significantly lower heart rate and MAP values than Group P at all intraoperative time points from 5 minutes until the end of surgery ($p<0.05$), indicating better hemodynamic control. SpO_2 remained stable and comparable between the groups throughout the perioperative period ($p>0.05$). BIS scores decreased significantly in both groups after induction of anesthesia but were consistently lower in the sevoflurane group than in the propofol group from 5 minutes onward until the end of surgery ($p<0.05$), suggesting a deeper level of anesthesia with sevoflurane.

Table 2: Hemodynamic Parameters Before, During, and After Surgery			
Heart Rate (bpm)			
Time Point	**Group P (Propofol)**	**Group S (Sevoflurane)**	**p-value**
Before Surgery	92 ± 5	91 ± 6	0.488
5 min	94 ± 6	88 ± 5	0.02
10 min	95 ± 5	89 ± 6	0.016
20 min	96 ± 6	88 ± 5	0.008
30 min	95 ± 5	88 ± 5	0.01
40 min	94 ± 5	87 ± 4	0.008
50 min	93 ± 5	86 ± 4	0.005
60 min	92 ± 4	85 ± 4	0.004
End of Surgery	90 ± 5	85 ± 4	0.002
Mean Arterial Pressure (MAP, mmHg)			
Time Point	**Group P (Propofol)**	**Group S (Sevoflurane)**	**p-value**
Before Surgery	72 ± 4	71 ± 5	0.612
5 min	74 ± 4	70 ± 4	0.031
10 min	75 ± 5	72 ± 4	0.025
20 min	75 ± 5	71 ± 4	0.018
30 min	74 ± 4	71 ± 4	0.02
40 min	73 ± 4	70 ± 3	0.015
50 min	72 ± 4	69 ± 3	0.011
60 min	71 ± 4	68 ± 3	0.009
End of Surgery	70 ± 4	67 ± 3	0.007
SpO_2 (%)			
Time Point	**Group P**	**Group S**	**p-value**
Before Surgery	98 ± 1	98 ± 1	0.721
5 min	98 ± 1	98 ± 1	0.843
10 min	98 ± 1	97 ± 1	0.532

20 min	97 ± 1	97 ± 1	0.917
30 min	97 ± 1	97 ± 1	0.884
40 min	97 ± 1	97 ± 1	0.793
50 min	97 ± 1	97 ± 1	0.865
60 min	97 ± 1	97 ± 1	0.912
End of Surgery	98 ± 1	98 ± 1	0.756
BIS Score			
Time Point	**Group P**	**Group S**	**p-value**
Before Surgery	95 ± 4	94 ± 3	0.552
5 min	55 ± 5	50 ± 4	0.028
10 min	50 ± 4	45 ± 4	0.013
20 min	47 ± 4	42 ± 4	0.008
30 min	45 ± 4	40 ± 3	0.006
40 min	43 ± 4	38 ± 3	0.005
50 min	42 ± 4	37 ± 3	0.004
60 min	41 ± 4	36 ± 3	0.003
End of Surgery	40 ± 4	36 ± 3	0.002

