

COMPARISON OF SEDATIVE EFFECT OF PROPOFOL VERSUS DEXMEDETOMIDINE ON MEAN ARTERIAL PRESSURE AND HEART RATE IN MECHANICALLY VENTILATED PATIENTS AT A TERTIARY CARE HOSPITAL

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Abstract

Background: Sedation is essential in mechanically ventilated patients. Propofol, though commonly used, may affect MAP and HR, while dexmedetomidine offers more stable hemodynamics. Due to conflicting evidence, this study compared their effects in ICU patients at a tertiary care hospital.

Objective: To compare mean arterial pressure and heart rate between propofol versus dexmedetomidine in mechanically ventilated patients at a tertiary care hospital.

Duration: Six months w.e.f. 08-10-2024 to 07-04-2025.

Methodology: Following approval from ethical review committee, 60 postoperative ICU patients at Sir Ganga Ram Hospital, Lahore, were enrolled after informed consent and randomly assigned into two groups using the lottery method: Group A (Dexmedetomidine, n=30) and Group B (Propofol, n=30). Sedation began when patients were arousable, using continuous infusion for 24 hours, administered by the same staff. Data were recorded consistently to minimize bias and ensure accurate comparisons.

Results: This study involved 60 patients with comparable baseline characteristics. Dexmedetomidine consistently resulted in higher mean arterial pressure and lower heart rate compared to propofol at various time intervals. While differences were statistically significant, subgroup analyses lacked consistent significance due to the limited sample size.

Conclusion: This study concluded that dexmedetomidine provided better hemodynamic stability than propofol in mechanically ventilated patients, as it consistently showed higher mean arterial pressure and lower heart rate at multiple time intervals following sedation, compared to the propofol group.

INTRODUCTION

More than 300 million surgical procedures are performed globally each year, the majority of which are conducted under general anesthesia and often involve endotracheal intubation. While most

patients are extubated immediately after surgery, some remain intubated unexpectedly and are transferred to the postanesthesia care unit (PACU) still intubated.¹ Certain patients may require short-

term mechanical ventilation, especially if they received excessive opioids or neuromuscular blocking agents during surgery. In such cases, extubation can be performed in the PACU.² However, patients with significant intraoperative complications like major bleeding, metabolic imbalances, or cardiac/neurological injuries require extended respiratory support and are typically transferred to the intensive care unit (ICU) for continuous monitoring.³ Intensive care represents a significant portion of healthcare costs, with mechanical ventilation being a major contributor to these expenses.⁴

To ensure patient safety, mechanical ventilation (MV) is often necessary for ICU patients. It involves endotracheal intubation, either through the nose or mouth, to replace spontaneous breathing and maintain airway patency.⁵ MV is crucial for preventing hypoxic injuries and carbon dioxide accumulation, which could lead to severe respiratory complications. Monitoring mean arterial pressure (MAP) and heart rate (HR) during MV is essential for assessing cardiovascular function and organ perfusion.⁶ Propofol, a well-known short-acting anesthetic, and dexmedetomidine, an α_2 -adrenoreceptor agonist approved by the FDA in 1999 for ICU sedation, are commonly used to manage sedation and hemodynamic stability in these patients.^{6,7}

Elbegably et al. in Egypt while comparing dexmedetomidine with propofol reported significantly higher MAP (98.2 ± 0.27 vs. 93.9 ± 8.29 mmHg; $p=0.02$) and significantly less heart rate (89.45 ± 11.24 vs. 97.45 ± 9.41 beats/min; $p=0.019$), respectively.⁷ Likewise were results of Patil et al. in India for HR (69.45 ± 1.66 vs. 78.87 ± 3.30 beats/min; $p=0.000$) between the groups.⁸

In the light of above studies, dexmedetomidine appears superior than propofol in providing significantly higher MAP and significantly less HR and hence, the same should be advocated. But prior to this, it is imperative to see another study that has reported otherwise. Akram et al. in Pakistani while comparing dexmedetomidine with propofol reported significantly less MAP (69.5 ± 4.12 vs. 79.4 ± 4.52 mmHg; $p=0.02$) significantly less heart rate (77.59 ± 7.55 vs. 86.58 ± 3.98 beats/min; $p=0.00$), respectively.⁹ Likewise, Chang et al. in Taiwan

reported significantly less MAP (81 vs. 91 mmHG, mean SD not given; $p<0.001$) and significantly less heart rate (74.5 ± 3.65 vs. 89.7 ± 5.24 beats/min; $p=0.000$) in dexmedetomidine than propofol.¹⁰

The above data⁷⁻¹⁰ was not conclusive and contained controversy, requiring further confirmation. Therefore, this study aimed to determine whether dexmedetomidine was significantly better than propofol in providing better hemodynamics and would play a vital role in future practice.

