Journal of Anesthesia (2025) 39:345–354
https://doi.org/10.1007/s00540-025-03463-4

ORIGINAL ARTICLE

Effect of ondansetron and metoclopramide on postoperative nausea and vomiting in children undergoing tonsillectomy with or without adenoidectomy: a systematic review with meta-analysis

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Received: 10 August 2024 / Accepted: 2 February 2025 / Published online: 24 February 2025

Abstract

Purpose Postoperative nausea and/or vomiting (PONV/POV) following tonsillectomy occurs in up to 89% of children without antiemetic prophylaxis. Prior systematic reviews have not evaluated the relative efficacy of ondansetron and metoclopramide for PONV/POV, including their adverse effects.

Methods A systematic search was conducted of five databases from their inceptions to June 19, 2024. Inclusion criteria were randomized controlled trials (RCTs) comparing ondansetron and metoclopramide in pediatric patients undergoing tonsillectomy or adenotonsillectomy. The primary outcome was incidence of PONV/POV. Secondary outcomes were length of hospital stay (LOS) and adverse events including postoperative extrapyramidal reactions and delayed hospital readmissions. Pooled risk ratios (RRs) or mean differences (MDs) and 95% confidence intervals (CIs) were calculated using random-effects meta-analysis. Adjusted RRs were calculated using random-effects meta-regression. Risk of bias and certainty of evidence were assessed using Cochrane RoB 2 and GRADE, respectively. This study was registered in PROSPERO (42,024,499,702).

Results Five RCTs met all inclusion criteria, consisting of 861 patients. Ondansetron significantly reduced risk of PONV/POV by almost 50% (RR 0.48 95% CI 0.31–0.75, moderate quality evidence), compared to metoclopramide. Intraoperative opioid dose did not impact the RR. Ondansetron also significantly shortened LOS (MD − 26.92 min 95% CI − 47.24 min to − 6.60 min, moderate quality evidence). Only two RCTs addressed readmission rates or extrapyramidal reactions, although no events occurred in either study.

Conclusion Ondansetron is more effective than metoclopramide for PONV/POV prophylaxis, decreasing the risk of PONV/POV as well as LOS. Continued surveillance for adverse effects may be recommended when using either medication.

Keywords Metoclopramide · Ondansetron · Postoperative nausea and/or vomiting · Pediatrics · Tonsillectomy

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Introduction

Tonsillectomy is one of the most common ambulatory procedures performed in children worldwide with approximately 377,000 procedures performed in the US in 2019 (around 5 per 1000 population) [1], and approximately 11,700 procedures performed in Japan in 2022–2023 (around 0.6 per 1000 population) [2, 3].

Postoperative nausea and/or vomiting (PONV/POV) following tonsillectomy is one of the most common complications with an incidence of up to 89% without antiemetic prophylaxis [4, 5]. PONV/POV is an unpleasant experience for children and caregivers and can lead to a prolonged stay in the post-anesthesia care unit (PACU) as well as delayed discharge [6]. PONV/POV could also increase the risk of aspiration and dehydration.

Ondansetron is a 5-hydroxytryptamine-3 (5-HT_3) antagonist and affects chemoreceptors in excitatory neurons in the medulla oblongata. Many randomized controlled trials (RCTs) have documented its effect on PONV/POV following tonsillectomy in children [7–11]. A meta-analysis by Bolton et al. reported that ondansetron is effective for the reduction of PONV/POV with an odds ratio (OR) of 0.36 (95% CI 0.26–0.46) [12]. Serious side effects associated with ondansetron have been reported including QT prolongation and serotonin syndrome [13, 14].

Metoclopramide is a dopamine receptor antagonist that affects the chemoreceptor trigger zone in the central nervous system. This agent has not only central antiemetic properties but also cholinergic stimulation of the gastrointestinal tract resulting in accelerated gastric emptying. Numerous RCTs have documented its antiemetic effect [11, 15] and the meta-analysis by Bolton et al. reported that metoclopramide reduces the incidence of PONV/POV with an OR of 0.51 (95% CI 0.34–0.77) [12]. However, metoclopramide is also thought to cause striatal dopamine receptor blockade leading to nigrostriatal and striatopallidal pathway imbalance and, in rare cases, may cause extrapyramidal reactions (16).

There are existing studies comparing ondansetron and/or metoclopramide to placebo [7–11]. The odds ratio of ondansetron for PONV/POV compared to placebo is smaller than that of metoclopramide in Bolton's meta-analysis [12]. However, prior antiemetic placebo-controlled studies have not evaluated the relative efficacy of ondansetron and metoclopramide for PONV/POV as a risk, including their adverse effects. We hypothesized that ondansetron is more effective than metoclopramide in preventing PONV/POV, resulting in a shorter length of hospital stay (LOS) and a decrease in unplanned hospital revisits or readmission.

Methods

The protocol for this systematic review was registered at PROSPERO (42,024,499,702). The study is reported following Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA).

Systematic literature search

Through the Ovid platform, comprehensive literature searching was conducted on MEDLINE, MEDLINE In-Process/ePubs, Embase Classic + Embase, Cochrane Central Register of Controlled Trials, and the Cochrane Database of Systematic Reviews.

The research question which guided the literature search was defined as follows: (1) population: all patients < 18 years of age undergoing tonsillectomy with or without adenoidectomy; (2) intervention: preoperative or intraoperative ondansetron; (3) Comparator: preoperative or intraoperative metoclopramide; (4) primary outcome: incidence of PONV/POV. Nausea is defined as a clinical judgement of retching or Baxter Retching Faces scale 4 or higher. Vomiting is defined as an active expulsive effort with or without gastric contents; (5) Secondary outcomes: LOS (defined as time stayed in the PACU or recovery room), incidence of postoperative extrapyramidal reactions (such as dystonia or oculogyric crisis), incidence of postoperative QT prolongation or arrythmia (documented by electrocardiogram), incidence of postoperative serotonin syndrome, and incidence of unplanned hospital revisits or readmissions due to delayed nausea, vomiting, and dehydration.

The initial literature searching was performed on October 13, 2023 and updated on June 19, 2024 by an information specialist (M.E.). Search terms used included controlled vocabulary and text words and synonyms for the concept components: (ondansetron OR metoclopramide) AND tonsillectomy. To enhance the retrieval strategy, terms related to the study design were not used. The results were limited to children. The full comprehensive search strategy is provided in Supplemental File 1.

Study selection

Title and abstract screening were conducted by two independent reviewers (M.S. and S.C.), using DistillerSR™ (Evidence Partners Inc., Ottawa, ON, Canada). Any disagreements were resolved by discussion with a third reviewer (K.A.).

Inclusion and exclusion criteria

Inclusion criteria were as follows: (1) study population was patients < 18 years old undergoing tonsillectomy or

adenotonsillectomy; (2) involved the oral or intravenous administration of preoperative or intraoperative ondansetron; (3) involved the oral or intravenous administration of preoperative or intraoperative metoclopramide; (4) reported any of the study outcomes: occurrence of PONV/POV, postoperative extrapyramidal reactions, postoperative QT prolongation or arrythmia, serotonin syndrome, unplanned hospital revisit or readmission, or LOS; (5) study design was RCT [17]; (6) full-text publication; and (7) published in English.

Exclusion criteria were: (1) studies which included patients ≥ 18 years old; (2) studies that described the postoperative or intramuscular administration of only ondansetron or metoclopramide, but not both; (3) study designs other than RCTs; (4) publication types other than full-text articles (such as abstracts, unpublished protocols, theses, letters, and correspondences); and (5) duplicate studies.