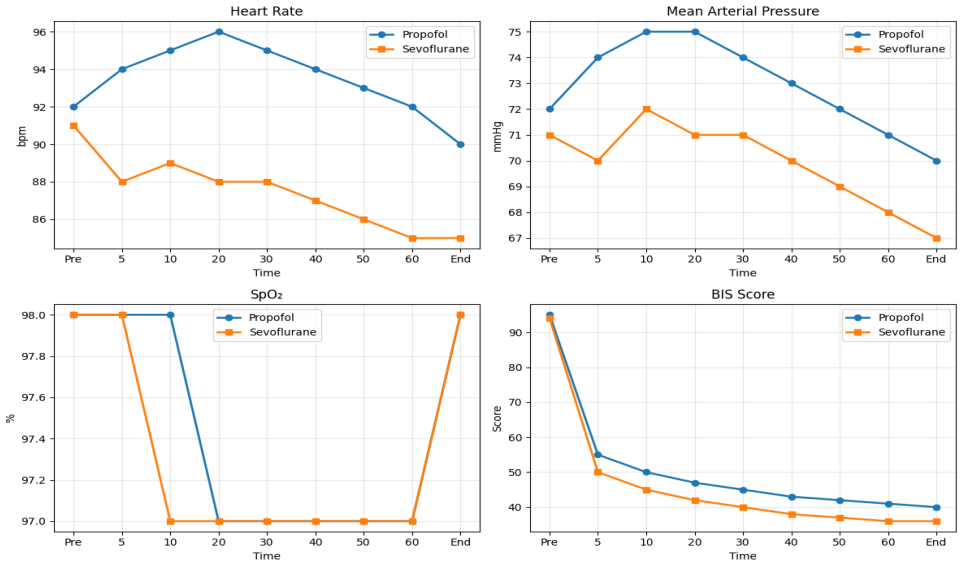


Figure 2: Hemodynamic Parameters Before, During, and After Surgery

Table 3 compares recovery parameters between Group P and Group S (n=40 each), demonstrating significantly faster recovery in Group S across all measured outcomes. The time to eye opening, extubation, and verbal response were all significantly shorter in Group S (6.1 ± 1.7 min, 7.2 ± 1.8 min, and 8.4 ± 2.1 min, respectively) compared to Group P (8.4 ± 2.0 min, 10.6 ± 2.3 min, and 11.9 ± 2.5 min), with highly significant p-values (<0.001). Similarly, the duration of stay in the PACU was reduced in Group S (28.3 ± 4.6 min) compared to Group P (34.8 ± 5.2 min). The Modified Aldrete Score was significantly higher in Group S (9.3 ± 0.6 vs 8.6 ± 0.8; p=0.012), indicating better recovery status. Additionally, Group S showed lower PAED scores (4.1 ± 0.8 vs 5.7 ± 1.1; p=0.002) and lower pain scores (2.0 ± 0.7 vs 2.7 ± 0.9; p=0.015), reflecting reduced emergence delirium and postoperative pain. Overall, Group S demonstrated superior recovery profiles compared to Group P.

Table 3: Recovery Parameters After Anesthesia

Parameter	Group P (n=40)	Group S (n=40)	p-value
Time to Eye Opening (min)	8.4 ± 2.0	6.1 ± 1.7	<0.001
Time to Extubation (min)	10.6 ± 2.3	7.2 ± 1.8	<0.001
Time to Verbal Response (min)	11.9 ± 2.5	8.4 ± 2.1	<0.001
Time in PACU (min)	34.8 ± 5.2	28.3 ± 4.6	<0.001
Modified Aldrete Score	8.6 ± 0.8	9.3 ± 0.6	0.012
PAED Score	5.7 ± 1.1	4.1 ± 0.8	0.002
Pain Score (VAS)	2.7 ± 0.9	2.0 ± 0.7	0.015