METHODOLOGY

This study was a randomized controlled trial conducted at the Department of Anaesthesia, Sir Ganga Ram Hospital, Lahore, over a 6-month period following the approval of the research synopsis. The sample size was determined to be 60 patients, with 30 patients in each group, based on an expected mean arterial pressure (MAP) of 98.2 ± 0.27 mmHg for the dexmedetomidine group and 93.9 ± 8.29 mmHg for the propofol group, using a power of 80% and a 5% significance level.⁷ A non-probability consecutive sampling technique was used for patient selection. Inclusion criteria for the study were patients of both genders, aged 18-65 years, with an ASA status of I or II, who required mechanical ventilation in the ICU following surgery. Patients with severe systemic diseases such as renal failure, respiratory illnesses, liver dysfunction, psychological disorders, or left ventricular ejection fraction $<40\%$, fractional shortening of the left ventricle $<20\%$, allergies to study drugs (propofol or dexmedetomidine), or those receiving vasodilators or inotropes were excluded from the study.

After obtaining approval from the Hospital's Ethical Review Board, 60 patients who met the inclusion criteria and required mechanical ventilation were enrolled. Informed consent was obtained from the patients' guardians. The patients were randomly assigned into two groups using a lottery method: Group A (dexmedetomidine group) and Group B (propofol group), with 30 patients in each group. All patients received routine postoperative care. Once the patients became arousable and had a Richmond Agitation-Sedation Scale (RASS) score of greater than 0, the study interventions began. The dexmedetomidine group received a continuous intravenous infusion of dexmedetomidine (Precedex;

Hospira) at a dose ranging from 0.1 to 0.7 mcg/kg/h, while the propofol group received a continuous intravenous infusion of propofol (Propofol-Lipuro 1%; B. Braun, Germany) at a dose ranging from 0.3 to 1.6 mg/kg/h. To minimize rapid hemodynamic fluctuations, no loading doses were administered. The infusion rate was titrated to achieve a RASS score of 0 to -2, and the infusion continued for up to 24 hours. After 24 hours, the primary intensivists selected the sedative. If any patient experienced severe bradycardia (heart rate <50 bpm for more than 5 minutes) or any other critical event, they were withdrawn from the study and provided standard care. Data analysis was performed using SPSS version 17. Numerical variables like age, BMI, MAP, and heart rate were presented as mean \pm SD, while categorical variables (ASA status, gender, surgical procedure, shivering, and adverse events) were presented as frequency and percentage. Independent sample t-tests were used to compare MAP and heart rate between the groups at various intervals, with a significance level of $p \leq 0.05$. Stratification of MAP and heart rate was done based on age, BMI, ASA status, and surgical procedure, and post-stratification independent sample t-tests were performed.

RESULTS

The study included a total of 60 participants. The mean age of the participants was 38.90 ± 12.63 years. Among them, 34 (56.7%) were in the 18–40 years age group, and 26 (43.3%) were in the 41–65 years group. In terms of gender distribution, 19 (31.7%) were male, and 41 (68.3%) were female. The mean BMI of the participants was 26.29 ± 3.50 kg/m². Based on BMI classification, 25 (41.7%) were of normal weight, while 35 (58.3%) were classified as overweight or obese. Regarding the type of surgical procedure, 19 (31.7%) underwent laparotomy, 11 (18.3%) had hysterectomy, 9 (15.0%) underwent open cholecystectomy, 11 (18.3%) had spinal decompression, and 10 (16.7%) underwent thyroidectomy. Data is given in Table 1.0. Moreover, all the patients in this study had ASA-II status. Both the groups were comparable for all baseline values as given in Table 2.0 and 3.0.

