

From the Desk of the Editor

Tracheal intubation in the ICU: Life saving or life threatening?

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Tracheal intubation (TI) is a routine procedure in the intensive care unit (ICU), and is often life saving. However, life-threatening complications occur in a significant proportion of procedures, making TI perhaps one of the most common but underappreciated airway emergencies in the ICU¹.

In contrast to the controlled conditions in the operating room (OR), the ICU is regarded as 'a hostile environment' for airway procedures². Poor access to patient's head end due to equipments and poor lighting can contribute to potential difficulty. The unstable physiologic state of the patients along with under evaluation of the airways and suboptimal response to pre-oxygenation are the major factors for the high incidence of life-threatening complications like severe hypoxemia and cardiovascular collapse in the ICU. In addition challenging anatomy associated with injuries, burns etc. along with patients having a full stomach due to gastroparesis of critical illness or due to the urgency of interventions may make airway control difficult. Unlike in the OR where skilled anaesthesiologists are handling the airway, in ICU, airway procedures are often performed by junior doctors with limited or no airway experience. Waking up the patient in case of failed airway intervention is often not an option like in the OR. Due to these factors any airway management in ICU is considered difficult, high risk and potentially life threatening.

Complications during TI in patients with acute hypoxic respiratory failure along with a hypermetabolic state like severe sepsis and shock who are hypoxic at the time of TI are frighteningly common. The airway complications increases significantly with increasing number of attempts of laryngoscopy³. The Fourth National Audit Project (NAP4) looked at major complications of airway management in the UK. There were 184 complications and though less than 20% (34) of the airway events occurred in ICU, 50% of deaths occurred in ICU. More than 60% events in ICU led to death or brain damage (compared with 14% in the OR). Failure to use capnography contributed to 74% of cases of death or persistent neurological injury in ICU².

Critically ill patients may have oxygen transport limitations (alveolar volume loss and shunt fraction). In those who cannot be adequately preoxygenated, the time course to desaturation below 85% following apnoea is shortened to 23 seconds as compared to 502 seconds in the healthy adults⁴. Thus maximal pre-oxygenation (at least 3 minutes) is recommended to buy adequate time to tolerate apnoea during intubation. Baillard et al., in a randomized controlled trial showed that the application of NIPPV in comparison to conventional preoxygenation for 3 minutes ensured better pulseoximetric saturation (98±2% vs. 93±6%) and higher PaO₂ values during TI (203 vs. 97 mmHg) and up to 5 min

into the postintubation period. In acute respiratory failure, non invasive positive pressure ventilation (NIPPV) improves oxygenation by delivering high oxygen concentration, by unloading respiratory muscle, by recruiting alveoli and thereby increasing the functional residual capacity in such hypoxaemic patients⁵.

Jaber and colleagues⁶, proposed an "Intubation Bundle". Adherence to this bundle resulted in significant reduction in life threatening complications (21% vs 34%). The "Intubation Bundle" should be incorporated in standard care of airway management in ICU. There are ten components in the Intubation Bundle. Before intubation there should be presence of two operators, load patient with 500 ml fluid, prepare long term sedation and preoxygenation for 3 minutes with NIPPV in case of acute respiratory failure [FiO₂ 100%, pressure support ventilation level between 5-15 cm H₂O to obtain an expiratory tidal volume 6-8 ml/ kg with positive end expiratory pressure (PEEP) 5 cm H₂O]. Perform rapid sequence intubation using Ketamine or Etomidate followed by succinylcholine and use of Sellick's manoeuvre. Post Intubation immediately confirm tube placement using capnograph, use norepinephrine if diastolic pressures remain low, initiate long term sedation and use lung protective ventilation.

Every ICU should have a difficult airway cart. Providing adequate oxygenation should be a priority over intubation. An intubation bundle as proposed by Jaber et al should be followed. Waveform capnography should be used to confirm tube position for intubation of all critically ill patients and during transfers. Call for an airway expert whenever there is an anticipated difficult airway. Fiberoptic intubation is the gold standard for an anticipated difficult intubation. Intensivists should be trained in the use of videolaryngoscopes and rescue devices like supraglottic airways and performance of cricothyroidotomy. Extubation of the patient is equally challenging, and one should have a preformulated extubation strategy for a difficult airway. Recognising the challenges of airway management in ICU, we should strive to improve the safety of this commonly performed life saving intervention.



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