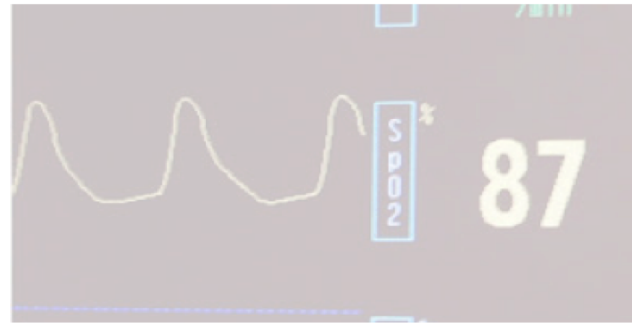


Deoxygenation During Intubation: More Common Than We Think?

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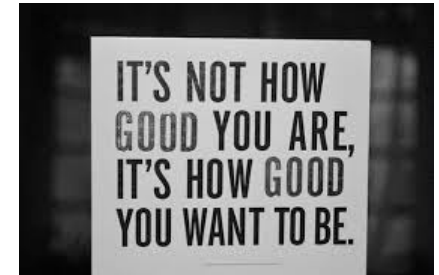
Rapid Sequence Deoxygenation



“Sats Looked Good When I Started and When I Finished”

More Common than We Think?

Our Motto...



To Oxygenate
Ventilate and Protect





Prehospital Emergency Care



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Evaluation of Physiologic Alterations during Prehospital Paramedic-Performed Rapid Sequence Intubation

Robert G. Walker, Lynn J. White, Geneva N. Whitmore, Alexander Esibov, Michael K. Levy, Gregory C. Cover, Joel D. Edminster & James M. Nania

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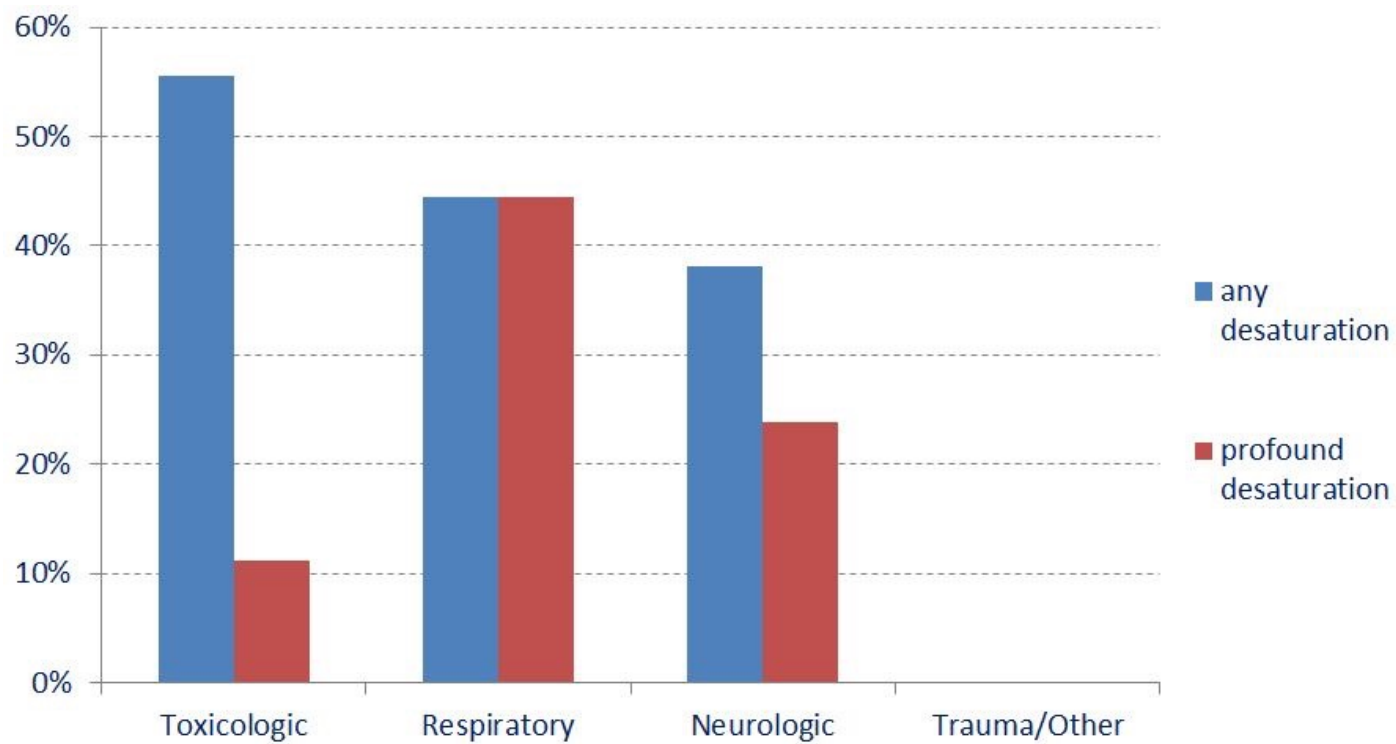


