AVOIDING THE CRASH: OPTIMIZE YOUR PRE, PERI, AND POST AIRWAY MANAGEMENT
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AVOIDING THE CRASH 3: RELAX, OPTIMAL POST-AIRWAY MANAGEMENT
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**Approach to the Emergency Airway**

- Decision to intubate
- Near death? Unresponsive?
- Difficult Airway?
- RSI
- Post Intubation Management

- **TIME**
- **ANATOMY**
- **PHYSIOLOGY**


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**Intubating the critically ill**

- Planning is critical – no margin for error
- Assess and plan for difficulty
- Optimize physiology – focus on prevention of hypoxia and hypotension
- Airway may come second
- Use a checklist – inform the team
Intubating the critically ill

“I need to intubate the patient…but I know he’ll crash when I do.”

- 2% risk of cardiac arrest during intubation of critically ill
- Significant hypotension common after ETI, systolic < 80mmHg in 30%, < 70 mmHg in 10%


Septic shock

- 32 yo male, hx of paraplegia from GSW, chronic decubitus ulcers, cocaine and non-compliance
- In septic shock, maintaining oxygenation

Intubating the shock patient

Optimize physiology - Perfusion
- Almost all patients need volume
- 40mL/Kg in kids
- 1-2 liters in adults
- May delay intubation if hypotensive, or hypovolemic and O2 OK – perfusion priority
- Fluids/pressors

Airway in the shock patient

- Favorite pre-treatment drugs:
### Airway in the shock patient

- Favorite pre-treatment drugs:

### Intubating the critically ill: The Crash

Mechanisms of the post-intubation crash:

- Medication induced vasodilatation
- Reduced catecholamines with sedation and relaxation


### Etomidate: Adrenal suppression?

- No prospective studies showing increase in mortality
- No outcome data to suggest discontinuation in emergency RSI
- Consider hydrocortisone in sepsis
- Alternative agents may exacerbate shock


### Peri-Intubation: Induction agent

**Etomidate?**

- 5% decrease (3-8%) in MAP in critically ill patients, ASA 4
- Propofol causes 18% decrease (10-25%)

- Probable associated catecholamine decrease
- Consider ketamine 2mg/kg as alternative

Etomidate or ketamine?
- Randomized, controlled study comparing etomidate and ketamine in critically ill
- 655 patients
- Higher percentage of adrenal insufficiency etomidate group (still 50% in ketamine)
- No difference in mortality, or morbidity (organ failure)


Induction: Why bother?
- 32 patients, 2.5 mg/kg ketamine or 5 mg/kg thiopental
- 0.6mg/kg rocuronium 2 minutes later
- Intubating conditions at 60 s acceptable in 50% with thiopental, 100% with ketamine
- Jaw relaxation excellent in both groups
- Vocal cord position significantly worse with thiopental


Induction: Good for you too
- In RSI, we are intubating at the leading edge of the effect of the NMBA
- Both agent and dose are important
- Individualize agent to patient condition

Intubating the critically ill: The Crash
Post-intubation ventilation causing:
- Air-trapping due to inadequate exhalation
- Positive Pressure Ventilation causes decreased venous return
### Intubating the critically ill: The Crash

Post-intubation ventilation causing:

- Acidosis from failure to compensate for pre-existing metabolic acidosis

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### Post-intubation in shock

- Consider acid/base balance before you change the ventilation
- Acidosis associated with compensatory respiratory alkalosis (tachypnea, kussmaul’s)
- Post intubation ventilate at their RR, “normal rate” may lead to transient worsening of acidosis
- Consider bicarb first in ASA poisoning

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### Intubating the critically ill: The Crash

Post-intubation ventilation causing:

- Elevated plateau pressures exacerbating barotrauma and ARDS

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### Pediatric asthma

- Preparation critical!
- Preoxygenation, fluids
- Prevent dosing and equipment error – Broeslow-Luten system
- Checklist, team plan
- Prepare for difficult bagging, NG
- Ventilator settings – permissive hypercapnia, low rate and tidal volume
### Vent settings made simple

**Assist control**
- Preset rate and tidal volume
- Will deliver standard tidal volume
- Initial mode of choice for respiratory failure (most ED patients)
- Less work of breathing than SIMV or pressure support

### Vent settings made simple

**Oxygenation**
- Primarily a function of FiO2 and PEEP
- Start FiO2 of 100%
- Start PEEP at 5 cm H2O
- Increase PEEP 2-3 cm q 15 min to increase oxygenation

### Vent settings made simple

**Ventilation (CO2)**
- Primarily a function of RR and tidal volume
- Maintain pH 7.3-7.4
- Change in RR greater effect on pCO2 and pH than tidal volume

### Vent settings made simple

**Barotrauma/ARDS**
- Primarily a function of plateau pressure (not peak)
- Keep plateau pressures below 30 cm H2O
- Reduce tidal volume in asthma, ARDS, high plateau pressures (6 cc/kg IBW)
- Increase peak flow (80-120 l/min)
- Reduced RR to allow expiration, avoid air trapping (8-12 bpm)
- Permissive hypercapnia may be needed
Vent settings made simple
Barotrauma/ARDS
- Primarily a function of plateau pressure (not peak)

Peri-intubation: Prevention
Improve outcome beyond the ED
- Elevate the head of the bed 30-45°
- Decompress stomach OG
- Sterile technique with procedures

Post Intubation Sedation
- Fentanyl 2 mcg/kg IV bolus then
- 1 mcg/kg/h OR!
- Hydromorphone 0.5-1 mg IV
- bolus then repeat q10 min to
- effect
- AND!
- Midazolam 0.05 mg/kg IV bolus
- then 0.025 mg/kg/hr OR!
- Propofol 0.5 mg/kg bolus and 20
- mcg/kg/hr OR ketamine 1 mg/kg
- bolus then 0.5 mg/kg/h

I Still Can’t Oxygenate!
- Advanced ventilation strategies (if time allows)
Summary

• Plan and Prepare
• Sometimes Airway comes second
• Assess and manage airway difficulty
• Consider and optimize physiology
• Favorite pretreatment? NS, O2, Plan
• Optimize Post-Intubation management