RSI 201

Outline / Notes / References

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Objectives:

- Review the concepts of "difficult" airways
- Discuss the need for an intubation/RSI plan
- Discuss/demonstrate various methods of managing a "difficult"/failed airway
- Discuss the human factors that enhance/impair airway management

Disclosures:

None.

7 P's of RSI (AHA 2010)

- Preparation
- Preoxygenation
- Premedication/Sedation
- Paralysis
- Protect and Placement
- Placement confirmation
- Post-intubation management

Preparation is comprised of a wide variety of actions, from education, deliberate practice, equipment/medication familiarity, and planning, as well as set-up for the actual intubation.

Fail to plan, plan to fail…

Always remember the potential for the laryngoscope to become a murder weapon! (emcrit.org)

Which difficulty?

- Physiological: difficult anatomy? Difficult physiology?
- Pharmacological: which sedative and paralytic?
- Psychological: STRESS on the team, space, personnel, room dynamics

Which difficulty?

- HOp Killers
  - Hemodynamics, Oxygenation, pH
- Positioning
  - Anatomy of the patient and their injury/illness
- Stress
  - Human Factors

HOp Killers:

- Hemodynamics
  - (p)Resusciation

    - Correct hypotension BEFORE INDUCTION
- Oxygenation
    - PreOxygenation prevents DeOxygenation
    - Correct poor oxygenation BEFORE RSI
    - Consider PPV (CPAP/BiPAP, BVM with PEEP valve)
    - Consider DSI (Delayed Sequence Intubation)
- pH
    - Match patients underlying minute ventilation, unless asthma/air trapping
    - Beware tachypnea!!! Tachypnea often = compensatory mechanism for acidosis
    - Sample vent strategy:
        - Rate=30
        - Vt=8cc/kg IBW
        - Flow rate=60lpm

Consider the need for "Resuscitation Sequence Intubation" versus Rapid Sequence Intubation

AVOID THE COFFIN POSITION!!!

<u>EMBRACE BUHE</u>:

Back up, head elevated.

- ❑ Physio Issues (HOp) Considered
- ❑ Induction Agent/Muscle Relaxant
- ❑ Post-Tube Analgesia/Sedation
- ❑ ± Push-Dose Epi
- ❑ Failed Plan Verbalized
- ❑ **Cric Evaluation**

