fortune Journals

Research Article

ANESTHESIA AND CRITICAL CARE

ISSN: 2687-7996

Association Between Body Mass, Dexamethasone Antiemetic Prophylaxis, and the Occurrence of Postoperative Nausea and Vomiting

Njall Pouth Clotilde[1*], Charles Emmanuel Toussaint Binam Bikoi[4], Serge Vivier Nga Nomo[3], Mbango-Ekouta Noel Désirée[1], Ebana Steve[1], Amengle ludovic[2], Binam Fidèle[3]

Abstract

Background: The effectiveness of dexamethasone antiemetic prophylaxis (DAP) in preventing postoperative nausea and vomiting (PONV) may depend on several factors. The aim of our study was to determine whether PONV prevention depends on body mass among patients who received DAP.

Methods: We conducted a case-control study in patients operated on in the ENT, traumatology, and gynecology departments of Laquintinie Hospital, Douala. Cases were defined as patients who received DAP, while controls were patients who did not. Body mass was measured using a SECA 797 scale (precision: ± 100 g; graduation: 100 g). Pearson's chi-square test with Fisher's extraction was used to evaluate the association between body mass, DAP, and PONV occurrence.

Results: PONV was more frequent among controls, particularly in the weight ranges [50–59] kg (33.3%), [60–69] kg (39.1%), and [70–79] kg (35.7%) compared to cases. In the [60–69] kg group, a statistically significant difference was observed (p = 0.036), with a higher proportion of PONV in controls (39.1%) compared to cases (9.5%).

Conclusion: The effectiveness of DAP in preventing PONV may depend on body mass, with a particular benefit observed in patients weighing between 60 and 69 kg.

Keywords: Body mass; Dexamethasone antiemetic prophylaxis; Postoperative nausea and vomiting

Introduction

Postoperative nausea and vomiting (PONV) are among the most common and distressing postoperative complications, affecting up to 30% of patients according to statistics [1-3]. Beyond the discomfort they cause, PONV may prolong hospitalization, increase the risk of respiratory complications, delay the resumption of oral intake, and raise healthcare costs [4]. Various preventive strategies have therefore been developed, ranging from anesthetic optimization (use of less emetogenic agents, reduction of opioids) to targeted administration of antiemetics such as 5-HT3 antagonists, metoclopramide, or anticholinergics [5]. Among these, dexamethasone antiemetic prophylaxis (a corticosteroid) is increasingly recommended due to its effectiveness, low cost, and simple single-dose preoperative administration [6]. Its use has significantly expanded in many modern anesthesia protocols, thanks to its generally favorable safety profile and the possibility of combining it with other antiemetics for synergistic effect [7]. However, some limitations remain, such as its potential impact on blood glucose

Affiliation:

[1]Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Cameroon

[2]Faculty of Biomedical Sciences, University of Yaoundé I, Cameroon

[3]Department of Anesthesia and Intensive Care, Catholic University of Central Africa, Yaoundé, Cameroon

[4]Department of Anesthesia and Intensive Care, University of Ebolowa, Ebolowa, Cameroon

***Corresponding author:**
Dr Clotilde Njall pouth, Faculty of Medicine and Pharmaceutical Sciences, Department of Surgery and Specialties, University of Douala. Anesthesiologist – Intensivist, Cameroon.

Citation: Njall Pouth Clotilde, Charles Emmanuel Toussaint Binam Bikoi, Serge Vivier Nga Nomo, Mbango-Ekouta Noel Désirée, Ebana Steve, Amengle ludovic, Binam Fidèle. Association Between Body Mass, Dexamethasone Antiemetic Prophylaxis, and the Occurrence of Postoperative Nausea and Vomiting. Anesthesia and Critical care 8 (2026): 25-29.

Received: September 13, 2025
Accepted: September 22, 2025
Published: February 25, 2026

Njall PC, et al., Anesth Crit Care 2025
DOI:10.26502/acc.097

and immunity, or its reduced effectiveness in certain patient groups [8-10].

Regarding its efficacy, several studies and meta-analyses confirm that dexamethasone significantly reduces the incidence of PONV compared to no prophylaxis or certain isolated treatments [11-15]. Nonetheless, various individual risk factors, such as history of motion sickness, sex, age, or body mass, may influence its effectiveness. In particular, body mass may play a role through multiple biological, cellular, and molecular mechanisms: changes in the volume of distribution of dexamethasone, metabolic alterations linked to excess adipose tissue, modifications in inflammatory profile, and endocrine dysregulations associated with obesity [16]. These mechanisms can lead to inappropriate plasma concentrations of the drug or variable pharmacodynamic responses, resulting in unequal prophylactic efficacy among patients at weight extremes [17].

Thus, investigating the association between body mass and the protective effect of dexamethasone against PONV is of major clinical interest, as it may help optimize preventive protocols and promote individualized, safer, and more effective care. This is precisely the objective of the present study: to understand the extent to which body mass influences dexamethasone antiemetic prophylaxis and, ultimately, to improve PONV prevention strategies for better quality of care.

Patients and Methods

Study Type, Period, and Setting

We conducted a case-control study from March to May 2015 at Laquintinie Hospital, Douala (HLD). It included patients operated on in the ENT, traumatology, and gynecology departments, aiming to determine whether PONV prevention depends on body mass among patients who received dexamethasone antiemetic prophylaxis (DAP).

Study Population

The study population comprised 105 patients operated on in ENT, traumatology, and gynecology departments, divided into 58 cases and 54 controls. Cases were defined as patients who received DAP, and controls as those who did not. Both groups were matched for age and sex. To distinguish cases from controls, consecutive numbers were assigned to patients: odd numbers corresponded to those receiving DAP, while even numbers corresponded to those not receiving it.

Data Collection Procedure

Data were collected using a predesigned anonymous survey form, completed from medical records and clinical observation. Body mass was measured through a series of weighings using a SECA 797 scale. Before each measurement, the scale was checked for proper calibration and stability on a flat surface. Patients removed shoes and heavy objects to avoid bias. They carefully stepped on the scale, remained still, and looked straight ahead. Once the value stabilized, body mass was recorded in kilograms with a precision of ±100 g. Between measurements, the zero point was checked, ensuring patients did not lean on any support. The same procedure was applied in cases before DAP administration and in controls (dosage: 4 mg for patients weighing <60 kg and 8 mg for those >60 kg). PONV occurrence was assessed within 48 hours postoperatively.

Ethical Considerations

Ethical principles were strictly observed. Authorization was obtained from the management of Laquintinie Hospital. Patients, or their legal representatives, were informed about the study's nature and objectives, and provided free and informed consent. Participation was voluntary and could be withdrawn at any time. Confidentiality was ensured by anonymized survey forms, and the database was accessible only to investigators and supervisors.

Data Analysis

Data were entered and analyzed using R software version 4.4.2 for Windows and presented as frequencies and percentages. Pearson's chi-square test with Fisher's correction was performed to evaluate the association between body mass, DAP, and PONV occurrence, with significance set at 5%.

Results

Association between Body Mass, DAP, and PONV Occurrence in Cases and Controls

PONV was generally more frequent among controls, particularly in the weight ranges [50–59] kg (33.3%), [60–69] kg (39.1%), and [70–79] kg (35.7%), compared with cases. In the [60–69] kg group, a statistically significant difference was observed ($p = 0.036$), with a higher proportion of PONV in controls (39.1%) compared to cases (9.5%). No statistically significant difference was found in the other weight ranges ($p > 0.05$) (Table 1).

