

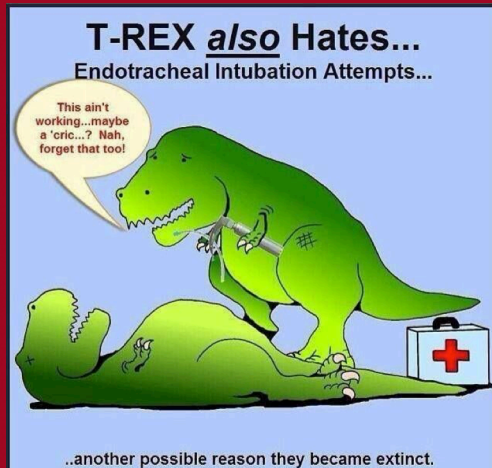
EM CASE OF THE WEEK

BROWARD HEALTH MEDICAL CENTER: DEPARTMENT OF EMERGENCY MEDICINE

Rapid Sequence Intubation

A distressed 34-year old male presents to the emergency department via ambulance after the abrupt development of shortness of breath with associated swelling of his hands, feet, and lips. History reveals he was stung multiple times by wasps while doing yard work 20 minutes ago. Patient has PMH significant for asthma. Vital signs reveal a blood pressure of 110/64 mmHg, respiratory rate of 32/min, pulse 88 bpm and normal temp. His oxygen saturation is at 88% on 5L/min nasal cannula. Physical exam was positive for oropharyngeal edema and stridor; negative for nausea, dizziness, and chest pain. What is the most appropriate initial step in management for this patient?

- A. Bolus of IV crystalloid
- B. Emergent cricothyroidotomy
- C. IV epinephrine
- D. IV glucocorticoids and diphenhydramine
- E. Rapid sequence intubation



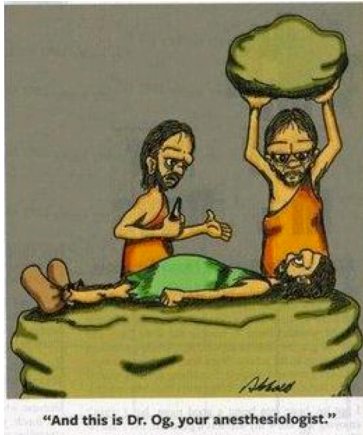
In the emergency room, critical patients could present with multiple life-threatening symptoms. Airway protection is crucial in managing the unstable patients. In many circumstances, rapid sequence intubation (RSI) is being used to secure the airway.

EM CASE OF THE WEEK

EM Case of the Week is a weekly "pop quiz" for ED staff. The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.



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Take Home Points

- “Seven P’s of RSI”
 - Preparation
 - Preoxygenation
 - Pretreatment
 - Paralysis with induction
 - Protection and positioning
 - Placement with proof
 - Postintubation management
- Preparation “STOP MAID”
 - S - Suction
 - T - Tools for intubation
 - O - Oxygen for preoxygenation
 - P - Positioning
 - M - Monitor
 - A - Assistant
 - I - IV access
 - D - Drugs

Rapid Sequence Intubation

The correct answer is E. The patient is in respiratory distress and is presenting in anaphylaxis. First and foremost, the patient’s airway should be assessed. If marked stridor is present or the patient is in respiratory arrest, prompt intubation should be performed to maintain a patent airway. **While preparing for possible intubation and establishing large bore IV access, the patient should receive intramuscular epinephrine**, which is the definitive and initial treatment for anaphylaxis. This medication works by decreasing the release of mediators, such as histamine, from mast cells. It also prevents and reverses obstruction to airflow in the upper and lower respiratory tracts and can prevent cardiovascular collapse.

Discussion:

Emergency medical care starts with airway management. The cornerstone for any difficult airway management is rapid sequence intubation (RSI). **RSI utilizes a sedative and a neuromuscular blocking agent to introduce rapid loss of consciousness and paralysis, respectively.** This permits the physician to perform an emergent endotracheal intubation while minimizing aspiration of gastric contents by the patient.