Data extraction

Data was extracted from eligible studies by two independent reviewers (M.S. and S.C.) into DistillerSR. Discrepancies were resolved by a third reviewer (K.A.). Study characteristics extracted included year of publication and number of study participants. Demographic data collected included age of participants, sex, weight, and ASA score. Treatment data extracted included administration timing and total dose of ondansetron or metoclopramide in mg/kg. Intraoperative characteristics extracted included procedure type (tonsillectomy or adenotonsillectomy), primary anesthetic agent (volatile anesthesia or total IV anesthesia using propofol with or without other intravenous anesthetic agents), fluid volume, anesthesia time, opioid consumption at operating room and PACU (sum of fentanyl, morphine, tramadol, pethidine, codeine, hydromorphone, and sufentanil in oral morphine milligram equivalent in mg per kilogram), analgesics use other than opioids (acetaminophen, non-steroidal anti-inflammatory agents, dexamethasone). Finally, data were extracted pertaining to primary (incidence of PONV/POV in postoperative care) and secondary outcomes (LOS, incidence of postoperative extrapyramidal reaction, postoperative QT prolongation or arrhythmia, serotonin syndrome).

Data synthesis: meta-analysis and meta-regression

Using the studies which reported outcomes separately by ondansetron and metoclopramide groups, a random-effects pair-wise meta-analysis was conducted to compute risk ratios (RRs) and 95% confidence intervals (CIs) of intravenous ondansetron compared to intravenous metoclopramide for the incidence of PONV, extrapyramidal reaction, QT prolongation or arrythmia, serotonin syndrome, and unplanned hospital revisits or readmissions.

A random-effects pair-wise meta-analysis was also conducted to compute the mean difference (MD) with 95% CI in LOS, in minutes, for intravenous ondansetron compared to metoclopramide.

Statistical heterogeneity was assessed using the I^2 statistic, with I^2 values between 50–74% being considered moderate and values ≥ 75% being considered high.

A random-effects meta-regression model was planned to estimate RRs adjusted for fluid volume, anesthesia time, and intraoperative opioid consumption.

Subgroup analyses were planned based on the anesthetic agent used (volatile anesthesia vs. total IV anesthesia using propofol) and the administration of antiemetics other than ondansetron and metoclopramide (with vs. without other antiemetics), both of which may influence the incidence of PONV/POV.

A sensitivity analysis excluding trials with high risk of bias was also planned.

Analyses were conducted using R version 4.3.0 and Review Manager by Cochrane (RevMan) version 5.4.1.

Quality assessments

For each included study, critical appraisal of the risk of bias was completed independently by two investigators (M.S. and S.C.) using the Cochrane Risk of Bias 2 tool for randomized trials [18]. Any disagreements between the investigators were resolved by a third reviewer (N.N. or K.A.). Studies were classified as having overall low risk, some concerns, or high risk of bias according to the findings of five domains: randomization process, assignment to intervention, missing outcome data, measurement of the outcome, and selection of the reported result [19–21].

The certainty of evidence was assessed following the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) framework, consisting of the following domains: risk of bias, inconsistency, indirectness, imprecision, and publication bias. Certainty of evidence was classified as high, moderate, low, or very low [19, 20].

Publication bias was planned to be assessed using funnel plots if > 10 trials were included.

Results

Systematic literature search

The literature search yielded 433 records, of which 116 were duplicates and thus removed. Title and abstract screening were therefore conducted on 317 records, resulting in 22 full-text articles being identified. Out of these 22 articles, five RCTs met all inclusion criteria [8–11, 22]. The PRISMA flow diagram is shown in Fig. 1.

Characteristics of eligible studies

The characteristics of the five included RCTs are presented in Table 1. The studies were published between 1994 and 2007 and included between 20 and 557 participants. The total number of participants was 861. Four out of five studies were conducted in the USA and one was conducted in Australia. Mean age of participants ranged from 5.3 to 6.5 years old. All studies involved intravenous administration. The ondansetron dose administered ranged from 0.03 to 0.15 mg/kg, while the metoclopramide dose ranged from 0.2 to 0.5 mg/kg. Four of five studies were considered to have some concerns regarding risk of bias using Cochrane Risk of Bias 2 (Table 1, Supplemental File 2).

PONV/POV outcomes

All five included RCTs reported the incidence of PONV/POV. Three studies defined PONV/POV as requiring active expulsion of gastric contents [8, 9, 22], while two studies considered retching even without expulsion of gastric contents to be an episode of vomiting [10, 11].