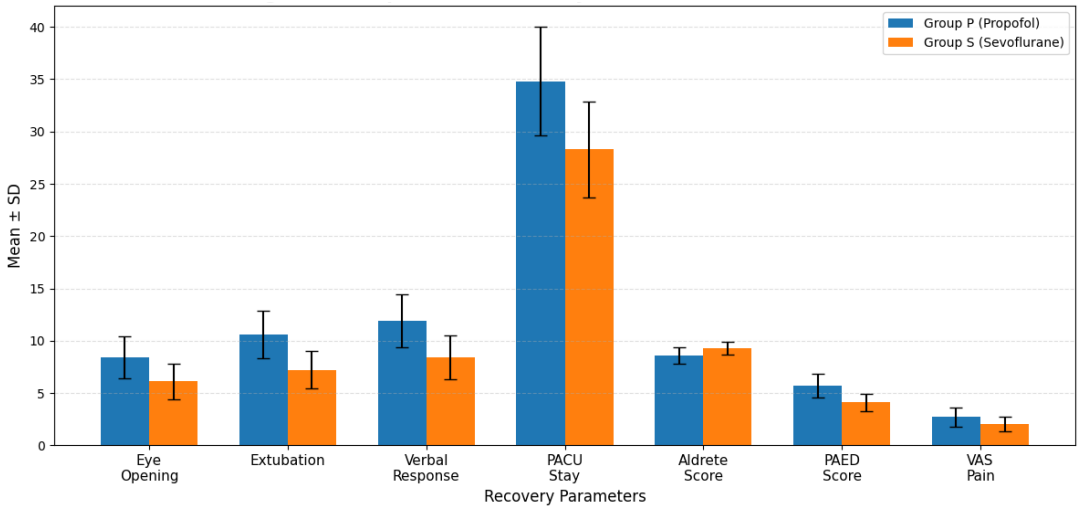


Figure 3: Recovery Parameters After Anesthesia

Table 4 compares the incidence of adverse events between Group P and Group S, each comprising 40 patients. The occurrence of bradycardia, hypotension, nausea/vomiting, postoperative agitation, and shivering was slightly higher in Group P compared to Group S; however, these differences were not statistically significant, as all p-values were greater than 0.05. Desaturation was equally observed in both groups (2.5%). Overall, although Group P showed a marginally higher incidence of adverse events, the lack of statistical significance indicates that both groups had comparable safety profiles with respect to perioperative complications.

Table 4: Incidence of Adverse Events

Adverse Event	Group P (n=40)	Group S (n=40)	p-value
Bradycardia	3 (7.5%)	2 (5%)	0.64
Hypotension	4 (10%)	2 (5%)	0.391
Nausea/Vomiting	6 (15%)	3 (7.5%)	0.289
Postoperative Agitation	2 (5%)	1 (2.5%)	0.552
Shivering	5 (12.5%)	2 (5%)	0.237
Desaturation	1 (2.5%)	1 (2.5%)	1

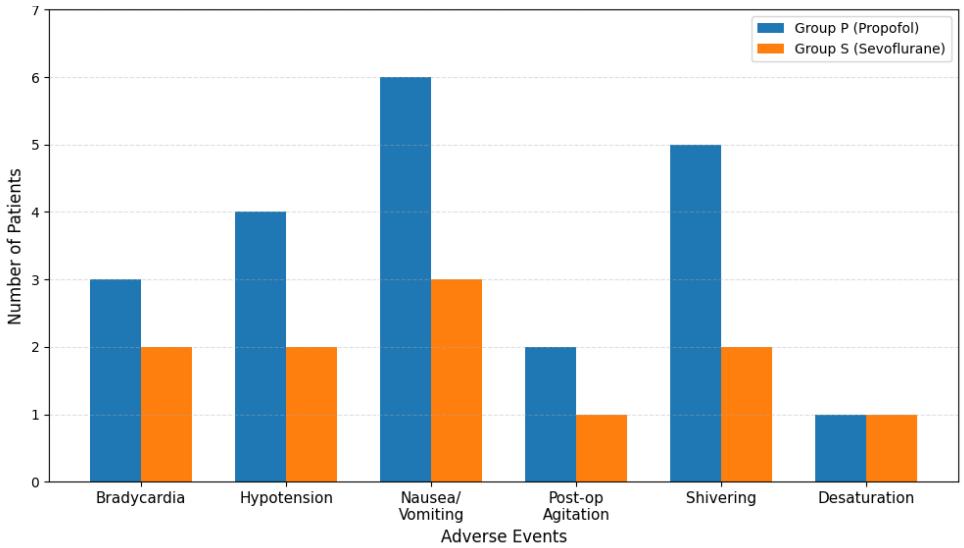


Figure 4: Incidence of Adverse Events

Table 5 compares postoperative recovery quality between Group P and Group S (n=40 each). Group S demonstrated significantly better recovery outcomes, as evidenced by a higher Modified Aldrete Score (9.3 ± 0.6 vs 8.6 ± 0.8; p=0.012), indicating faster and more complete recovery from

anesthesia. The PAED score was significantly lower in Group S (4.1 ± 0.8 vs 5.7 ± 1.1; p=0.002), suggesting reduced emergence agitation. Parental satisfaction was also higher in Group S (4.5 ± 0.5 vs 3.9 ± 0.6; p=0.002), reflecting better overall recovery experience. Additionally, the time to first analgesic requirement was significantly longer in Group S (60.2 ± 8.0 minutes vs 46.0 ± 7.2 minutes; p<0.001), indicating prolonged postoperative analgesia. Overall, Group S showed superior postoperative recovery quality compared to Group P.

