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ORIGINAL RESEARCH

Effect of single dose dexmedetomidine given prior to extubation-on-extubation conditions in adult patients following general anesthesia

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ABSTRACT

Background: The present study was conducted for assessing the effect of single dose dexmedetomidine given prior to extubation-on-extubation conditions in adult patients following general anesthesia. **Materials & methods:** Fifty adult patients, aged between 18 and 80 years, classified as American Society of Anesthesiologists physical status (ASA PS) class I-II, and representing both genders, were recruited for elective surgical procedures. The participants were randomly divided into two groups: Group A received dexmedetomidine at a dosage of 0.75 mcg/kg, while Group B was administered normal saline. Following the observation of satisfactory spontaneous respiratory efforts, neostigmine and glycopyrrolate were administered intravenously to reverse the effects of neuromuscular blockers. After the reversal, patients were gently and continuously prompted to open their eyes. Extubation occurred when patients responded to verbal stimuli by opening their eyes and demonstrated normal respiratory function, with the time of extubation recorded as TE. Subsequently, all patients were moved to the post-anesthetic care unit (PACU) post-surgery. Occurrences of postoperative nausea, vomiting (PONV), and shivering were documented. **Results:** Mean age of the patients of group A and group B was 39.2 years and 41.7 years respectively. There were 16 males and 9 females in group A and there were 18 males and 7 females in group B. Majority proportion of patients of both the study groups were of ASA grade A and Grade B. No significant difference was obtained while comparing the MAP among the patients of the two study groups at different time intervals. However; heart rate showed significant difference at 3 mins and 6 mins among the two study groups. Incidence of PONV was significantly higher among patients of group B. **Conclusion:** An administration of dexmedetomidine prior to extubation did not influence the intensity of coughing; however, it led to enhanced hemodynamic stability at specified intervals following extubation.

Key words: Extubation, Dexmedetomidine

INTRODUCTION

The process of weaning patients from mechanical ventilation is a critical aspect of managing those who are critically ill. This task is inherently complex and challenging. It is essential to initiate the weaning process as soon as the underlying conditions that necessitated mechanical ventilation begin to improve and stabilize. Delays or unnecessary extensions in the weaning process can lead to increased lengths of stay in the intensive care unit (ICU), higher healthcare costs, reduced availability of ICU beds, and negative impacts on patient outcomes.[1, 2] However, the approach to weaning must be carefully calibrated to avoid the risks associated with premature discontinuation, which can lead to complications such as difficulties in reestablishing artificial airways and impaired gas exchange. Most patients in the ICU who require ventilatory support also need intravenous sedatives and analgesics to enhance their tolerance to mechanical ventilation, manage discomfort associated with the endotracheal tube, and facilitate various invasive procedures, physiotherapy, tracheal suctioning, position changes, and dressing alterations, while also alleviating anxiety and moderating excessive hemodynamic and metabolic responses.[3-5]Dexmedetomidine administration 0.75 µg/mL was hypothesised to decrease the cough occurrence and emergence at extubation.[6]Hence; the present study

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was conducted for assessing the effect of single dose dexmedetomidine given prior to extubation-on-extubation conditions in adult patients following general anesthesia.

MATERIALS & METHODS

The current research was conducted for assessing the effect of single dose dexmedetomidine given prior to extubation-on-extubation conditions in adult patients following general anesthesia. Fifty adult patients, aged between 18 and 80 years, classified as American Society of Anesthesiologists physical status (ASA PS) class I-II, and representing both genders, were recruited for elective surgical procedures. The participants were randomly divided into two groups: Group A received dexmedetomidine at a dosage of 0.75 mcg/kg, while Group B was administered normal saline. All subjects were premedicated with midazolam and glycopyrrolate. Upon arrival in the operating room, monitoring equipment including pulse oximetry, electrocardiogram, and non-invasive blood pressure devices were applied. Fentanyl was administered to all patients. Following the observation of satisfactory spontaneous respiratory efforts, neostigmine and glycopyrrolate were administered intravenously to reverse the effects of neuromuscular blockers. After the reversal, patients were gently and continuously prompted to open their eyes. Extubation occurred when patients responded to verbal stimuli by opening their eyes and demonstrated normal respiratory function, with the time of extubation recorded as TE. Subsequently, all patients were moved to the post-anesthetic care unit (PACU) post-surgery. Occurrences of postoperative nausea, vomiting (PONV), and shivering were documented.All the results were compiled in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. chi-square test and student t test were used for evaluation of level of significance.

