the difficult airway course™ EMERGENCY

NOTES FROM THE DIFFICULT AIRWAY COURSE: EMERGENCY

EMERGENCY AIRWAY I

What is RSI?

The **virtually simultaneous** administration, after preoxygenation and optimization, of a potent sedative agent and a rapidly acting neuromuscular blocking agent to induce unconsciousness and motor paralysis for **tracheal intubation**.

Notes:

The 7 Ps of RSI

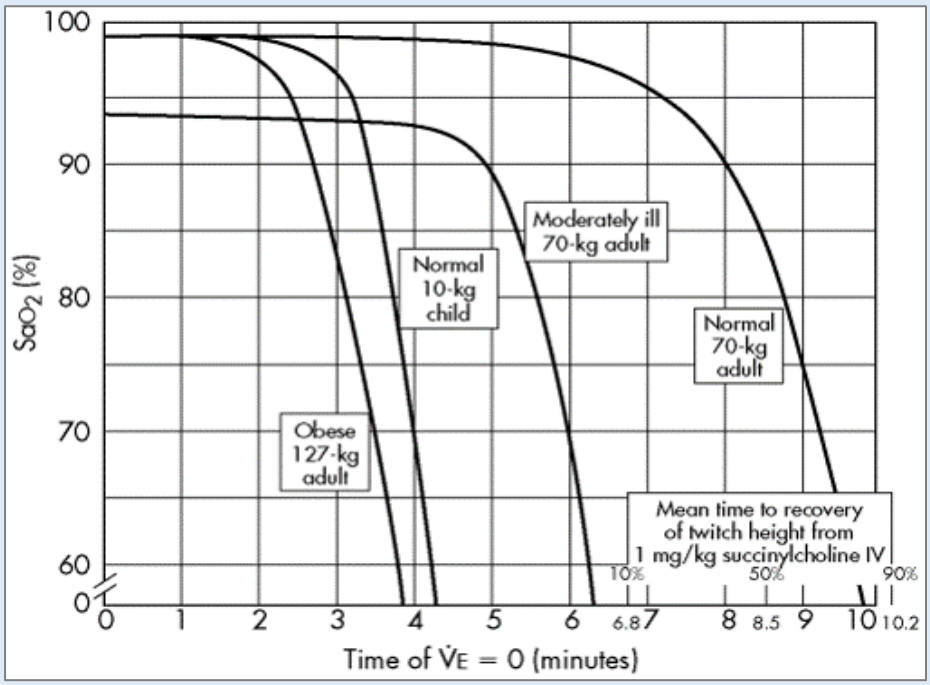
- Preparation
- Preoxygenation
- Physiologic Optimization
- Paralysis with Induction
- Positioning
- Placement
- Post-intubation Management

Notes:

Preoxygenation (Pre-Ox)

Goal is de-nitrogenation of the alveoi. The old standard was face-mask oxygen at 15 lpm but the average FiO2 is 65% mostly from room-air entrainment. A higher FiO2 is attained by using flush flow rate oxygen at 40-70 lpm. This outcompetes room air entrainment and increases the FiO2. Patients should tidally breathe the highest FiO_2 for 3 minutes, sitting upright if possible. Upright positioning maximizes the volume of the functional residual capacity (FRC) - the potential space in which an oxygen reservoir is created to permit safe apnea during RSI. If there is presumed intrapulmonary shunting and ambient pressure high-flow oxygen does not provide adequate pre-ox then consider transitioning to Bi-PAP. Apneic oxygenation (ApOx) has been shown in recent metanalyses to be helpful. There is little risk. Make it routine.

Time to Hemoglobin Desaturation with Initial F_AO_2=0.87



From Benumoff et al., Critical hemoglobin desaturation will occur before return to an unparalyzed state following 1 mg/kg IV succinylcholine. ***Anesthesiology****. 87:979-982, 1997.*

Expect oxygenation desaturation to occur more rapidly with patients who are critically ill, young (<24 months), and morbidly obese.