Discussion

The results of our study indicate that DAP is associated with an overall reduction in the frequency of PONV, with a particularly significant effect in the [60–69] kg weight range. In this group, the percentage of PONV decreased from 39.1% in controls (without DAP) to 9.5% in cases (with DAP), yielding a statistically significant difference ($p = 0.036$). These findings support the hypothesis that the effectiveness of DAP may be influenced by body mass, possibly due to specific pharmacokinetic and pharmacodynamic mechanisms [17].

Citation: Njall Pouth Clotilde, Charles Emmanuel Toussaint Binam Bikoi, Serge Vivier Nga Nomo, Mbango-Ekouta Noel Désirée, Ebana Steve, Amengle ludovic, Binam Fidèle. Association Between Body Mass, Dexamethasone Antiemetic Prophylaxis, and the Occurrence of Postoperative Nausea and Vomiting. Anesthesia and Critical care 8 (2026): 25-29.

Njall PC, et al., Anesth Crit Care 2025
DOI:10.26502/acc.097

Table 1: Study of the association between body mass, dexamethasone antiemetic prophylaxis (DAP), and the occurrence of postoperative nausea and vomiting (PONV) in cases and controls.

Body mass (Kg)		Cases	Controls	Total	p-value
	PONV	n (%)	n (%)	n (%)	
< 50 Kg	Yes	0 (0,0)	0 (0,0)	0(0,0)	na
	No	1 (100,0)	0 (0,0)	1 (100,0)	
[50-59]	Yes	0(0,0)	4 (33,3)	4(23,5)	0,261
	No	5 (100,0)	8 (66,7)	13 (76,5)	
[60-69]	Yes	2 (09,5)	9 (39,1)	11 (25,0)	**0,036***
	No	19 (90,5)	14 (60,9)	33 (75,0)	
[70-79]	Yes	2 (11,8)	5 (35,7)	7 (22,6)	0,198
	No	15 (88,23)	9 (64,3)	24 (76,27)	
[80-89]	Yes	2 (40,0)	1 (33,3)	3(37,5)	1
	No	3 (60,0)	2 (66,7)	5(62,5)	
[90-99]	Yes	0 (0,0)	0 (0,0)	0(0,0)	na
	No	3 (100,0)	2(100,0)	5(100,0)	
>100 Kg	Yes	1 (50,0)	0(0,0)	1 (50,0)	na
	No	1 (50,0)	0(0,0)	1 (50,0)	

Cases: *Patients operated on who received DAP;* ***Controls:*** *Patients operated on who did not receive DAP. Data are presented as frequency (n) and percentage (%).* ***P-value:*** *Pearson's chi-square test with Fisher's correction was performed to assess the association between body mass, DAP, and the occurrence of PONV, considered statistically significant at p < 0.05.*

Previous research has documented the overall efficacy of dexamethasone in preventing PONV, regardless of anesthetic strategy [7,13]. These studies notably highlight a significant reduction in PONV risk in patients who received a single preoperative dose of dexamethasone. In our study, the marked difference observed in the [60–69] kg group extends these findings and suggests that body mass could be an important determinant of the response to dexamethasone. It should be noted that some studies have focused on the influence of BMI rather than total body mass [2]. However, our results clearly show that simple stratification by weight ranges can already reveal variability in the effectiveness of antiemetic prophylaxis.

Several mechanisms may explain why patients within the mid-range of body mass (here [60–69] kg) respond better to DAP. On the one hand, the volume of distribution of dexamethasone may be more favorable in this group, maintaining optimal plasma concentrations of the corticosteroid [17]. On the other hand, metabolic changes associated with weight extremes (very low weight <50 kg or high weight >100 kg) may alter hepatic metabolism and dexamethasone clearance [18]. It is plausible that in these extreme ranges, the plasma concentration required to prevent PONV is not always achieved or maintained, thereby reducing effectiveness. Moreover, inflammation and immune response vary with body mass, and different levels of inflammatory cytokines may modulate corticosteroid responsiveness [19].

