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The Use of Dexmedetomidine During Non-Invasive Mechanical Ventilation in Patients with Post-operative Respiratory Failure

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Objectives: Hypoxemia and/or acute respiratory failure (ARF) commonly develops following major abdominal surgery. Maintenance of adequate oxygenation in the postoperative period has major importance. The efficiency of non-invasive mechanical ventilation (NIMV) on the post-operative ARF is conflicting and failure rate of NIMV in these patient population is high.Pain due to drains, tupes, surgery itself and also ajitation of patients are associated with failure of NIMV. Dexmedetomidine is a selective alpha-2 receptor agonist that possesses both sedative and analgesic properties with minimal respiratory depression. In our study, we hypotesized that the use of dexmedetomidin during NIMV in major abdomial surgical patients can reduce the NIMV failure.

Methods: Medical records of patients who underwent major abdominal surgery and were admitted to a general surgery ıntensive care unit (ICU) due to postoperative ARF (PaO2<55 mmHg) between January 2017 and September 2018 were investigated. Patients who received NIMV as a first treatment modality for ARF, who had NIMV failure due to ajitation [Richmond Agitation-Sedation Scale (RASS) > +2] and who received dexmedetomidine infusion were enrolled in this study. IV dexmedetomidine (0.2 µg/kg/hr titrated every 30 min to 1.2 µg/kg/hr. The infusion rate was adjusted to maintain a target sedation level of a RASS (-2)- (-3).Sedation was stopped when NIMV was discontinued.

Results: The mean age of the patients was 67±18 years, and the mean admission APACHE II score was 22±6. Thirty (71.4%) of the patients were female. Seven (16.7%) patients experiencing NIMV failure, all due to pulmonary condition worsening, required intubation and invasive ventilation. 35 (83.3%) patients were successfully weaned from NIMV under dexmedetomidine sedation and discharged from ICU. During NIMV application RASS scores were serially evaluated. RASS score of study group significantly improved at the 2 hours of dexmedetomidine initiation (+3 vs -2, p=0.01). Targeted sedation level achieved in 90.5% of patients. Dexmedetomidine was infused for a median of 25 hours with a median hourly dose across the patient cohort of 0.5 µg/kg/hr (range, 0.4–1.2 µg/kg/hr). Six (14.3%) patients developed bradycardia (30% change from the baseline heart rate) and 5 (11.9) patients had hypotension (30% change from the baseline blood pressure). None of the patients experienced hypotension or bradycardia requiring intervention. None of the patients experienced withdrawal.

Conclusion: Our data suggest that dexmedetomidine may represent an effective sedative agent in patients with postoperative ARF after abdominal surgery showing agitation during NIMV. Early use of dexmedetomidine in surgical patients receiving NIMV for postoperative ARF should be considered safe and capable of improving NIMV succsess.

Keywords: Postoperative respiratory failure, dexmedetomidine, non-invasive mechanical ventilation, sedation