

Research Article

Intravenous Dexmedetomidine versus Dexmedetomidine-Dexamethasone Combination: A Comparative Study on Postoperative Nausea and Vomiting After Abdominal Surgeries

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ABSTRACT

Background: Postoperative nausea and vomiting (PONV) is a frequent problem after abdominal surgeries. It delays recovery and increases patient discomfort. Dexmedetomidine has some antiemetic effect due to sympathetic block. Dexamethasone is also a well-known antiemetic drug.

Objective: To compare the effect of intravenous dexmedetomidine versus dexmedetomidine-dexamethasone combination on PONV after abdominal surgeries.

Study Design: Comparative observational study.

Place and Duration: Khyber Medical University-Institute of Medical Sciences, DHQ Teaching Hospital KDA Kohat, Pakistan. Study duration was 6 months from July 2025 to December 2025.

Methodology: Total 120 patients were included using non-probability consecutive sampling. Patients were divided into two equal groups. Group A received dexmedetomidine alone. Group B received dexmedetomidine with dexamethasone. PONV was observed for 24 hours after surgery. Data were analyzed using SPSS 26. Chi-square and t-test were applied. P-value ≤ 0.05 was considered significant.

Results: Overall PONV was significantly lower in Group B (23.3%) compared to Group A (46.7%) with p value 0.008. Nausea in early period was 16.7% vs 33.3%. Vomiting incidence was 11.7% vs 30%. Moderate and severe PONV were also reduced in combination group. Duration of surgery and opioid use were similar in both groups. Previous studies also show dexmedetomidine reduces PONV by lowering opioid requirement and stress response, and dexamethasone improves antiemetic effect through central pathways.

Conclusion: Dexmedetomidine plus dexamethasone is more effective than dexmedetomidine alone in reducing PONV after abdominal surgery.

Keywords: PONV, Dexmedetomidine, Dexamethasone, Abdominal Surgery, Anesthesia.

INTRODUCTION

Postoperative nausea and vomiting (PONV) are one of the most common complications after surgery under general anesthesia [1]. It causes discomfort, delayed oral intake, dehydration, poor patient satisfaction, and longer hospital stay. Many patients consider nausea and vomiting more disturbing than postoperative pain [2]. Abdominal surgeries are commonly associated with higher risk of PONV because of

anesthetic drugs, opioid use, bowel handling, and surgical stress [3]. Female gender, non-smoking status, prolonged surgery, and postoperative opioid use are also known risk factors for PONV [4].

Different antiemetic drugs are used to reduce postoperative nausea and vomiting, but no single drug completely prevents this complication. Recently, dexmedetomidine has gained attention in anesthesia practice because

of its sedative, analgesic, and sympatholytic effects [5]. It is a selective alpha-2 adrenergic agonist that decreases sympathetic activity and reduces perioperative opioid requirement. Lower opioid use may help in reducing postoperative nausea and vomiting [6].

Dexamethasone is an antiemetic drug steroid in nature. It has strong anti-inflammatory action. It works on central and peripheral pathways of nausea control [7]. Studies have shown that dexamethasone effectively reduces nausea, vomiting, and postoperative antiemetic requirement after abdominal and laparoscopic surgeries [8].

Despite availability of these drugs, PONV still occurs in many patients. Single drug therapy is often not enough, especially in abdominal surgeries. Therefore, combination therapy is being explored to improve outcomes. Combination of dexmedetomidine and dexamethasone may provide dual mechanism protection by reducing both central stimulation and inflammatory response [9].

Limited local data is available comparing these two regimens in abdominal surgery patients. Therefore, this study was designed to compare intravenous dexmedetomidine alone versus dexmedetomidine with dexamethasone for prevention of PONV.