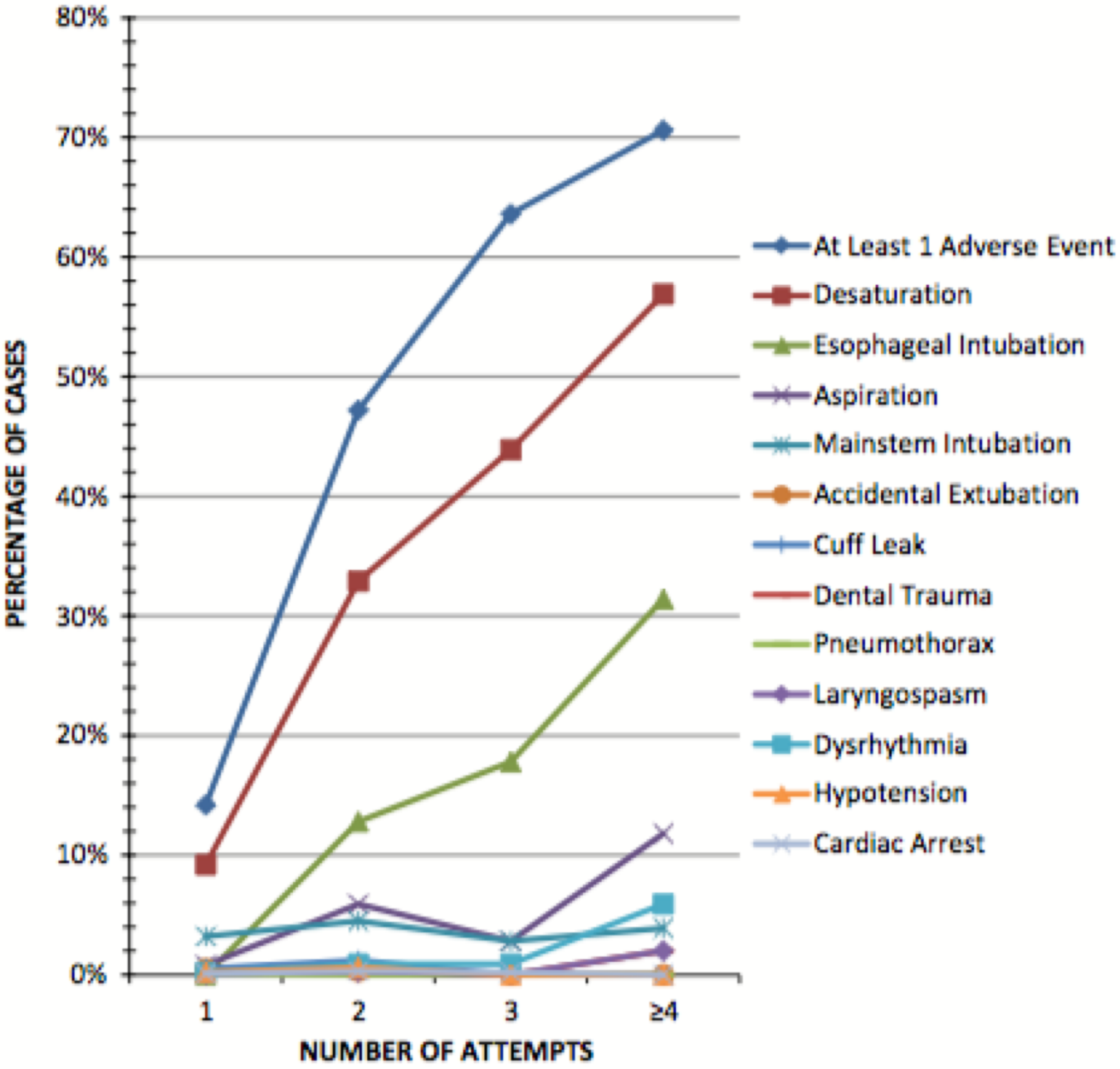
- ❑ Denitrogenated ≥ 3 minutes
- ❑ **ApOx with NC @15**
- ❑ **Oxygenated ≥ 95% (± CPAP)**
- ❑ Look in Mouth · Dentures · Range Neck
- ❑ **Positioning**
- ❑ Pulse Ox Visible or Audible
- ❑ Access - Reliable & Tested