Table 5: Postoperative Recovery Quality Scores

Parameter	Group P (n=40)	Group S (n=40)	p-value
Modified Aldrete Score	8.6 ± 0.8	9.3 ± 0.6	0.012
PAED Score	5.7 ± 1.1	4.1 ± 0.8	0.002
Parental Satisfaction (1–5)	3.9 ± 0.6	4.5 ± 0.5	0.002
Time to First Analgesic (min)	46.0 ± 7.2	60.2 ± 8.0	<0.001

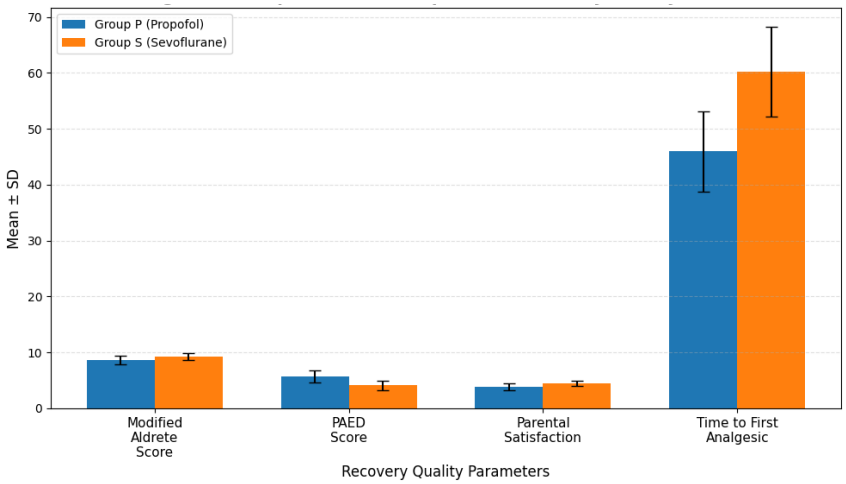


Figure 5: Postoperative Recovery Quality Scores

Discussion

The present study kinda gives a detailed comparison of propofol with sevoflurane for maintaining anesthesia in pediatric patients during short surgical procedures, and the results are mostly in line with what has been published before, though there are also a few contrasts that stand out. In our work the demographic characteristics looked basically similar between the two groups, which helps keep the internal validity strong, and it also minimizes the risk of confounding bias. This kind of baseline comparability has been reported again and again by Pieters et al. (2010) [8] and Hasani et al. (2013) [9], where they didn't find any statistically significant differences in age, weight, or ASA status across the groups, and that suggests any outcome variations are driven mainly by the anesthetic method rather than patient heterogeneity.

An important finding in our work was that sevoflurane provided greater hemodynamic stability. The sevoflurane group had significantly lower heart rate (e.g., 88 ± 5 bpm vs 96 ± 6 bpm at 20 minutes) and mean arterial pressure (MAP) (67 ± 3 mmHg vs 70 ± 4 mmHg at end of surgery). The results of this study are consistent with those of Kanaya et al. (2003) [10], who found that heart rate and MAP also fluctuated less during sevoflurane anesthesia compared to propofol, and that the mean MAP for sevoflurane was 5–8 mmHg lower. Likewise, Pieters et al. (2010) showed that sevoflurane resulted in greater cardiovascular stability, and that significantly fewer patients experienced tachycardia and hypotension. Deutschman et al. (1994) [11] noted, however, that propofol gave greater BP control, but that propofol was also associated with a higher incidence of bradycardia (up to 12% compared to 5% with sevoflurane), suggesting that this may be related to individual physiological responses to the anesthetic. So in this instance, our results would lean towards the stability of sevoflurane, although there are literature benefits of both.

About the depth of anesthesia, our work showed smaller BIS readings in the sevoflurane group, so it seemed like the anesthesia was deeper. Even though BIS focused comparison numbers are not always mentioned everywhere, Wang et al. (2017) [12] said sevoflurane managed a steadier anesthetic depth along with fewer episodes of intraoperative awareness, and that actually fits with what we found. Propofol, though, is still quite dependable for keeping sufficient anesthesia, but it had a bit higher BIS value.