One of the five studies which met inclusion criteria did not report PONV/POV incidence for the ondansetron and metoclopramide groups separately and was therefore excluded from subsequent meta-analyses [22].

In the remaining four RCTs which did report PONV/POV outcomes there were a total of 841 patients, of which 417 received ondansetron and 424 received metoclopramide [8–11]. Ondansetron dose was 0.15 mg/kg for three studies and 0.1 mg/kg for one study. Metoclopramide dose was 0.25 mg/kg in two studies and 0.5 mg/kg in two studies. In the ondansetron group, 99 (24%) patients experienced PONV/POV vs. 176 (42%) patients in the metoclopramide group. Pair-wise meta-analysis of these four RCTs demonstrated ondansetron significantly reduced risk of PONV/POV by almost 50% (RR 0.51 95% CI 0.36–0.74, moderate quality evidence), compared to metoclopramide (Fig. 2; Table 2). There was moderate heterogeneity ($I^2 = 52\%$).

LOS in PACU outcomes

Four RCTs reported LOS outcomes [8, 10, 11, 22]. The minimum observation period varied between studies at 2 h [22], 4 h [10], and 5 h [8]. One study did not define a minimum period of stay [11].

Of these four RCTs, three reported results separately by ondansetron or metoclopramide. These three RCTs consisted of 284 patients total (144 received ondansetron, 140

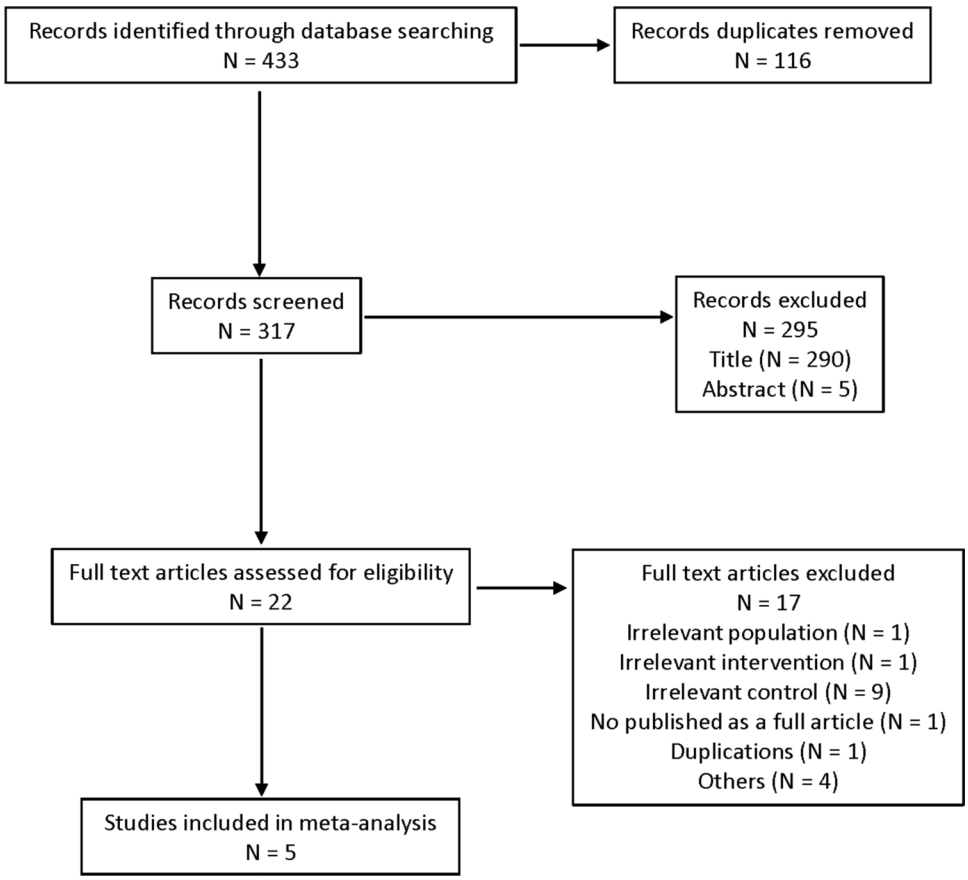

Fig. 1 PRISMA flow diagram. *PRISMA* preferred reporting items for systematic review and meta-analysis