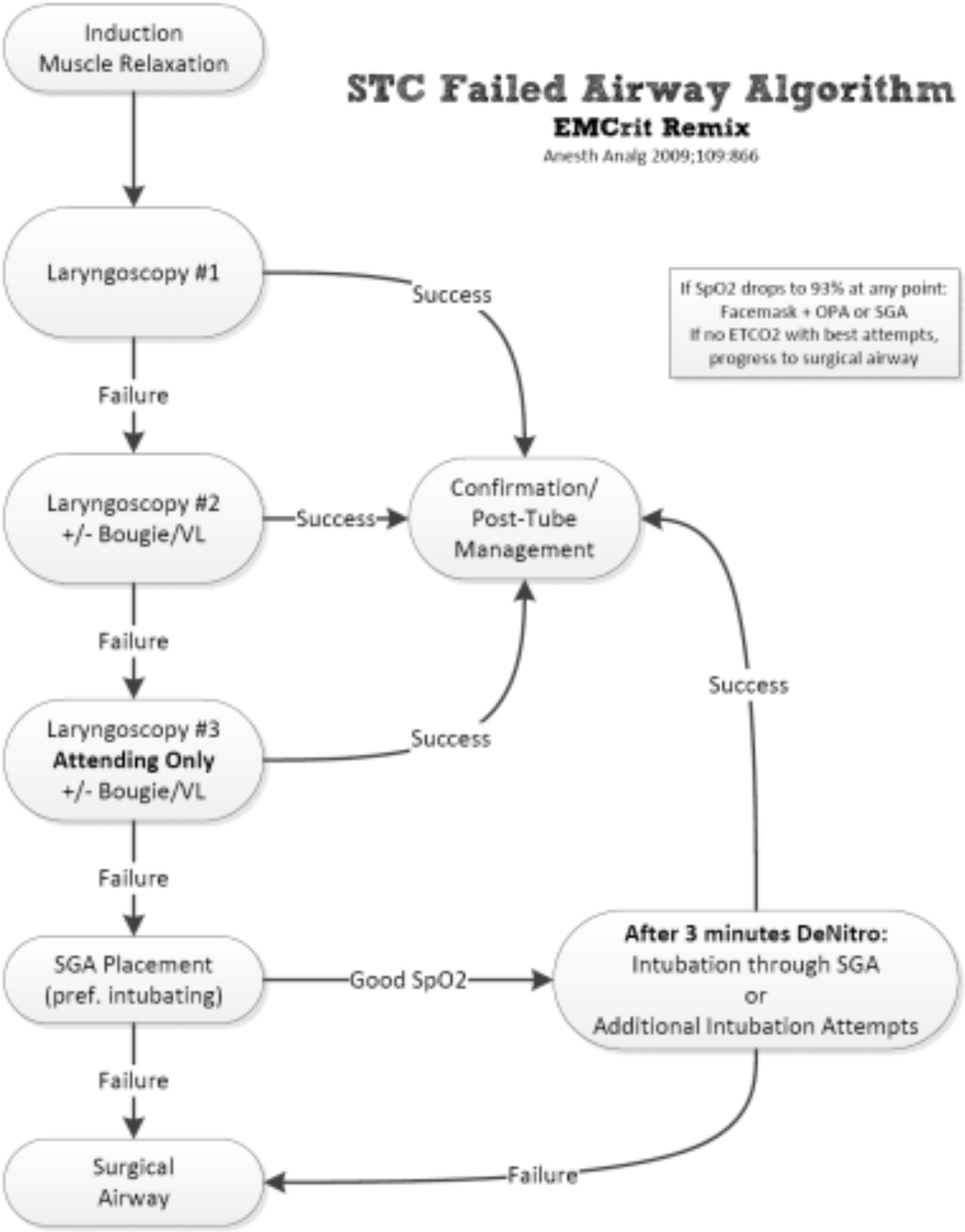
- ❑ Kit Dump on Table
- ❑ BVM (± PEEP Valve) on Oxygen
- ❑ **Waveform Capnograph on BVM**
- ❑ Video Laryngoscope
- ❑ Backup Laryngoscope
- ❑ **OPA, Bougie, SGA, Scalpel**
- ❑ Suction x 2

- ❑ ELM/Head Elev./**Collar Briefing**
- ❑ **Eye/Face Protection**

<u>Number of attempts</u>:

12% of patients will require multiple attempts (Bucher&Cuthbert, 2016)
11% require 3+ attempts (Hasegawa et al, 2012)
Adverse events increase with number of attempts (Sakles et al, 2013)


80%
70%
60%
50%
40%
30%
20%
10%
0%
PERCENTAGE OF CASES
1
2
3
≥4
NUMBER OF ATTEMPTS
At Least 1 Adverse Event
Desaturation
Esophageal Intubation
Aspiration
Mainstem Intubation
Accidental Extubation
Cuff Leak
Dental Trauma
Pneumothorax
Laryngospasm
Dysrhythmia
Hypotension
Cardiac Arrest


STC Failed Airway Algorithm
EMCrit Remix
Anesth Analg 2009;109:866
Induction
Muscle Relaxation
Laryngoscopy #1
Success
Failure
Laryngoscopy #2
+/- Bougie/VL
Success
Confirmation/
Post-Tube
Management
Failure
Laryngoscopy #3
Attending Only
+/- Bougie/VL
Success
Success
Failure
SGA Placement
(pref. intubating)
Good SpO2
After 3 minutes DeNitro:
Intubation through SGA
or
Additional Intubation Attempts
Failure
Surgical
Airway
Failure
If SpO2 drops to 93% at any point:
Facemask + OPA or SGA
If no ETCO2 with best attempts,
progress to surgical airway