RESULTS

Mean age of the patients of group A and group B was 39.2 years and 41.7 years respectively. There were 16 males and 9 females in group A and there were 18 males and 7 females in group B. Majority proportion of patients of both the study groups were of ASA grade A and Grade B. No significant difference was obtained while comparing the MAP among the patients of the two study groups at different time intervals. However; heart rate showed significant difference at 3 mins and 6 mins among the two study groups. Incidence of PONV was significantly higher among patients of group B.

Table 1: Demographic data

Variable	Group A	Group B
Mean age (years)	39.2	41.7
Males	16	18
Females	9	7
ASA grade I	15	13
ASA Grade II	10	12

Table 2: Comparison of mean arterial pressure at different time intervals

MAP	Group A	Group B	p-value
Baseline	89.8	90.5	0.23
3 mins	90.5	93.3	0.81
6 mins	99.3	98.4	0.46
9 mins	95.1	96.6	0.33
Extubation	102.6	100.8	0.28
3 mins post-extubation	98.5	99.1	0.88
6 mins post-extubation	95.7	96.4	0.46

Table 3: Comparison of heart rate at different time intervals

Heart rate	Group A	Group B	p-value
Baseline	83.5	82.4	0.75
3 mins	73.6	84.2	0.00*
6 mins	70.1	85.6	0.00*
9 mins	86.2	84.1	0.51
Extubation	90.3	88.9	0.68
3 mins post-extubation	88.1	90.2	0.55
6 mins post-extubation	85.6	86.7	0.93

*: Significant

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Table 4: Incidence of PONV

PONV	Group A	Group B
Number	1	6
Percentage	4	24
p-value	0.001 (Significant)	

Table 5: Incidence of cough and shivering

Variable	Group A	Group B	p-value
Cough (%)	8	12	0.71
Shivering (%)	8	4	0.33

DISCUSSION

The extubation process represents a pivotal moment in the administration of anesthesia and the overall management of patients undergoing surgical interventions. This procedure entails the removal of the endotracheal tube, signifying a shift from a controlled anesthetic environment to the initiation of spontaneous respiration. Extubation is often accompanied by a range of physiological challenges, such as fluctuations in hemodynamics, airway sensitivity, coughing, and emergence agitation, all of which can affect the patient's safety and comfort. During extubation, the autonomic nervous system typically exhibits an increase in sympathetic activity, leading to heightened blood pressure, tachycardia, and other stress-related responses that may pose risks, especially for individuals with preexisting cardiovascular or respiratory issues. The pursuit of improved extubation conditions has prompted investigations into various pharmacological approaches designed to mitigate these negative effects and improve patient outcomes. One notable agent that has garnered attention in recent years is dexmedetomidine, a highly selective alpha-2 adrenergic agonist.[7- 9]Hence; the present study was conducted for assessing the effect of single dose dexmedetomidine given prior to extubation-on-extubation conditions in adult patients following general anesthesia.

