AIRWAY UPDATE 2016
Current themes, new research and directions for the future

Not a systematic review!
(Papers and themes emerging from late 2015 to end 2016)
THEMES IN 2016

• Clinical assessment – we suck
• New assessment methods – we still suck
• New devices – lack of robust evidence for improvement (we suck)
• Obstetric airway management – sucks
• OOT airway mx – everyone (including us) sucks
• Dealing with crises – Humans suck
• Suction devices - suck

Only thing that works is… ?
People say we cannot live without LOVE. I think OXYGEN is more important.
Difficult intubation incidence 1.86%
Unanticipated in 75-93% of cases

Difficult mask ventilation unanticipated in 94%
AIRWAY ULTRASOUND

- Thyroid cartilage
- Airline (≈ CTM)
- Cricoid cartilage
- Airline (≈ CTM)
VIRTUAL ENDOSCOPY

https://www.youtube.com/watch?v=Alz0FX-HOE
3D Printing of Human Anatomy: The Production of Realistic Airway Models for Cricothyroidotomy Simulation

Michelle L. Smith [1], Tiarnan Byrne [1], Conan McCasil [2,3], Peter J. McMahor [4], Thomas Broalin [5], James F.X. Jones [1]


Novel Layfoam 40 airway model pre-, during and post immersion in deionised water

Complete 3D printed cricothyroidotomy model

Incised cricothyroidotomy model
Cochrane systematic review

- **Primary:**
  - No difference in hypoxaemia
  - VL = fewer failed intubations

- **Secondary:**
  - VL improved glottic view
  - No difference in FPS
  - VL may reduce airway trauma
  - Subgroups: only CMAC better than DL
  - No difference with inexperienced VL users

TRAINING

"Do, or do not. There is no try."

-Dumbledore

• What is expertise?
• How do we become experts?
• How do we remain experts?
Beware... Mount Stupid!

Dunning-Kruger Effect

Unskilled and unaware of it: how difficulties in recognizing one’s own incompetence lead to inflated self-assessments

“Go To The Sim
Like You Go To The Gym”

@StarSkaterDk
TRAINING TARGETS?

NAP4: 39% of adverse events during anaesthesia involve:
• Difficult/delayed intubation
• Failed intubation
• CICO

Of all anaesthesia deaths,

CICO = 25%
GAMIFICATION

- DEXTER
- ORSIM
- DAARC

https://www.youtube.com/watch?v=SrhOGhm1cM
It is our choices

that show who we truly are

far more than our abilities.
NEW GUIDELINES

- (DAS-OAA)
- DAS 2015
- Vortex 2
- ANZCA Transition
- Indian
Management of unanticipated difficult tracheal intubation in adults

Plan A: Facemask ventilation and tracheal intubation
- Optimise head and neck position
- Preoxygenate
- Adequate neuromuscular blockade
- Direct / Video Laryngoscopy (maximum 3+1 attempts)
- External laryngeal manipulation
- Bougie
- Remove cricoid pressure
- Maintain oxygenation and anaesthesia

If in difficulty call for help

If succeed
- Confirm tracheal intubation with capnography

If declare failed intubation

Plan B: Maintaining oxygenation: SAD insertion
- 2nd generation device recommended
- Change device or size (maximum 3 attempts)
- Oxygenate and ventilate

If succeed

STOP AND THINK Options (consider risks and benefits):
1. Wake the patient up
2. Intubate trachea via the SAD
3. Proceed without intubating the trachea
4. Tracheostomy or cricothyroidotomy

If declare failed SAD ventilation

Plan C: Facemask ventilation
- If facemask ventilation impossible, paralyse
- Final attempt at facemask ventilation
- Use 2 person technique and adjuncts

If succeed
- Wake the patient up

If declare CICO

Plan D: Emergency front of neck access
- Scalpel cricothyroidotomy

Post-operative care and follow up
- Formulate immediate airway management plan
- Monitor for complications
- Complete airway alert form
- Explain to the patient in person and in writing
- Send written report to GP and local database

This flowchart forms part of the DAS Guidelines for unanticipated difficult intubation in adults 2015 and should be used in conjunction with the text.
Plan D: Emergency front of neck access

Continue to give oxygen via upper airway
Ensure neuromuscular blockade
Position patient to extend neck

**Scalpel cricothyroidotomy**

**Equipment:**
1. Scalpel (number 10 blade)
2. Bougie
3. Tube (cuffed 6.0mm ID)

**Laryngeal handshake to identify cricothyroid membrane**

**Palpable cricothyroid membrane**
- Transverse stab incision through cricothyroid membrane
- Turn blade through 90° (sharp edge caudally)
- Slide coude tip of bougie along blade into trachea
- Railroad lubricated 6.0mm cuffed tracheal tube into trachea
- Ventilate, inflate cuff and confirm position with capnography
- Secure tube

**Impalpable cricothyroid membrane**
- Make an 8-10cm vertical skin incision, caudal to cephalad
- Use blunt dissection with fingers of both hands to separate tissues
- Identify and stabilise the larynx
- Proceed with technique for palpable cricothyroid membrane as above
THE VORTEX

FOR EACH LIFELINE CONSIDER:

MANIPULATIONS:
- HEAD & NECK
- LARYNX
- DEVICE

ADJUNCTS

SIZE / TYPE

SUCTION / O₂ FLOW

MUSCLE TONE

MAXIMUM THREE ATTEMPTS AT EACH LIFELINE (UNLESS GAMECHANGER)
AT LEAST ONE ATTEMPT SHOULD BE BY MOST EXPERIENCED CLINICIAN
CICO STATUS ESCALATES WITH UNSUCCESSFUL BEST EFFORT AT ANY LIFELINE
CANNULA VS. SCALPEL CRIC