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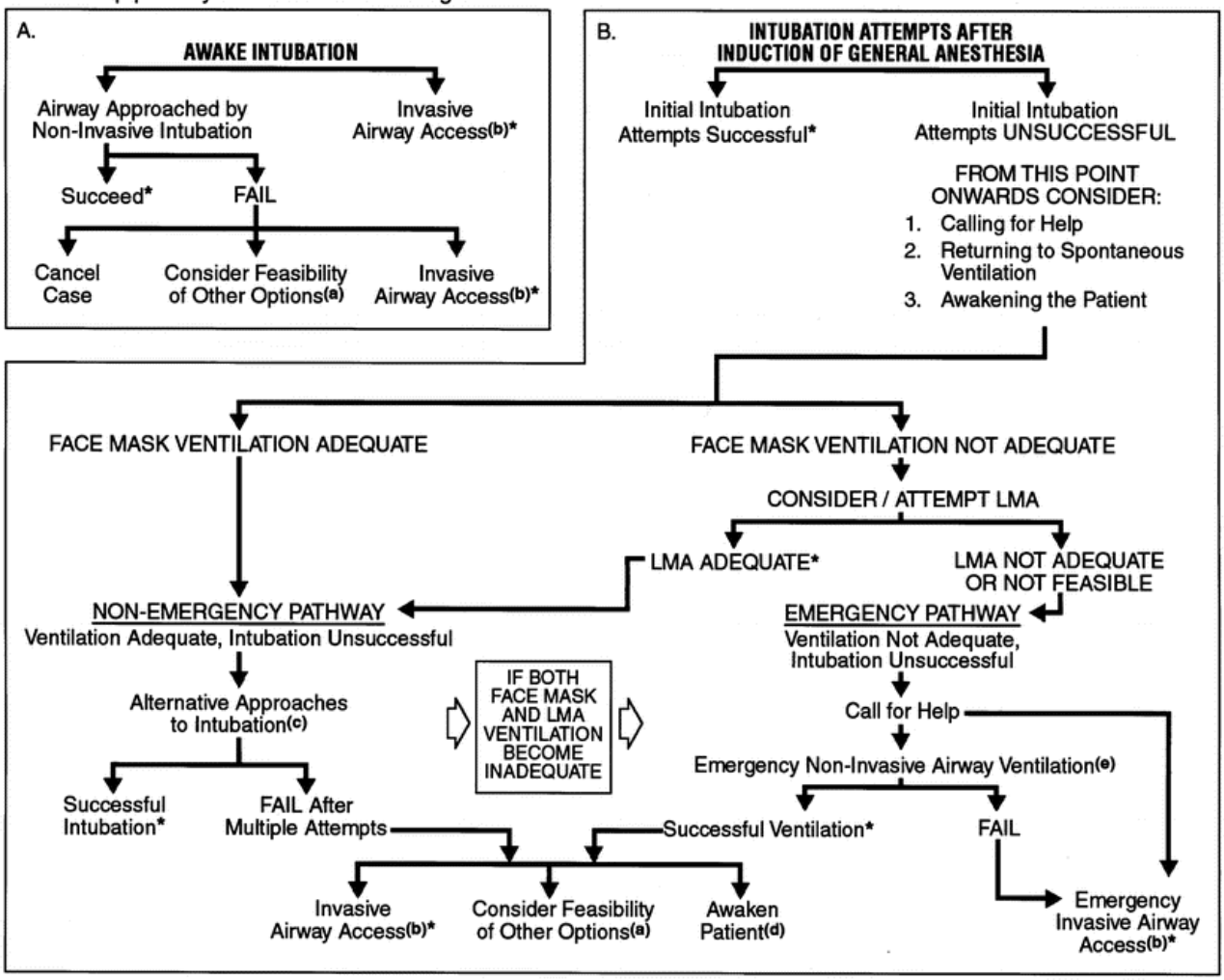
DIFFICULT AIRWAY ALGORITHM

1. Assess the likelihood and clinical impact of basic management problems:
   - A. Difficult Ventilation
   - B. Difficult Intubation
   - C. Difficulty with Patient Cooperation or Consent
   - D. Difficult Tracheostomy
2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management
3. Consider the relative merits and feasibility of basic management choices:

A.	Awake Intubation	vs.	Intubation Attempts After Induction of General Anesthesia
B.	Non-Invasive Technique for Initial Approach to Intubation	vs.	Invasive Technique for Initial Approach to Intubation
C.	Preservation of Spontaneous Ventilation	vs.	Ablation of Spontaneous Ventilation