Mean age of the patients of group A and group B was 39.2 years and 41.7 years respectively. There were 16 males and 9 females in group A and there were 18 males and 7 females in group B. Majority proportion of patients of both the study groups were of ASA grade A and Grade B. No significant difference was obtained while comparing the MAP among the patients of the two study groups at different time intervals. However; heart rate showed significant difference at 3 mins and 6 mins among the two study groups. Incidence of PONV was significantly higher among patients of group B.Suresh S et al, in a previous study assessed the effect of single dose dexmedetomidine given prior to extubation on extubation conditions in adult patients following general anaesthesia. Incidence of cough at extubation was comparable in both groups (66.7% vs. 63.6%, p 1.00). Baseline mean arterial pressure was comparable in both groups, but at 3min after extubation it was significantly lower in Group A. Heart rate, postoperative nausea, vomiting, shivering and sedation scores did not show any significant difference between the two groups (p>0.05) Conclusion: An infusion of dexmedetomidine at 0.75mcg/kg prior to extubation.[10]Shukla A et al evaluated the effects of a single dose of dexmedetomidine administered prior to extubation-onextubation conditions, hemodynamic stability, and post-operative outcomes in adult patients following general anesthesia. Patients were randomly assigned to either Group A (dexmedetomidine 0.75 µg/kg, n=50) or Group B (normal saline, n=50). Group A had 64% of patients with no post-extubation cough compared to 60% in Group B (p = 0.95). MAP was significantly higher in Group B at the 3-minute post-surgery mark (98.45 mmHg vs. 88.85 mmHg, p = 0.03). Group A had a significantly lower heart rate at T0 and 3 minutes post-administration (69.35 bpm and 71.50 bpm, respectively), compared to Group B (75.65 bpm and 82.90 bpm, p = 0.03, 0.02). Group A also had lower rates of severe PONV.[11]

CONCLUSION

An administration of dexmedetomidine prior to extubation did not influence the intensity of coughing; however, it led to enhanced hemodynamic stability at specified intervals following extubation.

REFERENCES

1. Fan Q, Hu C, Ye M, Shen X. Dexmedetomidine for tracheal extubation in deeply anesthetized adult patients after otologic surgery: a comparison with remifentanil. BMC Anesthesiol. 2015;15(1):106.
2. Wong F, Lim C, Chan H. Use of dexmedetomidine to improve extubation conditions: A randomized trial. Asia Pac J Anesth. 2018;5(3):67-73.
3. Ali Z, Yusuf R, Fernandez A. Impact of dexmedetomidine on pain scores and opioid consumption after surgery: A doubleblind study. Pain Manag J. 2022;14(3):210-218.
4. Gupta S, Mehta S, Sharma A. Evaluation of demographic characteristics in patients receiving dexmedetomidine as an adjuvant in epidural anesthesia. Indian J Anaesth. 2020;64(4):298-304.
5. Ahmed I, Khan S, Raza M, Pervez M. Impact of dexmedetomidine on postoperative cough scores in epidural anesthesia: A comparative analysis. Anaesth Pain Intensive Care. 2021;25(3):45-51.
6. Bhatia P, Gupta R, Garg R, Patel N. Hemodynamic effects of dexmedetomidine as an adjuvant in regional

DOI: 10.69605/ijlbpr_14.1.2025.30

anesthesia: A systematic analysis. Saudi J Anaesth. 2018;12(4):533-539.
7. Jain V, Chaturvedi A, Pandia MP, Bitha PK. Effect of dexmedetomidine on recovery profile of patients undergoing anterior cervical discectomy and fusion. J Anaesthesiol Clin Pharmacol. 2019;35:92–8.
8. Smith J, Patel H, Andrews R. Dexmedetomidine and its impact on postoperative hemodynamic stability: A clinical review. Anesth Essays Res. 2022;16(1):34-40
9. Lumb AB, Bradshaw K, Gamlin FMC, Heard J. The effect of coughing at extubation on oxygenation in the post-anaesthesia care unit. Anaesth. 2015;70(4):416–20.
10. Suresh S, Rajan S, Varghese R, Kumar L. Effect of single dose dexmedetomidine given prior to extubation on extubation conditions in adult patients following general anaesthesia. Indian J Clin Anaesth 2020;7(2):262-266
11. Shula A et al. To study the effect of single dose dexmedetomidine given prior to extubation-on-extubation conditions in adult patients following general anaesthesia.International Journal of Life Sciences, Biotechnology and Pharma Research. 2024; 13(10): 889-893