METHODOLOGY

This comparative observational study was conducted at Khyber Medical University-Institute of Medical Sciences, DHQ Teaching Hospital KDA Kohat, Pakistan, over a period of six months from July 2025 to December 2025. The study was designed and reported according to the STROBE guidelines for observational studies [10]. Ethical approval was obtained from the Institutional Research and Ethics Committee of Khyber Medical University-Institute of Medical Sciences under reference number KMU-IMS/ERC/25/071. Written informed consent was taken from all participants before inclusion in the study.

A total sample size of 120 patients was calculated using the expected reduction in postoperative nausea and vomiting incidence with combination therapy, keeping a confidence level of 95%, power of 80%, and assuming a moderate effect size. Patients were selected using non-probability consecutive sampling and then randomly allocated into two equal groups

of 60 each using computer-generated random numbers. Group A received intravenous dexmedetomidine alone, while Group B received dexmedetomidine combined with dexamethasone.

Adult patients aged 18 to 65 years of either gender, belonging to ASA physical status I to III, and scheduled for elective abdominal surgery under general anesthesia were included. Patients with known allergy to study drugs, chronic opioid use, preoperative antiemetic use, pregnancy, significant hepatic or renal dysfunction, history of motion sickness, psychiatric illness, or emergency surgeries were excluded. Potential confounders such as age, gender, smoking status, duration of surgery, and intraoperative opioid consumption were controlled through randomization and standardization of anesthesia protocol across both groups.

In Group A, dexmedetomidine was administered as a loading dose of 1 mcg/kg over 10 minutes followed by infusion at 0.5 mcg/kg/hour intraoperatively. In Group B, the same dexmedetomidine regimen was used along with a single dose of intravenous dexamethasone 8 mg given after induction of anesthesia. Postoperative nausea and vomiting was assessed at 0–6 hours and 6–24 hours using a simple clinical scoring system based on presence or absence of nausea, retching, or vomiting without use of any proprietary tool.

Data were analyzed using SPSS version 26.0. Continuous variables were presented as mean $\pm$ standard deviation and compared using independent sample t-test. Categorical variables, including incidence of nausea and vomiting, were analyzed using chi-square test. A p-value of less than 0.05 was considered statistically significant. Missing data were handled using intention-to-treat analysis, and patients with incomplete follow-up were included in final analysis based on last available observation.

RESULTS

A total of 120 patients were included in the final analysis, with 60 patients in each group. No patient was lost to follow-up or excluded after randomization. Both groups were comparable at baseline with no statistically significant differences in demographic or surgical variables (Table 1).

Table 1: Baseline Demographic and Clinical Characteristics of Patients

Variable	Group A (Dexmedetomidine) n=60	Group B (Dexmedetomidine + Dexamethasone) n=60	p-value
Age (years, mean $\pm$ SD)	42.8 $\pm$ 11.6	41.5 $\pm$ 10.9	0.54
Gender (Male/Female)	34 / 26	32 / 28	0.71
ASA I/II/III	18 / 30 / 12	20 / 28 / 12	0.88
BMI (kg/m ²)	26.3 $\pm$ 3.9	25.9 $\pm$ 4.1	0.62
Smokers (%)	18 (30%)	16 (26.7%)	0.68

Both groups were statistically comparable, and no significant difference was observed in baseline characteristics (Table 2).

Table 2: Intraoperative Variables

Variable	Group A (n=60)	Group B (n=60)	p-value
Duration of surgery (minutes)	118.4 $\pm$ 32.7	121.6 $\pm$ 30.9	0.59
Intraoperative opioid (Morphine equivalent mg)	12.6 $\pm$ 3.4	12.1 $\pm$ 3.1	0.43
Fluid administered (mL)	1850 $\pm$ 420	1900 $\pm$ 390	0.48

No significant differences were observed in intraoperative management between the two groups (Table 3).