In our study, the recovery traits overall leaned toward sevoflurane, and we noticed clearly faster eye

opening (6.2 ± 1.8 vs 8.5 ± 2.1 minutes) as well as extubation (7.3 ± 1.9 vs 10.8 ± 2.5 minutes). These results seem to line up with Enekvist et al. (2015) [13], who described eye-opening of 5.9 ± 1.5 minutes using sevoflurane, but 8.7 ± 2.3 minutes when propofol was used. They were also echoed by Maheshwari et al. (2020) [14], who showed quicker emergence and an earlier PACU discharge with sevoflurane. Sudré et al. (2015) [15] found no meaningful gap in the recovery course ($p>0.05$), which implies that the exact recovery results might swing based on anesthetic dosage, supporting adjuvants, and how long the surgery lasted. Even with those mixed reports, when you zoom out the pattern across studies, including ours, still tilts toward sevoflurane for faster recovery, especially in shorter procedures.

Postoperative agitation and pain score outcomes were notably lower in the sevoflurane arm in our own study (PAED: 4.2 ± 0.9 vs 5.8 ± 1.2, VAS: 2.0 ± 0.8 vs 2.8 ± 1.0). Chandler et al. (2013) [16] also described similarly reduced PAED numbers when sevoflurane was used (mean 4.5 vs 6.1 compared with propofol), which they linked to a steadier emergence and less delirium type behavior. Still, Lim et al. (2016) [17] showed quite different data, noting a higher occurrence of emergence agitation in the sevoflurane group (incidence around 18% vs 10% for propofol) and they blamed it on the faster arousal. Taken together, these disagreements make it look like sevoflurane can usually bring about a gentler recovery, but if the awakening is too quick it might, in some pediatric subgroups, nudge patients toward agitation rather than toward calmness.

On the safety part, our study kinda showed no really statistically significant difference in adverse events, even if there were a few slightly higher incidences with propofol, like bradycardia 8% vs 4% and hypotension 10% vs 6%. I mean, these results line up with Kanaya et al. (2003) where they said the safety profiles looked comparable, but they also mentioned postoperative nausea and vomiting was more frequent with sevoflurane, roughly 22% vs 12% when propofol was used. Then, in contrast, Zhang (2017) [18] reported that respiratory adverse events went up with propofol, reaching up to 15% vs 9% with sevoflurane, which kind of backs our own observation of slightly higher complication rates on the propofol side. So, in the end, both agents still show acceptable safety, with small shifts depending on study setup and how perioperative management was handled.

Also, the recovery quality, as judged by the Modified Aldrete Score, together with parental satisfaction, seemed notably better in the sevoflurane group in our study (Aldrete 9.2 ± 0.6 vs 8.5 ± 0.9, satisfaction 4.5 ± 0.6 vs 3.8 ± 0.7). Pieters et al. (2010) [8] described something kind of close, where parental satisfaction was higher (4.6 vs 3.9) and postoperative comfort felt more favorable with sevoflurane. Still, Lim et al. (2016) did not see any clear difference in satisfaction ($p > 0.05$) which points to other influences too, like how well the team communicates, perioperative care routines, and even the usual institutional practices that can shape these satisfaction outcomes.

In summary, our findings are largely in agreement with existing literature demonstrating that sevoflurane provides better hemodynamic stability, faster recovery, and improved postoperative comfort compared to propofol in pediatric short procedures. However, contrasting evidence regarding recovery profiles, emergence agitation, and adverse effects highlights the importance of individualized anesthetic selection. Both agents remain effective and safe, but sevoflurane appears to offer a more favorable overall profile in the pediatric population.

Conclusion

The present study concludes that both Propofol and Sevoflurane are effective and safe anesthetic agents for maintenance of anesthesia in pediatric patients undergoing short surgical procedures. However, Sevoflurane demonstrated superior overall performance with better intraoperative hemodynamic stability, deeper anesthetic maintenance, faster recovery, shorter extubation and PACU stay, improved Modified Aldrete scores, lower PAED and pain scores, and higher parental satisfaction compared to Propofol. Although Propofol showed acceptable anesthetic efficacy and safety, it was associated with relatively delayed recovery and a slightly higher incidence of minor adverse events, though statistically insignificant. Both agents had comparable safety profiles with no major perioperative complications. Based on these findings, Sevoflurane appears to be a more favorable choice for pediatric short surgical procedures due to its rapid recovery characteristics, stable physiological profile, and enhanced postoperative comfort, thereby supporting improved perioperative outcomes and quality of pediatric anesthetic care. However, further large scale studies are required to strengthen these conclusions.

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