Comparison of mean MAP between the groups at various time intervals revealed statistically significant

differences at multiple points post-sedation. At baseline (0 hours before sedation), the mean MAP was comparable between the groups (Group A: 98.77 ± 5.55 mmHg vs. Group B: 98.23 ± 4.56 mmHg; $p = 0.686$). However, from 30 minutes onward, Group A consistently showed higher mean MAP values compared to Group B. At 30 minutes, the mean MAP was 91.07 ± 5.69 mmHg in Group A and 87.63 ± 4.32 mmHg in Group B ($p = 0.011$). At 1 hour, it was 87.03 ± 5.44 mmHg in Group A and 83.70 ± 4.62 mmHg in Group B ($p = 0.013$). This trend continued at 2 hours (85.50 ± 5.72 vs. 82.23 ± 4.28 mmHg; $p = 0.015$), 3 hours (86.17 ± 6.34 vs. 82.80 ± 4.65 mmHg; $p = 0.023$), 4 hours (85.40 ± 6.44 vs. 82.27 ± 4.69 mmHg; $p = 0.035$), 5 hours (86.40 ± 6.65 vs. 82.63 ± 5.43 mmHg; $p = 0.019$), 12 hours (87.03 ± 6.68 vs. 83.00 ± 5.94 mmHg; $p = 0.017$), and 24 hours (89.50 ± 6.60 vs. 85.20 ± 6.21 mmHg; $p = 0.012$) as given in Table 3.0.

Comparison of mean HR between the groups at various time intervals showed statistically significant differences at several points post-sedation. At baseline (0 hours before sedation), the mean HR was comparable between the groups (Group A: 90.50 ± 6.81 bpm vs. Group B: 92.13 ± 6.92 bpm; $p = 0.361$). At 30 minutes, Group A demonstrated a significantly lower mean HR (83.20 ± 7.05 bpm) compared to Group B (88.47 ± 6.79 bpm; $p = 0.005$). This trend persisted at 1 hour (79.00 ± 7.10 vs. 84.57 ± 6.90 bpm; $p = 0.003$), 2 hours (78.43 ± 7.54 vs. 84.03 ± 7.51 bpm; $p = 0.006$), 3 hours (77.47 ± 8.00 vs. 82.13 ± 8.81 bpm; $p = 0.036$), 4 hours (78.80 ± 7.53 vs. 83.87 ± 7.28 bpm; $p = 0.010$), and 5 hours (80.40 ± 7.56 vs. 85.23 ± 7.12 bpm; $p = 0.014$). Although Group A continued to show lower mean HR at 12 hours (84.93 ± 7.62 vs. 88.50 ± 7.26 bpm; $p = 0.069$) and 24 hours (85.87 ± 7.53 vs. 89.30 ± 7.47 bpm; $p = 0.082$), these differences were not statistically significant, Table 4.0.

Stratification of mean MAP and HR at all the intervals after sedation produced similar results between the groups but statistical significance at all the intervals could not be achieved due to small sample size in sub groups.

Table 1.0 Baseline Characteristics of Study Sample

Characteristics	Study Sample n=60
Age (years)	38.90±12.63
• 18-40 years	34 (56.7%)
• 41-65 years	26 (43.3%)
Gender	
• Male	19 (31.7%)
• Female	41 (68.3%)
BMI (kg/m ²)	26.29±3.50
• Normal Weight	25 (41.7%)
• Overweight/Obese	35 (58.3%)
Surgical Procedure	
• Laparotomy	19 (31.7%)
• Hysterectomy	11 (18.3%)
• Open Cholecystectomy	9 (15.0%)
• Spinal Decompression	11 (18.3%)
• Thyroidectomy	10 (16.7%)

Table 2.0 Comparison of Baseline Characteristics between the Groups at Baseline

Characteristics	Group A n=30	Group B n=30	p-value
Age (years)	38.70±13.25	39.10±12.20	0.904
• 18-40 years	16 (53.3%)	18 (60.0%)	0.602
• 41-65 years	14 (46.7%)	12 (40.0%)	
Gender			
• Male	8 (26.7%)	11 (36.7%)	0.405
• Female	22 (73.3%)	19 (63.3%)	
BMI (kg/m ²)	26.48±3.24	26.11±.78	0.683
• Normal Weight	11 (36.7%)	14 (46.7%)	0.432
• Overweight/Obese	19 (63.3%)	16 (53.3%)	
Surgical Procedure			
• Laparotomy	12 (40.0%)	7 (23.3%)	0.109
• Hysterectomy	8 (26.7%)	3 (10.0%)	
• Open Cholecystectomy	4 (13.3%)	5 (16.7%)	
• Spinal Decompression	3 (10.0%)	8 (26.7%)	
• Thyroidectomy	3 (10.0%)	7 (23.3%)	