Table 3: Incidence of Postoperative Nausea (0–24 hours)

Time Interval	Group A (n=60)	Group B (n=60)	p-value
0–6 hours	20 (33.3%)	10 (16.7%)	0.03
6–24 hours	15 (25.0%)	7 (11.7%)	0.04
Overall (0–24 h)	25 (41.7%)	12 (20.0%)	0.01

A significantly lower incidence of nausea was observed in the combination group compared to dexmedetomidine alone (Table 4).

Table 4: Incidence of Vomiting (0–24 hours)

Time Interval	Group A (n=60)	Group B (n=60)	p-value
0–6 hours	14 (23.3%)	6 (10.0%)	0.04
6–24 hours	10 (16.7%)	4 (6.7%)	0.09
Overall (0–24 h)	18 (30.0%)	7 (11.7%)	0.01

Vomiting episodes were significantly reduced in Group B, especially in the early postoperative period (Table 5).

Table 5: Overall Postoperative Nausea and Vomiting (PONV)

Outcome	Group A (n=60)	Group B (n=60)	p-value
Any PONV episode	28 (46.7%)	14 (23.3%)	0.008
No PONV	32 (53.3%)	46 (76.7%)	—

The combination therapy significantly reduced overall PONV compared to dexmedetomidine alone (Table 6).

Table 6: Severity of PONV (0–24 hours)

Severity	Group A (n=60)	Group B (n=60)	p-value
Mild (nausea only)	10 (16.7%)	7 (11.7%)	0.38
Moderate (nausea + 1 vomiting episode)	12 (20.0%)	5 (8.3%)	0.05
Severe (> 1 vomiting episode)	6 (10.0%)	2 (3.3%)	0.14

DISCUSSION

Postoperative nausea and vomiting (PONV) is one of the most common and distressing complications after abdominal surgeries [1]. It delays recovery, increases discomfort, and may

prolong hospital stay. In our study, we compared intravenous dexmedetomidine alone with dexmedetomidine plus dexamethasone combination [2]. The main aim was to see better control of PONV in both early and late

postoperative periods. Our results showed clear reduction in nausea, vomiting, and overall PONV in the combination group.

Both groups in our study were similar in age, gender, ASA status, BMI, smoking status, and surgical time. This shows that the difference in results is due to drug effect, not patient variation. This is important because PONV is influenced by many factors like female gender, smoking, and opioid use as shown in previous literature [11].

In our study, nausea incidence was significantly lower in the combination group in both 0–6 hours and 6–24 hours period. Vomiting episodes were also reduced, especially in early postoperative hours. Overall PONV was almost half in the combination group compared to dexmedetomidine alone. These findings are supported by published studies showing that dexmedetomidine reduces PONV by lowering sympathetic response and opioid requirement [12]. It also decreases perioperative opioid consumption, which is a known major risk factor for PONV [13]. This explains why both nausea and vomiting were less in our patients. When we compare dexmedetomidine alone with combination therapy, previous randomized studies also show similar results. A clinical trial on abdominal surgery patients reported that dexmedetomidine-dexamethasone combination reduces PONV more than dexmedetomidine alone, especially in laparoscopic and high-risk surgeries [14]. However, some studies also suggest that both regimens may be similar in low-risk patients [15]. The difference in our study may be due to better anti-inflammatory and central antiemetic effect of dexamethasone added to dexmedetomidine.

The reduction in early PONV (0–6 hours) in our study is clinically important. This early period is strongly linked with anesthetic drugs, opioids, and surgical stress. Dexmedetomidine reduces sympathetic tone and stabilizes hemodynamics, which helps in early recovery. Dexamethasone acts through central antiemetic pathways and reduces inflammatory mediators, which gives prolonged protection in late phase [16]. This dual mechanism explains better results in combination group.

CONCLUSION

Dexmedetomidine combined with dexamethasone is more effective than dexmedetomidine alone in reducing postoperative nausea and vomiting after abdominal surgeries. It significantly decreases both early and overall PONV. The combination

provides better patient comfort and should be preferred in high-risk surgical patients.

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