Preoxygenation Before Paralysis: A retrospective analysis of Delayed Sequence vs. Rapid Sequence Intubation in Trauma Patients.

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Background: Rapid Sequence Intubation (RSI) and Delayed Sequence Intubation (DSI) are crucial techniques for securing the airway in critically ill or injured patients. Although they differ in their approach to preoxygenation and sedation, both methods are equally significant in their potential to save lives. The primary objective of RSI is to perform endotracheal intubation by administering a sedative and a neuromuscular blocking agent simultaneously. This method minimizes the time between losing consciousness and securing the airway, thereby reducing the risk of complications such as aspiration. Typically, RSI involves a brief period of preoxygenation, followed by the administration of induction agents (e.g., etomidate, ketamine) and paralytics (e.g., succinylcholine, rocuronium). (1,2) On the other hand, DSI is used in patients who are agitated or delirious and cannot tolerate preoxygenation. In DSI, a dissociative dose of ketamine is first administered to sedate the patient while preserving spontaneous breathing, which is a unique feature of this technique (3,4).

Methods: We performed a retrospective study assessing trauma activations that required intubation between July 2021 and July 2024. Three authors reviewed 1151 charts, utilizing a data collection instrument to record study demographics for statistical analysis. After exclusions such as patients intubated outside of the emergency department, children, pregnant patients, and incarcerated patients, 291 RSI and 68 DSI patients were included.

Results:
Our findings support the presence of clinical equipoise between RSI and DSI in trauma airway management. While RSI is often considered the standard approach for emergency intubation, our results suggest that DSI may offer comparable, and potentially improved, outcomes in certain patient populations. The consistent trend toward benefit with DSI, combined with wide confidence intervals spanning both benefit and harm, highlights the uncertainty surrounding the optimal intubation strategy. The point estimate from the IPTW analysis suggests a 16% relative reduction in mortality associated with DSI. In practical terms, this could translate to approximately six fewer deaths per 100 intubated trauma patients if the observed association reflects a true causal effect. DSI allows for improved preoxygenation by providing dissociative sedation while maintaining spontaneous respirations, which may reduce the risk of peri-intubation hypoxemia. Prior studies have demonstrated that improved oxygen saturation before intubation is associated with reduced complications during airway management. The physiologic rationale underlying DSI therefore supports the effect observed in our findings.

Conclusions: Trauma patients represent a unique patient population and definitive airway management including endotracheal intubation is not without risk. Our study results are similar to previous published literature suggesting a trend towards improved outcomes with the use of delayed sequence intubation.

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