Method

- SpO₂ was trended by the monitor on 30s intervals
- Additional intermittent values recorded in conjunction w device alarms and event markings
- Since capnography was standard, airway placement was defined as appearance of persistent CO₂ waveform
- We looked for O₂ desaturation during period from 5 minutes before until 2 minutes after



Vital signs trend and continuous waveform data were downloaded from the monitor, and compared with patient care report (PCR) documentation to create a composite summary of the airway management process.



Desat= <90% or >10% if first value <90%, severe desat <80% or change>20% if initial <90%

EPIC TRIAL

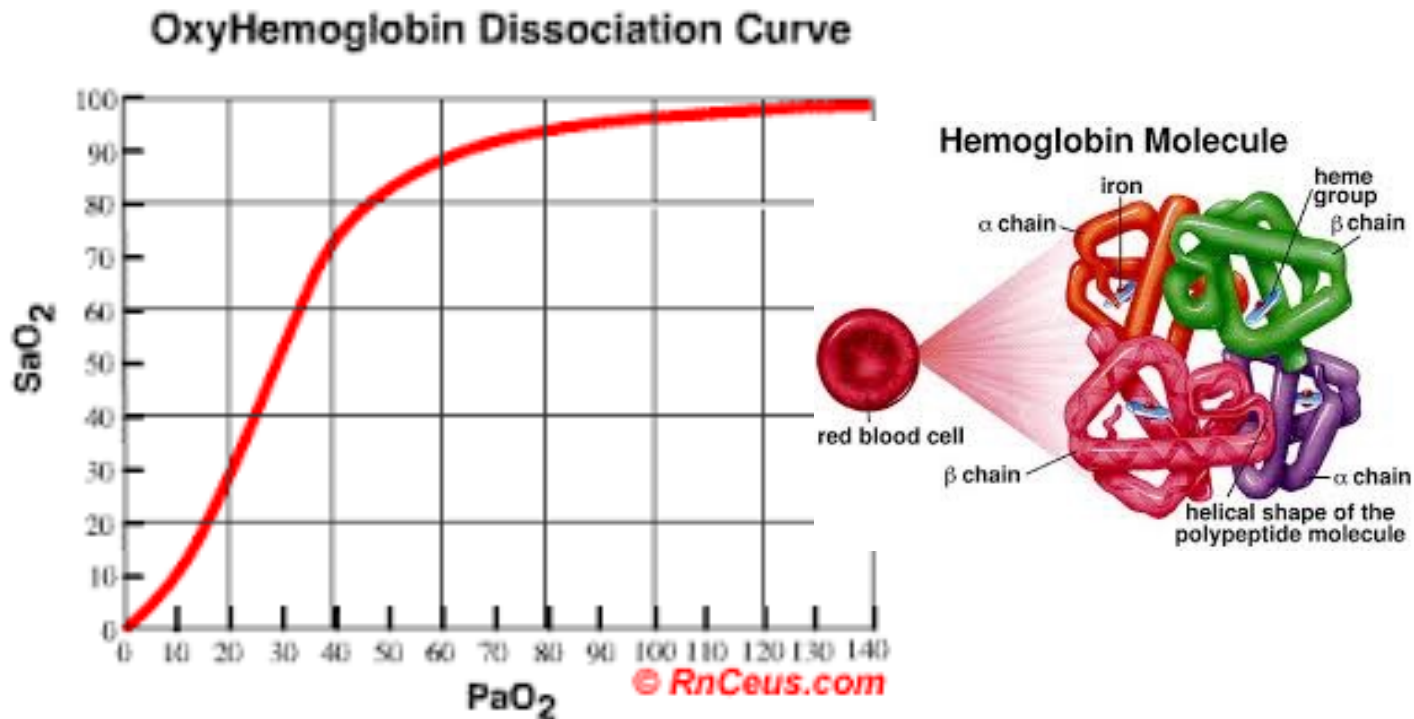
Mortality Risk With Hypoxia, Hypotension, or Both in TBI