Table 1 Characteristics of included studies

Author	Study year	Number of participants	Age (years)[a]	Ondansetron (mg/kg)	Metoclopramide (mg/kg)	Investigated outcome			Incidence of PONV/POV (%)	RoB judgement
						PONV/POV	LOS[b]	Unplanned hospital revisit	Extrapyramidal reaction QT prolongation Serotonin syndrome		
Bolton	2007	557	5.3 (1–12)	0.1	0.5	Yes	No	No	Yes	31	Low
Gunter	2006	20	6.4 ± 2	0.03	0.2	Yes[c]	Yes[c]	Yes[c]	Yes[c]	38	Some concerns
Stene	1996	84	6.0 ± 2.2	0.15	0.25	Yes	Yes	Yes	No	39	Some concerns
Rose	1996	80	6.5 ± 2.5	0.15	0.25	Yes	Yes	No	No	31	Some concerns
Furst	1994	120	5.7 ± 2.9	0.15	0.5	Yes	Yes	Yes	Yes	35	Some concerns

LOS length of hospital stay, *PONV* post operative nausea and/or vomiting, *POV* postoperative vomiting, *RoB* risk of bias

[a]Values are mean (range) or mean ± standard deviation

[b]LOS represents the period staying in the post-anesthesia care unit or recovery room

[c]Study did not report the outcome separately between ondansetron and metoclopramide group

received metoclopramide) [8, 10, 11]. Ondansetron dose was 0.15 mg/kg in all three studies. Metoclopramide dose was 0.25 mg/kg in two studies and 0.5 mg/kg in one study.

Ondansetron resulted in lower mean LOS compared to metoclopramide in all three RCTs (MD range − 60.00 min to − 22.00 min). In pair-wise meta-analysis, compared to metoclopramide, ondansetron significantly reduced LOS by approximately 27 min (MD − 26.92 min 95% CI − 47.24 min to − 6.60 min, moderate quality evidence) (Fig. 3; Table 2). There was no evidence of heterogeneity ($I^2 = 0$).

Adverse events/safety

Unplanned hospital revisits and adverse events such as extrapyramidal reactions were each investigated by three RCTs, however as aforementioned only two RCTs reported outcomes separately for ondansetron and metoclopramide groups (Table 1).

Although we were unable to conduct a meta-analysis examining unplanned hospital revisits due to the low number of studies reporting each outcome, no readmissions due to delayed PONV/POV were reported by either RCT, in either treatment group [8, 10]. Similarly, no extrapyramidal reactions were reported in the two RCTs which investigated and reported this outcome separately by treatment group [9, 10].

Certainty of evidence (GRADE)

The components of the certainty of evidence assessments using GRADE criteria are presented in Supplemental File 3. The certainty of evidence for both PONV/POV and LOS analyses were considered moderate. Serious risk of bias was a concern, with one study not reporting clear information about concealing allocation, one not reporting sample size estimation, and one not reporting assessor awareness.

Pre-planned meta-regression, subgroup analysis and sensitivity analysis

The meta-regression model adjusted for intraoperative opioid dose demonstrated no significant association between PONV/POV risk and increasing oral morphine equivalent (per 0.1 mg/kg increment, RR − 0.04, p value = 0.87) (Supplemental File 4, Supplemental File 5). There were an insufficient number of studies which reported the other pre-planned variables for meta-regression (fluid volume, anesthesia time) to perform this analysis.