Independent Sample t test /Chi Square test, taking p-value ≥0.05 as insignificant

Table 3.0 Comparison of Mean MAP between the Groups at Various Time Intervals

Time Interval	Study Group	N	Mean	Std. Deviation	p-value
At 0hrs before sedation	Group A	30	98.77	5.55	0.686
	Group B	30	98.23	4.56	
At 30m	Group A	30	91.07	5.69	0.011

	Group B	30	87.63	4.32	
At 1hr	Group A	30	87.03	5.44	0.013
	Group B	30	83.70	4.62	
At 2hr	Group A	30	85.50	5.72	0.015
	Group B	30	82.23	4.28	
At 3hr	Group A	30	86.17	6.34	0.023
	Group B	30	82.80	4.65	
At 4hr	Group A	30	85.40	6.44	0.035
	Group B	30	82.27	4.69	
At 5hr	Group A	30	86.40	6.65	0.019
	Group B	30	82.63	5.43	
AT 12hr	Group A	30	87.03	6.68	0.017
	Group B	30	83.00	5.94	
At 24hr	Group A	30	89.50	6.60	0.012
	Group B	30	85.20	6.21	

Independent Sample t test, taking p-value ≤ 0.05 as significant

Table 4.0 Comparison of Mean HR between the Groups at Various Time Intervals

Time Interval	Study Group	N	Mean	Std. Deviation	p-value
At 0hrs before sedation	Group A	30	90.50	6.81	0.361
	Group B	30	92.13	6.92	
At 30m	Group A	30	83.20	7.05	0.005
	Group B	30	88.47	6.79	
At 1hr	Group A	30	79.00	7.10	0.003
	Group B	30	84.57	6.90	
At 2hr	Group A	30	78.43	7.54	0.006
	Group B	30	84.03	7.51	
At 3hr	Group A	30	77.47	8.00	0.036
	Group B	30	82.13	8.81	
At 4hr	Group A	30	78.80	7.53	0.010
	Group B	30	83.87	7.28	
At 5hr	Group A	30	80.40	7.56	0.014
	Group B	30	85.23	7.12	
AT 12hr	Group A	30	84.93	7.62	0.069
	Group B	30	88.50	7.26	
At 24hr	Group A	30	85.87	7.53	0.082
	Group B	30	89.30	7.47	

Independent Sample t test, taking p-value ≤ 0.05 as significant

DISCUSSION

Sedation in mechanically ventilated patients is critical for comfort and safety.^{11,12} Propofol, commonly used for sedation, can affect mean arterial pressure (MAP) and heart rate, raising concerns in critically ill patients. Dexmedetomidine, a newer

sedative, offers sedation with less impact on cardiovascular stability.¹²⁻¹⁶ However, existing literature presents conflicting results regarding their comparative effects on MAP and heart rate.⁷⁻¹⁰ This study was planned to compare the sedative effects of propofol and dexmedetomidine on MAP and heart

rate in mechanically ventilated patients at a tertiary care hospital.

This study included 60 participants with a mean age of 38.90 ± 12.63 years. Of these, 34 (56.7%) were aged 18–40 years, and 26 (43.3%) were aged 41–65 years. The majority were female (68.3%), with 31.7% male. The mean BMI was 26.29 ± 3.50 kg/m², with 58.3% classified as overweight or obese. Surgical procedures included laparotomy (31.7%), hysterectomy (18.3%), open cholecystectomy (15%), spinal decompression (18.3%), and thyroidectomy (16.7%). Both groups were comparable for baseline characteristics. Significant differences were found in mean MAP and HR at multiple time points, with dexmedetomidine showing better hemodynamic stability than propofol. However, statistical significance was limited in subgroup comparisons due to small sample sizes.