In the other weight ranges, a trend was also observed toward a higher incidence of PONV among controls than cases. However, these differences were not statistically significant, which may be explained by sample size or a less pronounced effect of DAP in these weight categories. For example, in the [50–59] kg group, the sample size was limited ($p = 0.261$), making interpretation difficult [5]. Similarly, in patients weighing [70–79] kg, despite frequency differences (35.7% PONV in controls vs. 11.8% in cases), the p-value of 0.198 prevents concluding statistical dependence. Finally, extreme weight ranges (<50 kg, [90–99] kg, and >100 kg) had such small numbers that no robust conclusions could be drawn [4].

An important strength of this study lies in its case-control design, directly comparing the effect of DAP between two homogeneous groups while accounting for the variable "body mass." However, not considering in detail other PONV risk factors (such as history of motion sickness, sex, or opioid use) represents a limitation. Furthermore, evaluating body mass alone, without calculating BMI or measuring body composition, may overlook determinants linked to fat and muscle distribution [2].

From a clinical perspective, our data suggest that personalization of dexamethasone dosing could be considered, particularly for patients whose body mass may modulate plasma drug concentration [20]. In addition, combining dexamethasone with other classes of antiemetics (5-HT3 antagonists, NK1 antagonists, etc.) could be especially effective in high-risk patients, whether due to extreme weight or associated comorbidities [7].

Citation: Njall Pouth Clotilde, Charles Emmanuel Toussaint Binam Bikoi, Serge Vivier Nga Nomo, Mbango-Ekouta Noel Désirée, Ebana Steve, Amengle ludovic, Binam Fidèle. Association Between Body Mass, Dexamethasone Antiemetic Prophylaxis, and the Occurrence of Postoperative Nausea and Vomiting. Anesthesia and Critical care 8 (2026): 25-29.

Njall PC, et al., Anesth Crit Care 2025
DOI:10.26502/acc.097

Conclusion

Our study highlights a significant relationship between body mass, administration of DAP, and the occurrence of PONV, mainly in the [60–69] kg weight group. The underlying mechanisms likely involve variations in distribution volume, hepatic metabolism, and inflammatory response. Further research, including more precise methods of body composition assessment and larger sample sizes, is warranted to better define the role of body mass in DAP effectiveness and ultimately optimize PONV prevention.

Declarations

Statements on Human Ethics and Consent to Participate

- **Ethical Approval**

Ethical approval was obtained from the Ethics Committee of the University of Douala, Cameroon and authorized by the management of Laquintinie Hospital in Douala

- **Consent to Participate**

All participants provided informed consent before their inclusion in the study. The consent process ensured that participants fully understood the purpose of the research, their role in the study, and their rights, including the right to withdraw at any time without any negative consequences

- **Confidentiality**

The privacy and confidentiality of all participants were safeguarded throughout the study. Data were anonymized to ensure that no participant could be identified

Availability of Data and Materials

The data used in this study can be made available upon request by the reviewers

Competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be interpreted as a potential conflict of interest.

Funding

The authors declare that the research was conducted without external funding.