All studies administered inhalation anesthetics and only one study in addition administered propofol with inhalation anesthetics, therefore the pre-planned subgroup analysis by anesthetic type (volatile vs. total IV anesthesia using propofol with or without other intravenous anesthetic agents)

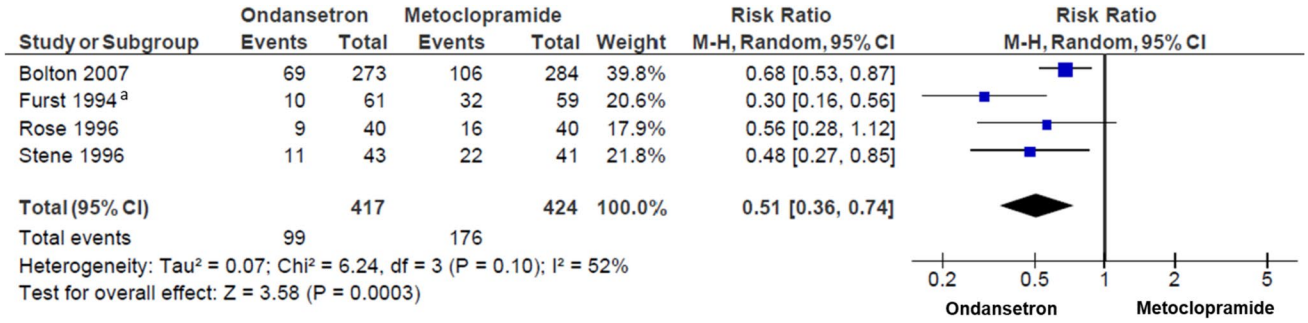

Fig. 2 The effect of ondansetron in comparison with metoclopramide for postoperative nausea and/or vomiting. *CI* confidence interval, *M-H* Mantel–Haenszel. [a]The number of events was represented as the nearest whole number, calculated from the total number of participants and reported PONV/POV percentages in each group

Table 2 Summary of findings

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)
	Risk with metoclopramide	Risk with ondansetron			
PONV/POV	467 per 1000	238 per 1000 (168–346)	RR 0.51 (0.36–0.74)	841 (4 RCTs)	⨁⨁⨁◯ Moderate[a,b,c,d]
Length of hospital stay (LOS)[e]	NA	MD 26.92 min lower (47.24 lower to 6.60 lower)	NA	284 (3 RCTs)	⨁⨁⨁◯ Moderate[a,b,c]

*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI)

GRADE working group grades of evidence

High certainty: we are very confident that the true effect lies close to that of the estimate of the effect

Moderate certainty: we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different

Low certainty: our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect

Very low certainty: we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect

CI confidence interval, *MD* mean difference, *RR* risk ratio

[a]One study did not have clear information about concealing allocation

[b]One study did not have clear information about sample size estimation

[c]One study did not have clear information about assessor awareness

[d]There was moderate heterogeneity

[e]The period staying in the post-anesthesia care unit or recovery room

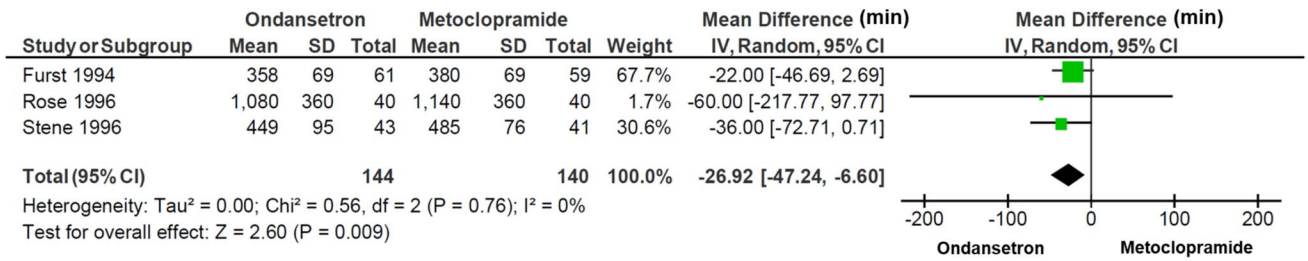

Fig. 3 The effect of ondansetron in comparison with metoclopramide for length of hospital stay. *CI* confidence interval, *IV* inverse variance

could not be performed. Similarly, of the four trials which reported metoclopramide and ondansetron outcomes separately, only one trial administered an additional antiemetic (dexamethasone) [9]. Thus, the subgroup analysis by administration of another antiemetic could not be performed.