RSI is the standard of care for emergent airway management of intubation. Multiple studies have shown that RSI has far fewer complications and improved success compared to emergency intubation (intubation without paralysis). Although the indications have not been fully delineated, **major indications for RSI** are as follow:

- GCS < 8 (26.3%)
- Hypoxia (26.3%)
- Respiratory failure (15.7)
- Falling GCS (11.8%)
- Transfer with potential airway compromise (7.5%)
- Multiple injuries (3.5%)
- Other (9.0%)

For a list of educational lectures, grand rounds, workshops, and didactics please visit

<http://www.BrowardER.com>

and click on the “Conference” link. All are welcome to attend !

Technique: RSI requires preparation and a step-wise approach. A helpful mnemonic is “Seven P’s of RSI”:

- Preparation
- Preoxygenation
- Pretreatment
- Paralysis with induction
- Protection and positioning
- Placement with proof
- Postintubation management

Preparation: Intubation can present problems with inserting the ET tube and with visualizing the airway and other key structures. Although adequate preoxygenation can delay oxygen desaturation up to 8 minutes in an apneic patient, it is important to prepare for the worst case scenario. Preparation ranges from setting up the area to drawing up the medications. “STOP MAID” is a good mnemonic for preparation:

- S: Suction
- T: Tools for intubation (laryngoscopy blades either MAC or Miller 3-4, handle, McGraw or video laryngoscopy for difficult airway)
- O: Oxygen source for preoxygenation and ventilation
- P: Positioning
- M: Monitors, such as ECG, pulse oximetry, blood pressure, end-tidal CO₂, and esophageal stethoscope
- A: Assistants, such as face mask, airway devices (ET tube, syringe, stylets, LMA)
- I: IV access
- D: Drugs, such as induction agent, neuromuscular blocking agent, and others

Preoxygenation: The idea of preoxygenation is to replace nitrogen (denitrogenation) in the patient’s functional residual capacity with oxygen. It is generally given as **3-5 L/min of oxygen via bag valve mask/face mask for 8 deep breathes over 60 seconds**. Face mask is preferred if the patient is awake and able to breath on their own. Use of a bag valve mask involves excessive force that leads to over

inflation of the lungs and distension of the stomach. Patients at different ages or with different clinical presentations will have different durations of apnea before desaturating to 90%:

- Healthy 70 kg adult: 8 minutes
- Young children: 4 minutes
- Adult with severe illness or obesity: 3 minutes

Pretreatment: Specific situations might warrant additional medications. In order to be effective, pretreatment must be administered at least 3 minutes prior to ET tube placement. In highly emergent cases, such adjuncts (such as lidocaine, fentanyl, etc.) will be omitted as RSI takes priority.

Paralysis with induction: Since RSI is based on simultaneous administration of a sedative and a paralytic, the dose is precalculated and does not involve titration. The most commonly used paralytic is succinylcholine with rocuronium as back up if succinylcholine is contraindicated. Sedative agents can be chosen depending on the clinical presentation:

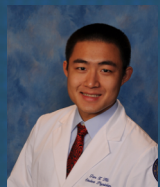
Drug	Benefits	Contraindications	Note
Etomidate	No CV effect	Cortisol suppression	Pretreat steroid
Ketamine	Sympathetic activation Bronchodilate	Hypertension	Bronchospasm & hypotension
Midazolam	Amnesia	Hypotension	Overdose
Propofol	Bronchodilate	Hypotension	

Protection and Positioning: RSI utilizes the Sellick’s maneuver or cricoid pressure to compress the esophagus to prevent passive regurgitation.

Placement with proof: Prepare to look for chest rise, ET tube misting, bilateral lung sounds, cyclic waveform on capnography, and continued pulse oximeter > 95% to indicate proper ET tube placement.

Postintubation management: Secure ET tube, obtain chest x-ray, and manage any post-procedure complications.

- Miller, Ronald D., and Manuel Pardo. Basics of Anesthesia. 6th ed. Philadelphia, PA: Elsevier/Saunders, 2011. Print.
- Reid, C. "The Who, Where, and What of Rapid Sequence Intubation: Prospective Observational Study of Emergency RSI outside the Operating Theatre." Emergency Medicine Journal (2004): 296-301. Print.
- "Rapid Sequence Intubation in Adults." Rapid Sequence Intubation in Adults. Uptodate. Web. 26 Oct. 2015.



ABOUT THE AUTHOR:
 This month’s case was written by Tom Hu. Tom is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at BHMC in October 2015. Tom plans on pursuing a career in Anesthesiology after graduation.