Endpoint	Mortality (%)	Adjusted Odds Ratio
Neither Hypoxia nor Hypotension	6.5	1.0 (reference)
Hypoxia Only	29.7	4.1
Hypotension Only	21.8	3.0
Hypoxia Plus Hypotension	50.6	13.8

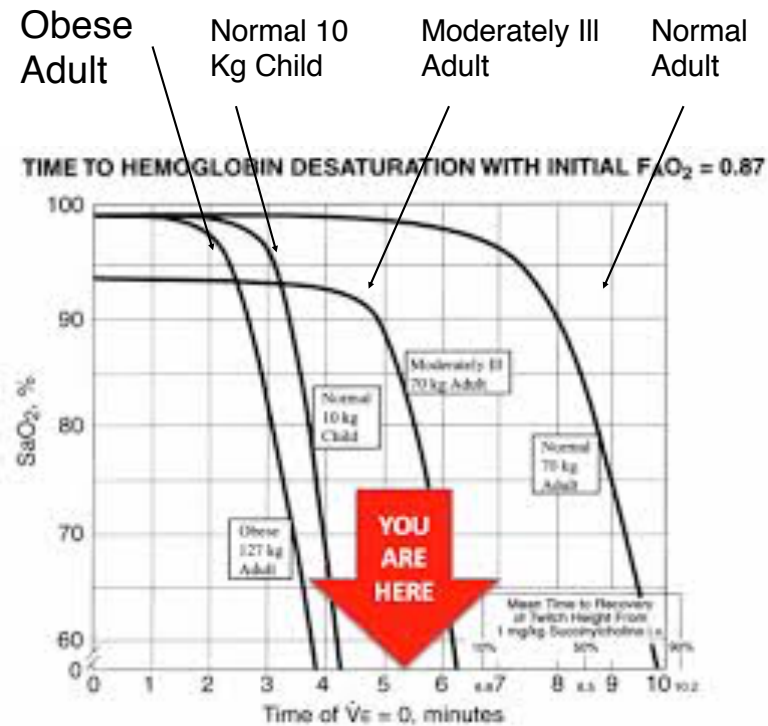
Does a little hypoxemia matter?

Grading on the Curve?

Oxyhemoglobin Desaturation Curve



Why Worry?



Benumof, J. Dagg, R. Benumof, R., 1997 Critical hemoglobin desaturation will occur before return to an unparalyzed state following 1-mg/kg intravenous succinylcholine. Anesthesiology 87 979-982.

New Ideas...

- High Performance Airway Management
- Pit crew
- Every airway is a failed airway...until it isn't



Rapid Sequence Airway Placement (RSAP) with Neuromuscular Blockade

Indications

To establish an effective airway in a patient in imminent danger because of an uncontrolled airway or ventilatory insufficiency, in whom other methods for

Contraindications

- Upper airway obstruction.
- Probable inability to oxygenate afterward because of very unfavorable anatomical characteristics, or face or neck trauma.
- If the only available paralytic agent to be used is Succinylcholine, then contraindications for RSAP include:
 - Known hyperkalemia
 - Known myopathy (personal or family history of disease of muscles)

Note

If unable to intubate or use AirQ rescue airway or ventilate effectively via BVM, proceed to surgical airway

Guidelines

- Prior to initiating RSAP, reevaluate the patient for any obvious contraindications for paralysis
- One paramedic and at least one other provider with advanced airway skills (approved by the medical director for field intubations) will directly attend the airway during and immediately after administration of the paralytic, until any airway devices have been placed and the patient has been reassessed.
- Device placement and ventilation decisions are driven by the status of the patient
- etCO₂ Capnography must be in place for immediate confirmation of gas exchange during all BVM ventilation and be employed immediately upon placement of an endotracheal tube or AirQ airway device
- During endotracheal intubation placement attempts the provider performing laryngoscopy and ETI should verbalize the procedure, paying particular attention to the issue of direct vs indirect visualization of the vocal cords.