Since there were no RCTs identified with high risk of bias using Cochrane Risk of Bias 2 criteria, the pre-planned sensitivity analysis excluding trials with high risk of bias was not performed.

Discussion

Principal findings

In this systematic review and meta-analysis, ondansetron was found to significantly reduce risk of PONV/POV by almost half as well as shorten the length of stay in the PACU or recovery room, compared to metoclopramide (moderate quality of evidence for both outcomes). No unplanned hospital revisits or extrapyramidal reactions were reported by any of the included studies.

General interpretation of the results in the context of other evidence

In our meta-analysis, ondansetron significantly reduced the risk of PONV/POV compared to metoclopramide. Our findings support the findings from a 1998 meta-analysis by Domino et al. which pooled the results from RCTs investigating pediatric tonsillectomy or adenotonsillectomy with RCTs investigating pediatric strabismus surgery. Domino et al. found ondansetron to be more effective than metoclopramide in preventing PONV/POV among children undergoing these surgeries (OR 0.33, 95% CI 0.27, 0.39) [23]. Our findings are also consistent with the results found in studies of other pediatric surgeries and conditions [24, 25].

The shortened length of PACU stay found with ondansetron may be partially explained by the approximately 50% reduced risk of PONV/POV. Edler et al. reported a significant association between PONV/POV and post-tonsillectomy or adenoidectomy LOS, with each PONV/POV episode increasing LOS in the PACU by 31 min [26]. In fact, children in the study who did not experience PONV/POV had up to 80% shorter LOS compared to those children who did experience PONV/POV [26]. PONV/POV and overnight hospital stay after pediatric tonsillectomy have also been previously positively correlated, although studied in the context of morphine-induced vomiting [27]. A decrease in PONV/POV may also decrease the risk of dehydration, wound dehiscence, and aspiration, which in turn may be related to decreased length of PACU stay.

There were few head-to-head trials of ondansetron vs. metoclopramide assessing various safety measures such as delayed hospital revisits or readmissions. Regardless, the RCTs included in this systematic review reported no unplanned hospital revisits in either treatment group, highlighting the rarity of these adverse events. It may therefore be necessary to draw from population-based cohort studies and case reports to better understand their incidence and risk factors. For example, a recent, large population-based cohort study found nausea accounted for 3.57% of hospital revisits and 5.78% of hospital readmissions following pediatric tonsillectomy or adenotonsillectomy, with most revisits and readmissions occurring the first day after surgery [28].

Metoclopramide-induced extrapyramidal reactions such as dystonia and oculogyric crisis have been reported in numerous case reports of children [29–31]. A systematic review and meta-analysis of prospective studies examining the adverse effects of metoclopramide in children for any indication found administration of metoclopramide as a single-dose resulted in no life-threatening or slow resolving adverse effects [31]. The meta-analysis did find that extrapyramidal symptoms are the most common adverse effect when multiple doses of metoclopramide are administered, as was used for chemotherapy-induced nausea and vomiting prophylaxis [31]. However, the use of multiple doses of metoclopramide is uncommon in PONV/POV prophylaxis.

Existing evidence regarding ondansetron and QT prolongation for the pediatric population suggests risk remains low at therapeutic doses used for PONV/POV prophylaxis [32–35]. However, significant QT prolongation and serotonin syndrome have been noted at higher doses [36–38], in the PICU setting [39], and among children with high baseline risk (such as congenital long QT syndrome) [40, 41].

A prior systematic review from the Cochrane Database of Systematic Reviews reported that administration of dexamethasone can reduce vomiting in pediatric tonsillectomies (RR 0.49, 95% CI 0.41, 0.58.) [42]. Furthermore, a recent consensus guideline has recommended dexamethasone for the management of PONV/POV in children [43]. In one of the eligible trials included in the current meta-analysis, dexamethasone was administered to all study participants [9]. Had there been enough trials using dexamethasone, a stratification analysis of the studies by the dexamethasone use might have enabled us to evaluate the efficacy of ondansetron and metoclopramide in the context of dexamethasone. Nonetheless, dexamethasone is widely recognized as an effective antiemetic in pediatric tonsillectomy.