**Cannula:**
- Familiarity vs. psychological barriers
- Training opportunities
- Pre-emptive use

**Scalpel:**
- Definitive; protective
- Suitable for impalpable anatomy
- Less fine motor requirement
- Better/easier ventilation
CICO Status

Ready
- Call for Help
- Allocate Proceduralist
- Kit Out At Bedside & Confirm Contents

Set
- Open Kit & Prepare Equipment
- Identify Anatomy
- Infiltrate Adrenaline Containing LA

Go
- Optimise Patient Position
- Initiate CICO Rescue

CICO Status Escalates With A Unsuccessful Best Effort At Any Lifeline*

Consider additional escalation in CICO Status if:
- Predicted difficult airway
- SaO2 <90%
- Rapidly deteriorating SaO2
- Consecutive unsuccessful attempts at any two lifelines

*Ensure best efforts at all 3 lifelines before declaring GO Status

1 Time Permitting. Must not delay GO status
• Paradox: Decreasing skill with increasing challenge
• Failed intubation reviewed: 1970 to present
  • We used to suck (Failure ~1:300)
  • We still suck (Failure ~1:440)
  • Failed intubation kills (~1:90)
• Should we use SGAs for GA/CS?
• Should we use SGAs for rescue?
• Should we use VL?
## CRICOID PRESSURE

Debate rages on

### Does Cricoid Pressure Reduce the Risk of Aspiration?

<table>
<thead>
<tr>
<th>This study has been completed.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sponsor:</strong> Mayo Clinic</td>
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<tr>
<td><strong>Collaborator:</strong> Alfred I. duPont Hospital for Children</td>
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<tr>
<td><strong>Information provided by (Responsible Party):</strong> John (J Kyle) K. Bohman, M.D., Mayo Clinic</td>
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</tbody>
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**ClinicalTrials.gov Identifier:**

NCT02058004

First received: January 26, 2014
Last updated: December 30, 2015
Last verified: December 2015

[History of Changes](#)
Original Article

Transnasal Humidified Rapid-Insufflation Ventilatory Exchange (THRIVE): a physiological method of increasing apnoea time in patients with difficult airways

A. Patel$^1$ and N. A. R. Nouraei$^1$

Anaesthesia 2015, 70, 323-329  Doi:10.1111/anae.12923
APNEIC OXYGENATION IN MAN

M. Jack Frumin, M.D., Robert M. Epstein, M.D., Gerald Cohen, Ph.D.

This report deals with prolonged suppression of respiratory function in man while full oxygenation and other vital functions are maintained. This phenomenon has been studied extensively in dogs and other laboratory animals, and was termed "diffusion respiration" by Draper, Whitehead and their collaborators and "apneic diffusion oxygenation (ADO)" by Holmdahl who also reviewed the extensive literature in this subject.

The descriptive term "apneic oxygenation" first employed by Nahas is used here instead of the other titles to avoid the misconception that the process of molecular diffusion in the conducting air passages brings oxygen to the alveoli from the outside environment. This misconception regarding mechanism was strengthened by an incomplete description of the process in an early report by Draper et al. even though in a later report it was stated that the en masse movement of gas down the trachea is responsible for the sustained high alveolar and blood oxygen levels. However, the exact mechanism responsible for this bulk movement was not presented explicitly.

Objections to the term "diffusion" have been raised by Joels and Samueloff and by Bartlett et al. They have emphasized the interpretation accepted in this study of the mechanism responsible for this mass movement and Bartlett et al. proposed the title of "ventilation mass flow (VMF)" for this phenomenon.

Accepted for publication June 25, 1959; presented at the Annual Meeting of the American Society of Anesthesiologists, Inc., Miami Beach, Florida, October 9, 1959. The authors are in the Department of Anesthesiology and Biochemistry, College of Physicians and Surgeons, Columbia University, and the Anesthesiology Service, The Presbyterian Hospital, New York, New York.

METHODS

Eight essentially healthy patients scheduled for a variety of minor operations served as subjects. In four instances, the apneic period was produced while the surgical procedure was being performed, while in the remainder the operation was completed first. The subjects received 50-100 mg of meperidine and 0.4 mg of scopolamine approximately one hour before the induction of anesthesia. In all cases but one, 100 per cent oxygen was administered with a circle anesthesia apparatus for five minutes, then an hypnotic dose of 2.5 per cent thiopental was given intravenously followed by approximately 100 mg of succinylcholine chloride. When relaxation was complete, a cuffed endotracheal catheter was inserted and a tight seal obtained by inflation of the cuff. Denitrogenation was accomplished by administering 100 per cent oxygen for a minimum of 30 minutes with the circle apparatus at a flow rate of at least 8 liters per minute. To insure unconsciousness throughout the apneic period, a minimum of 20 mg of thiopental was administered intravenously, generally in divided doses. Anesthesia was maintained during the apneic period by halothane administered in an oxygen atmosphere, using a circle apparatus with halothane vaporizer.

ECCLESIASTES 1:9

That which has been is what will be, that which is done is what will be done, and there is nothing new under the sun.
ApOx only helps if:

• Airway open
• Intubation delayed
• (Flow high)
“May the force be ever in your favor,
Mr. Potter”
-Gandalf
(The Chronicles of Narnia)