Preparation

Early recognition of impending ventilatory failure or a failing/failed airway should prompt the lead provider to take preparatory steps well in advance of an actual decision to initiate an RSAP sequence

1. Assemble personnel and equipment:
 - 2 providers with airway skills at the PM level
 - IV access with running IV or IO in place.
 - SpO₂ monitoring in place
 - EtCO₂ using Waveform Capnography in place
 - Check label and draw up paralytic and appropriate sedative.
 - Assemble suction, BVM, Laryngoscope, appropriate ET tube and Eschmann Stylet. Also ready appropriate sized AirQ rescue airway and a surgical airway kit. **All equipment to be assembled checked and located at the patient's side.**
2. Assign roles-lead provider to assign crew members to specific tasks i.e. SpO₂, monitor, airway assist
3. Assessment of oxygenation status
 - Recognition of hypoxemia at SpO₂ of 90% or less
4. Assessment of Airway
 - Assess patient anatomy and potential difficult airway
 - Are protective reflexes present?

Procedure

1. **Preoxygenate patient** with 100% oxygen from BVM. If patient is spontaneously ventilating with adequate volume and SpO₂ (>90%), DO NOT VENTILATE. If patient requires BVM ventilation, insert an oropharyngeal airway (OPA) and nasopharyngeal airway (NPA). Two NPA's should be used if able to. A head tilt and/or jaw thrust should be used to optimize airway position (when not contraindicated).
2. **Initiate apneic oxygenation** with nasal cannula at the maximum possible flow of oxygen.
3. **Administer sedation.**
 - Etomidate: 0.3 mg/kg SIVP over 15-60 seconds for sedation prior to paralytic.
 - Consider Ketamine sedation for RSI (first line medication in hypotension or severe bronchospasm): (Adult/Pediatric dose) IV/IO: 1.0-2.0 mg/kg SIVP (administer slowly). May repeat titrated 0.5 mg/kg every 3-5 minutes SIVP if required to maintain sedation post intubation.
4. **Administer paralytic:**
 - Rocuronium is the preferred agent: (Adult dose) 1.0 mg/kg IVP
 - Succinylcholine or Vecuronium are agents to be used only during periods when supplies of Rocuronium are unavailable
5. **Reassess oxygenation state and select airway device:**
 - If hypoxemic (<90% SaO₂):
 - Attempt to oxygenate by BVM (if responsive and able to achieve >90% SpO₂ consider moving directly to ETI)
 - Insert an AirQ rescue airway device if patient remains hypoxic
 - If non-hypoxic:
 - Provider may perform an optimized endotracheal intubation attempt
 - Additional ETI attempts if required must be performed under the guidelines of the multiple attempt flow-chart limiting laryngoscopy to three (3) attempts.
 - Placement of an endotracheal tube requires immediate confirmation of correct placement by both breath sounds and EtCO₂ Waveform Capnography
 - The provider may elect to place the AirQ rescue airway as the first choice airway (deferring endotracheal intubation).
 - After successful placement of an AirQ airway, the provider may elect to change to endotracheal intubation
 - Reassess oxygenation after attempt or placement of airway device.
6. **If the airway is not immediately controlled and effective oxygenation achieved, the provider shall follow the Difficult Airway Matrix.**
7. **Sedation** is administered after successful airway control and end of paralytic action, administer benzodiazepine or ketamine and analgesia per medication standing order.
8. **Continually monitor** airway device, oxygenation, SpO₂, ventilation and etCO₂ using Waveform Capnography. Be prepared to troubleshoot changes encountered.

Questions?