Limitations

The moderate heterogeneity observed in the pooled PONV/POV results (Fig. 2) may be explained by varying effect sizes secondary to varying doses of metoclopramide (0.25 mg/

kg, 0.5 mg/kg) and varying sample sizes of each RCT. In addition, the definitions of PONV/POV used by each study were inconsistent (including or excluding retching). In addition, one study was halted at interim analysis [8] and another study had 20% loss to follow-up, although it was unclear if the distribution of attrition differed between the different treatment groups [10]. These may further contribute to the various effect sizes found by the RCTs.

With respect to the LOS in the PACU results, the exact discharge criteria used in each RCT was unclear. This clinical heterogeneity may have influenced the results and weightings assigned by the random-effects meta-analysis.

Due to low number of studies and inconsistent reporting, we were unable to complete the pre-planned meta-regression to adjust for other factors known to impact PONV/POV incidence such as fluid volume and anesthesia time. Furthermore, the results of our study may not be generalizable to surgeries other than tonsillectomy or adenotonsillectomy. Finally, some concerns regarding risk of bias were identified in many of the included studies (Table 1).

Implications of the results for practice, policy, and future research

Metoclopramide is not currently recommended by the Food and Drug Administration (FDA) for PONV/POV prophylaxis in children. The European Medicines Agency (EMA) only recommends short-term use of metoclopramide in children > 1 yo, only after other options have been considered or tried [44]. Similarly, the Japanese Society of Anesthesiologists cautions regarding the use of metoclopramide in children due to an increased likelihood of extrapyramidal reaction.

Antiemetic prophylaxis is particularly important given how common PONV/POV is among pediatric tonsillectomy surgeries. Based on the findings from this systematic review and meta-analysis, ondansetron is recommended over metoclopramide assuming there are no contraindications to its use. Continued surveillance for adverse events when using either ondansetron or metoclopramide may be recommended.

Beyond ondansetron and metoclopramide, there are many antiemetic medications currently used in practice for PONV/POV prophylaxis in pediatric tonsillectomy [45, 46]. Future research on other comparisons of other prophylactic treatments is needed to better guide treatment decisions.

Conclusions

Based on this systematic review and meta-analysis, ondansetron is more effective than metoclopramide for PONV/POV prophylaxis, not only decreasing the risk but also granting smoother recovery and leading to decreased length of time spent in the PACU or recovery room. Given the current landscape of PONV/POV prophylaxis options, future research comparing other prophylactic treatments and combinations of treatments is warranted.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s00540-025-03463-4.

Acknowledgements KA acknowledges the Department of Anesthesiology and Pain Medicine, University of Toronto, and the Hospital for Sick Children, for secured academic time to conduct the current work as a recipient of a Merit Award 2023-2025.

Author contributions KA and MS conceived this paper. KA and MS developed the protocol. ME performed the systematic literature searches, managed database results and documentation. MS, NN, and KA performed the systematic review and data extraction. MS and AY performed the analysis on the result of the literature search and extracted data. MS, SC, AY, RA, and KA interpreted data. SC and MS wrote the initial draft of the manuscript, and RA, EP, PC, JH, KY, and KA helped draft the final version, which was approved by all authors.

Funding This work was supported by POS Summer Studentship Program, Hospital for Sick Children 2024 (SC, RA, JH, KA), Canadian Anesthesiologists' Society Research Award 2022–2024 (KA), Canadian Anesthesiologists' Society Career Scientist Award in Anesthesia 2024–2026 (KA) and Project Grants (PJX179857, PJT183603) 2022–2024, Canadian Institutes of Health Research (KA).

Data availability All relevant data are contained within the article.

Declarations

Conflict of interest The authors declare that they have no competing interest related to this publication.

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