4. Develop primary and alternative strategies:



*** Confirm ventilation, tracheal intubation, or LMA placement with exhaled CO_2**

a. Other options include (but are not limited to): surgery utilizing face mask or LMA anesthesia, local anesthesia infiltration or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the Emergency Pathway.

b. Invasive airway access includes surgical or percutaneous tracheostomy or cricothyrotomy.

c. Alternative non-invasive approaches to difficult intubation include (but are not limited to): use of different laryngoscope blades, LMA as an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, light wand, retrograde intubation, and blind oral or nasal intubation.

d. Consider re-preparation of the patient for awake intubation or canceling surgery.

e. Options for emergency non-invasive airway ventilation include (but are not limited to): rigid bronchoscope, esophageal-tracheal combitube ventilation, or transtracheal jet ventilation.

DEFAULT STRATEGY FOR FAILED RSI IN ADULTS

Plan A:
initial tracheal intubation plan

direct laryngoscopy

- **RSI CHECKLIST**
- pre-oxygenate
- position: 'ear to sternal notch'- 'RAMP' if obese
- paralysis & sedation for all
- cricoid pressure for all initially but release if poor view and apply External Laryngeal Manipulation
- bougie for all

succeed → **tracheal intubation**
verify with $ETCO_2$

- **maximum 2 attempts in 2 mins**
- re-oxygenate if SpO_2 <90% with 2 person BVM + OPA + NPA
- **CALL ANAESTHETICS IF PLAN A FAILS (ext: 3186)**

fail ↓

Plan B:
secondary tracheal intubation plan

video laryngoscopy

- as difficult airway, maximise laryngeal view by avoiding cricoid pressure and by using External Laryngeal Manipulation

succeed → **tracheal intubation**
verify with $ETCO_2$

- **maximum 2 attempts in 2 mins**
- re-oxygenate if SpO_2 <90% with 2 person BVM + OPA + NPA

fail ↓

Plan C:
maintenance of oxygenation/ ventilation

LMA

- avoid cricoid pressure

improved oxygenation → **contact anaesthetics (ext: ____) for fibreoptic intubation**

- **maximum 2 attempts in 2 mins**
- plan D if SpO_2 <75%

fail ↓

Plan D:
rescue techniques for "can't intubate can't ventilate" situation

scalpel/ finger/ tube cricothyroidotomy

scalpel | finger | tube

modified from www.das.co.uk

Consider that video laryngoscopy is a distinct skill, and requires deliberate practice to develop expertise. Cortellazzi et al (2015) demonstrated it took 76 attempts for anesthesia residents to develop expertise with the Glidescope.

Know and practice your front of neck options for CICO (cannot intubate, cannot oxygenate) situations.

- Surgical cricothyrotomy
- Needle cricothyrotomy
- Retrograde intubation

Know and practice alternatives to RSI such as awake intubation!

Rapid Sequence Awake Intubation via @srrezaie

- Nebulize 10cc of 4% Lidocaine into oropharynx
- Apply 2-4% topical lidocaine to posterior toungue with tongue depressor
- Spray 5cc of 4% lidocaine just past vocal cords with MADgic Device
- INTUBATE with endotracheal tube

Human Factors:
Dr Marshalls slide deck: www.slideshare.net/StuartMarshall15
or
http://cirrus.capstan.net.au/anzca/asm/2016/pres/30637/player.html

Key Points to Improve Decision Making:
Share generic and specific plans
Use team prompts
Walkthrough/Timeout
Use cognitive aids for that situation

Further resources: CHFG.org (Site run by Elaine Bromiley's husband)

"In our opinion, the 'difficult airway' does not exist. It is a complex situational interplay of patient, practitioner, equipment, expertise and circumstances"
Huitnik & Bouwman, 2015

Questions:
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FULL VIDEO LINKS:
Elaine Bromiley Case: https://vimeo.com/103516601

Surgical Cricothyrotomy: https://vimeo.com/125342238

Retrograde Intubation: https://www.youtube.com/watch?v=mpm6NqYkgGI

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