The comparison of findings in this study with existing literature reveals varying results regarding the hemodynamic effects of dexmedetomidine and propofol in mechanically ventilated patients. Elgebaly et al. found no significant differences between the two groups regarding age, body mass index, and respiratory parameters. However, they observed that the propofol group had lower MAP and heart rate compared to the dexmedetomidine group. Additionally, they highlighted that dexmedetomidine led to reduced requirements for midazolam and fentanyl, with significant financial savings, emphasizing its potential benefit in cost-effective sedation.⁷

Similarly, Akram et al. reported significant differences in mean arterial pressure (MAP) between the two sedatives. Specifically, the MAP in the dexmedetomidine group at 15, 30, 45, and 60 minutes after induction of anesthesia was consistently lower compared to the propofol group. This group concluded that dexmedetomidine caused relatively smaller fluctuations in MAP and heart rate compared to propofol, especially in patients undergoing coronary artery bypass grafting (CABG).⁹ Patil et al. compared sedation levels and ventilator duration between the two drugs, finding no significant differences. However, they noted that the dexmedetomidine group had lower heart rates and significantly reduced analgesic requirements. They concluded that both dexmedetomidine and propofol

are safe and effective sedatives in ICU patients undergoing off-pump coronary artery bypass (OPCAB) but recommended dexmedetomidine for its superior effect on heart rate and analgesic reduction.⁸

Srivastva et al. found a notable decrease in heart rate after dexmedetomidine infusion, although no significant difference was observed between propofol and midazolam groups. While MAP significantly decreased from baseline in all groups post-infusion, post-extubation MAP did not differ significantly. They concluded that dexmedetomidine is as effective as propofol in neurosurgical patients, offering better hemodynamic stability and a rapid extubation time, similar to propofol. Additionally, dexmedetomidine reduced postoperative fentanyl requirements.¹⁶

Wanat et al. focused on the length of mechanical ventilation, finding a shorter duration in the dexmedetomidine group (7.4 hours vs. 12.9 hours), suggesting that dexmedetomidine may lead to faster recovery. However, no significant differences were found between the groups regarding ICU or hospital length of stay, incidence of delirium, or mortality.¹⁷

Hughes et al. studied the impact of light sedation in sepsis patients, finding no difference in outcomes between those receiving dexmedetomidine and propofol.¹⁸ Similarly, Rashwan et al. concluded that both drugs were effective in maintaining sedation without major hemodynamic complications in postoperative ICU patients.¹⁹

Finally, Chang et al. concluded that there were no significant differences in cardiac index between the two drugs. Although the incidence of bradycardia, hypotension, and severe low cardiac index was similar, both drugs proved to be effective in maintaining adequate sedation.¹⁰

CONCLUSION

This study concluded that dexmedetomidine provided better hemodynamic stability than propofol in mechanically ventilated patients, as it consistently showed higher mean arterial pressure and lower heart rate at multiple time intervals following sedation, compared to the propofol group.

LIMITATIONS & RECOMMENDATIONS

This study had several strengths, including a randomized controlled design and well-matched baseline characteristics between groups, which enhanced internal validity. It provided valuable insights into the comparative effects of dexmedetomidine and propofol on hemodynamic parameters in mechanically ventilated patients. However, the limited sample size reduced the power to detect significant differences in subgroup analyses. Future studies with larger, multicenter samples are recommended to confirm these findings and explore long-term outcomes, cost-effectiveness, and broader patient populations for improved clinical guidance.

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Authors Contribution

Author 1

Substantial contributions to study design, acquisition of data.

Analysis & interpretation of data, manuscript writing.

Has given final approval of the version to be published.

Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Author 2

Substantial contributions to concept, study design.

Data Analysis, manuscript writing, critical review.

Has given final approval of the version to be published.

Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

Magor R, Dabush-Elisha I, Aviram D, Karol D, Syn-Hershko A, Schwartz R, et al. In-hospital mortality of patients requiring unplanned postoperative ventilatory support: a multicenter observational study. *Perioper Med (Lond)*. 2022;11(1):1-7.

Palacios DC, Silva JA, Sarmento AF, Sierra MG. Mean arterial pressure and outcomes in critically ill patients: is there a difference between high and low target?. *Rev Assoc Med Bras*. 2023;69(6):e20230162.

White KC, Quick L, Durkin Z, McCullough J, Laupland KB, Blank S, et al. Mean arterial pressure in critically ill adults receiving vasopressors: a multicentre, observational study. *Crit Care Resusc*. 2025;27(1):100103.