References

1. Tan HS, Cooter M, George RB, et al. A risk score for postoperative nausea and/or vomiting in women undergoing cesarean delivery with intrathecal morphine. Int J Obstet Anesth 44 (2020): 126-130.
2. Apfel CC, Läärä E, Koivuranta M, et al. A simplified risk score for predicting postoperative nausea and vomiting: conclusions from cross-validations between two centers. Anesthesiology 91 (1999): 693-700.
3. Schlesinger T, Meybohm P, Kranke P. Postoperative nausea and vomiting: risk factors, prediction tools, and algorithms. Curr Opin Anaesthesiol 36 (2023): 117-123.
4. Gan TJ, Meyer TA, Apfel CC, et al. Society for Ambulatory Anesthesia guidelines for the management of postoperative nausea and vomiting. Anesth Analg 105 (2007): 1615-1628.
5. Pierre S, Corno G, Benais H, Apfel CC. A risk score-dependent antiemetic approach effectively reduces postoperative nausea and vomiting—a continuous quality improvement initiative. Can J Anaesth 51 (2004): 320-325.
6. Jin Z, Daksla N, Gan TJ. Neurokinin-1 antagonists for postoperative nausea and vomiting. Drugs 81 (2021): 1171-1179.
7. De Oliveira GS, Castro-Alves LJS, Ahmad S, et al. Dexamethasone to prevent postoperative nausea and vomiting: an updated meta-analysis of randomized controlled trials. Anesth Analg 116 (2013): 58-74.
8. Dada SA, Fatungase OM, Osinaike BB, et al. Effect of single low-dose dexamethasone on peri-operative blood glucose levels. Ann Health Res 10 (2024): 253-263.
9. Bain CR, Draxler DF, Taylor R, et al. The early in-vivo effects of a single anti-emetic dose of dexamethasone on innate immune cell gene expression and activation in healthy volunteers. Anaesthesia 73 (2018): 955-966.
10. Babu GC, Chekka N, Kumar S, et al. A randomised controlled study evaluating the efficacy of dexamethasone in preventing post-operative nausea and vomiting and its effect on blood glucose. Indian J Anaesth Analg 6 (2019): 2077-2082.
11. Wang XX, Zhou Q, Pan DB, et al. Dexamethasone versus ondansetron in the prevention of postoperative nausea and vomiting in patients undergoing laparoscopic surgery: a meta-analysis of randomized controlled trials. BMC Anesthesiol 15 (2015): 118.
12. De Oliveira GS, Castro-Alves LJS, Ahmad S, et al. Dexamethasone to prevent postoperative nausea and vomiting: an updated meta-analysis of randomized controlled trials. Anesth Analg 116 (2013): 58-74.
13. Henzi I, Walder B, Tramèr MR. Dexamethasone for the prevention of postoperative nausea and vomiting: a quantitative systematic review. Anesth Analg 90 (2000): 186-194.
14. Sekhavat L, Davar R, Behdad S. Efficacy of prophylactic dexamethasone in prevention of postoperative nausea and vomiting. J Epidemiol Glob Health 5 (2015): 175-179.
15. Weibel S, Rücker G, Eberhart LH, et al. Drugs for

Njall PC, et al., Anesth Crit Care 2025
DOI:10.26502/acc.097

preventing postoperative nausea and vomiting in adults after general anaesthesia: a network meta-analysis. Cochrane Database Syst Rev 10 (2020): CD012859.

16. Korets J, Li F. Complications in anesthesia. In: Argalious M, Farag E, Sharma D, eds. Basic Sciences in Anesthesia. Cham: Springer Nature Switzerland (2024): 519-542.
17. Ingrande J, Lemmens HJM. Dose adjustment of anaesthetics in the morbidly obese. Br J Anaesth 105 (2010): i16-i23.
18. Zou Z, Jiang Y, Xiao M, et al. The impact of prophylactic dexamethasone on nausea and vomiting after thyroidectomy: a systematic review and meta-analysis. PLoS One 9 (2014): e109582.
19. Shaikh SI, Nagarekha D, Hegade G, et al. Postoperative nausea and vomiting: a simple yet complex problem. Anesth Essays Res 10 (2016): 388-396.
20. Gan TJ. Risk factors for postoperative nausea and vomiting. Anesth Analg 102 (2006): 1884-1898.

Citation: Njall Pouth Clotilde, Charles Emmanuel Toussaint Binam Bikoi, Serge Vivier Nga Nomo, Mbango-Ekouta Noel Désirée, Ebana Steve, Amengle ludovic, Binam Fidèle. Association Between Body Mass, Dexamethasone Antiemetic Prophylaxis, and the Occurrence of Postoperative Nausea and Vomiting. Anesthesia and Critical care 8 (2026): 25-29.