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"End-Tidal Oxygen as a Measure of Preoxygenation During Rapid Sequence Intubation"

Preoxygenation refers to the administration of supplemental oxygen to a patient prior to intubation. During rapid sequence intubation (RSI) in the emergency department (ED) setting, breathing ceases when paralytic agents are administered, and the patient should be properly preoxygenated prior to their administration. End-tidal oxygen (ETO2) is the gold standard for assessing oxygenation and denitrogenating of the lungs, however, it is rarely utilized outside of the operating room or realm of anesthesiology. Currently, there are no objective measures of preoxygenation being employed in the ED, and most providers rely on clinical gestalt (patient's morbidities and clinical appearance, oxygenation device, oxygen flow rate, duration of oxygenation, etc.) to determine if a patient has been adequately preoxygenated. The primary aim of this study is to measure ETO2 during the preoxygenation phase of RSI in the ED. We hypothesize that some patients may not be optimally oxygenated/denitrogenated at the time preoxygenation ceases, paralytics are administered, and the provider attempts to pass an endotracheal tube (ETT) as indicated by 1) a suboptimalETO2 at cessation of preoxygenation, 2) a strong correlation between ETO2 and duration of apnea without desaturation (DAWD), and 3) a strong correlation between ETO2 and first pass success rate. This study will be a prospective observational convenience study of adult patients presenting to the Yale New Haven Hospital Department of Emergency Medicine that undergo preoxygenation as part of RSI during their ED length of stay. Inclusion criteria are patients ≥18years of age for which RSI is medically indicated. Patients actively undergoing CPR or belonging to a vulnerable population and cases in which the research intervention may cause a delay in care will be excluded. The research investigator at bedside will observe the pre-intubation sequence and record information regarding the technique employed to preoxygenate (mask type, oxygen flow rate, ventilations provided) as well as the time preoxygenation is initiated, T0. The research investigator will then record the time at which preoxygenation is completed, T1, as demonstrated by the intubator's attempt to pass the ETT. The investigator will then record the time the ETT is successfully passed, T2. ETO2, ETCO2, and SpO2 values will be recorded at T0 (initiation of preoxygenation), T1 (end of preoxygenation), and T2 (passage of ETT). For failed attempts, the minimum ETO2 and SpO2 will be recorded. Number of attempts, intubator level of training, induction/paralytic agents, time at which desaturation occurs (when applicable), and method of laryngoscopy will also be recorded. Recordings will end when the ETT is attached to the mechanical ventilator or additional attempts at intubation are aborted.