Santer P, Zheng S, Hammer M, Nabel S, Pannu A, Li Y, et al. Ventilatory frequency during intraoperative mechanical ventilation and postoperative pulmonary complications: a hospital registry study. *Br J Anesth*. 2020;125(1):e130-9.

Partain KN, Mpody C, Rodgers B, Kenney B, Tobias JD, Nafiu OO. Prolonged postoperative mechanical ventilation (PPMV) in children undergoing abdominal operations: an analysis of the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. *J Pediatr Surg* 2021;56(6):1114-9.

Zhao C, Huang M, Wang B, Zhong H, Meng W. Influence of dexmedetomidine on diaphragm function and postoperative outcomes in ICU patients with mechanical ventilation. *Evid Based Complement Alternat Med*. 2021;2021:1-8.

Elgebaly AS, Sabry M. Sedation effects by dexmedetomidine versus propofol in decreasing duration of mechanical ventilation after open heart surgery. *Ann Card Anaesth*. 2018;21(3):235.

Patil VP, Abraham J, George GM. Comparing dexmedetomidine and propofol for sedation and hemodynamic stability in cardiothoracic intensive care unit for patients following offpump coronary artery bypass graft surgery. *Int J Basic Clin Pharmacol*. 2021;10:153-9.

Akram MA, Bukhari SS, Khurshid H, Chaudhry IA, Naseer M. Comparison of effects of propofol and dexmedetomidine on patient hemodynamics during coronary artery bypass graft surgery. *Pak Armed Forces Med J* 2021;71(2):353-56.

- Chang YF, Chao A, Shih PY, Hsu YC, Lee CT, Tien YW, et al. Comparison of dexmedetomidine versus propofol on hemodynamics in surgical critically ill patients. *J Surg Res.* 2018;228:194-200.
- Farrukh R, Mehreen M, Qurban F, Ather S, Rizwan A, Ovais F. Comparative evaluation of effects of propofol and ketamine versus dexmedetomidine and ketamine on blood pressure, heart rate and recovery of patients undergoing dilatation and curettage: effects of propofol and ketamine versus dexmedetomidine and ketamine in patients. *Pak J Health Sci.* 2024;7(5):174-9.
- Motes A. Monitoring sedation during mechanical ventilation. *Southwest Respir Crit Care Chron.* 2022;10(45):19-27.
- Farmawy MS, Othman HA, Saada AM, Awadalla AM. Effect of dexmedetomidine versus propofol sedation on the cerebral blood flow velocity and cerebral metabolic rate of oxygen in patients with traumatic brain injuries. *Zagazig Uni Med J.* 2025;31(1):473-83.
- Ibrahim AM, ElSharkawy MS, Abdelrahman RK, Hassan AE, Saad MG, Elzoughari IA, et al. Comparing the sedative effect of dexmedetomidine and propofol in mechanically ventilated patients using Salivary Alpha-Amylase as a stress marker: a randomized open-label trial. *Anesthesiol Pain Med.* 2024;14(5):e149364.
- Heybati K, Zhou F, Ali S, Deng J, Mohananeey D, Villablanca P, et al. Outcomes of dexmedetomidine versus propofol sedation in critically ill adults requiring mechanical ventilation: a systematic review and meta-analysis of randomised controlled trials. *Br J Anaesth.* 2022;129(4):515-26.
- Srivastava VK, Agrawal S, Kumar S, Mishra A, Sharma S, Kumar R. Comparison of dexmedetomidine, propofol and midazolam for short-term sedation in postoperatively mechanically ventilated neurosurgical patients. *J Clin Diagn Res.* 2014;8(9):4-7.
- Wanat M, Fitousis K, Boston F, Masud F. Comparison of dexmedetomidine versus propofol for sedation in mechanically ventilated patients after cardiovascular surgery. *Methodist DeBakey Cardiovas J.* 2014;10(2):111-7.
- Hughes CG, Mailloux PT, Devlin JW, Swan JT, Sanders RD, Anzueto A, et al. Dexmedetomidine or propofol for sedation in mechanically ventilated adults with sepsis. *New Engl J Med.* 2021;384(15):1424-36.
- Rashwan S, Mahmoud HE, Taha Z. Safety and efficacy of dexmedetomidine, ketofol, and propofol for sedation of mechanically ventilated patients. *J Intensive Crit Care.* 2016;4(4):1-9.