Notes:

Pre-intubation Optimization

- Address deranged hemodynamics.
- Fluids, blood, pressor agents (norepinephrine drip) can all be administered prior to RSI in most cases.
- In patients with hypotension, elevated shock index or poor CV reserve, address abnormal physiology.
- Risk of cardiovascular collapse during RSI is 2-6x higher in patients with pre-intubation shock or hypoxemia.

Notes:

Paralysis with Induction

- Succinylcholine and Rocuronium can both be given at 1.5 mg/kg IV.
- Use Roc when there is concern about hyperkalemia from Sch [neurologic injury with paralysis risk starts as early as 3 days post-injury].
- Sch clinical duration of action is approx. 10 minutes, while Rocuronium's is 45-60 minutes.

Notes:

Positioning, Placement and Post-Intubation Care

- Positioning is in full sniffing position for DL and doesn't hurt for VL. Not mandatory for hyper-angulated VL. Cricoid pressure has not been shown to reduce aspiration but can worsen glottic view and is not recommended. Obese patients may benefit from extreme torso ramping and exaggerated head forward position to ensure the ear is even with the sternal notch.
- Delayed Sequence Intubation (DSI) may be an option for agitated patients who won't permit preoxygenation because of behavioral issues. A one-time 1.0 mg/kg dose of ketamine has been studied as a "procedural sedative" for preoxygenation. These patients need high levels of vigilance, however, as case reports of premature apnea have been described with this approach.
- Shock sensitive RSI: Fluid loading, early use of vasopressor and selection of cardio-stable induction agents (sometimes given at reduced doses) can reduce the risk of peri-intubation hypotension and cardiac arrest.
- Etomidate is the most commonly used induction agent for emergency airway management. The standard induction does is 0.3 mg/kg IV. There is no definitive evidence that proves etomidate increases mortality in patients with sepsis.
- Etomidate, in large registry data, resulted in less hypotension than ketamine in patients with sepsis.

Notes:

Body Weight Dosing

All RSI drugs are based on total (actual) patient weight with ONE exception → for morbidly obese patients the induction agent should be based on lean body weight.

LBW = 1/3 (TBW – IBW) + IBW

LBW = Lean Body Weight *IBW = Ideal Body Weight* *TBW = Total Body Weight*

Notes:

EMERGENCY AIRWAY II

Difficult laryngoscopy is more common in ED patients. The unavoidable need to intubate makes the stakes higher as well. Airway difficulty can be thought of in two main buckets:

- **Anatomically difficult** – Patient features that prevent creation of a direct line of view to the airway.
- **Physiologically different** – Deranged physiology that puts the patient at risk for hypoxic insult or circulatory collapse during RSI.

Abnormal anatomy can impact four main aspects of emergency airway management:

1. Difficult Laryngoscopy
2. Difficult Rescue Bag/Mask Ventilation
3. Difficult EGD Placement
4. Difficult Cricothyrotomy

Many anatomic features can be overcome by video laryngoscopy. This is now the most common modality for emergency intubation. In large registry data of ED intubations, VL outperforms DL augmented by bougie use, laryngeal manipulation and changing of patient positioning (ramping). VL use results in increased odds of a first attempt success ranging from 1.5 to 3.0 depending on the VL blade shape.

Notes:

The Difficult Airway Mnemonics

Difficult Laryngoscopy

LEMON

L	Look Externally
E	Evaluate 3-3-2
M	Mallampati
O	Obstruction/Obesity
N	Neck Mobility

Notes:

Difficult Bag Mask Ventilation

ROMAN

R	Radiation/Restriction
O	Obstruction / Obesity / OSA (Triple-O)
M	Mask Seal / Mallampati / Male
A	Age
N	No Teeth

Notes:

Difficult EGD

RODS

R	Restriction
O	Obstruction / Obesity
D	Distorted Anatomy
S	Short Thyromental Distance

Notes:

Difficult Cricothyrotomy

SMART

S	Surgery (recent or remote)
M	Mass
A	Access/Anatomy
R	Radiation (or other scarring)
T	Tumor

Notes: