

Airway

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Topics to be discussed.

- Background.
- Evidence.
- Causes.
- Contributing factors.
- Recommendations.
- Specific algorithms.

- **Background.**

History of ABCDE approach.

Father of ABC.

- ❖ 1924 – 2003.
- ❖ **Peter Safar** worked with **James Elam** to define Head tilt, Chin lift and mouth to mouth breathing.
- ❖ Dr **George Crile** reported the first use of external chest compressions.
- ❖ Incorporated the A-B-C approach for resuscitation.
- ❖ Influenced **Asmund Laerdal** to create a Mannequin called Resusci-Anne.



Father of ABCDE in Trauma.

Dr James K Styner.

- ❖ Orthopaedic Surgeon from US.
- ❖ Involved in a plane crash in 1976.
- ❖ Wife and 4 children involved.
- ❖ Wife died at scene.
- ❖ Critical injuries to 3 of 4 children.



- **Evidence.**



The Royal College of Anaesthetists



The Difficult Airway Society



The National Patient Safety Agency
Patient Safety Division



The Intensive Care Society



The College of Emergency Medicine

4th National Audit Project of
The Royal College of Anaesthetists and The Difficult Airway Society

Major complications of airway management in the UK

NAP4

Report and findings
March 2011

Findings.

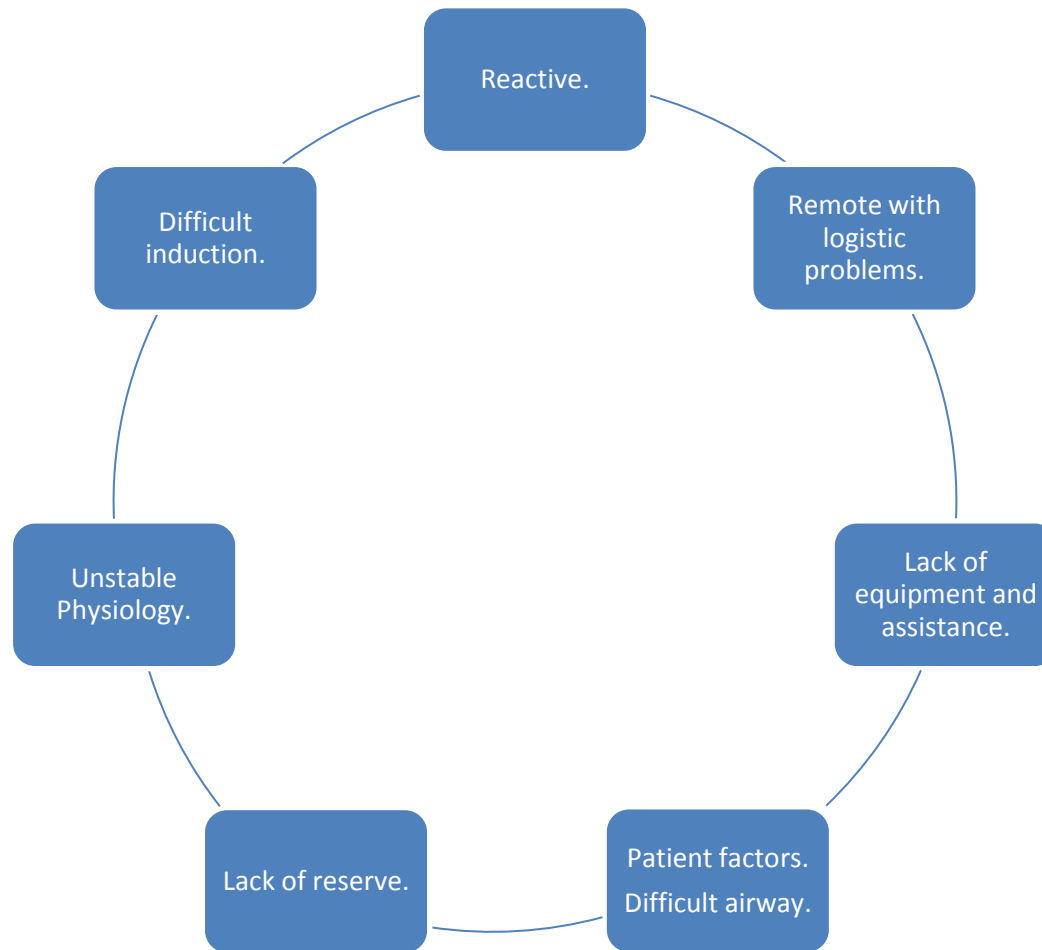
	Anaesthesia	ICU	ED
Death	16	18	4
Death +BD	18	22	1
Denominator	2.9m*	48,000**	20,000***
Incidence	1:180,000	1:2,700	1:50,000
Relative death rate	1	x67	x36
RR death +BD	1	x70	x38

*NAP4 Census

**HES ICU data 2008/9

*** Hopkinson/Benger EMJ 2010

Why is airway death more common in ICU?



- **Causes.**
- ***Accidental extubation 8 deaths.
1 tube, 7 tracheostomy.***
- ***Failed intubation 10 deaths.***

- Accidental extubation:
 - Tracheal tube: 5, 1 death
 - Obese (BMI > 30): 3
 - On movement: 2
 - Known difficult airway: 2
 - Tracheostomy displacement: 14, 7 deaths
 - Obese patients (BMI > 30): 8
 - On movement: 5
 - Known difficult airway: 3
 - Previous difficulties with tracheostomy: 3

- Failed intubation: 10 (+ 2 tracheostomies)
 - 3 in patients with recognised difficult airways
- Unrecognised oesophageal intubation: 4
- Transfer: 3
- Haemorrhage: 3
- Miscellaneous: 3

- Failed cricothyroidotomy: 3/5

- **Contributing factors.**

patient factors

equipment factors

planning factors

personnel factors

Patient factors.

- 19 were receiving invasive mechanical ventilation, 8 non-invasive
- 94% supplemental O₂; 35% had FiO₂ > 0.6
- 13 had other organ failure, 9 vasoactive drugs or RRT
- 47% occurred in patients with BMI > 30 kg/m²

Equipment factors.

- *Capnography*
- Tracheostomy design
- Difficult airway trolleys

Planning factors.

- Time delay to intubation
- Unanticipated difficult intubation, re-intubation
- Unanticipated airway displacement/ extubation
- Unanticipated difficulty post extubation

Personnel or staff factors.

- 46% of events took place out of hours
- Consultants were present for 58% of events (36% out of hours)
- Lack of advanced airway skills: increasing number of non-anaesthetists staffing ICUs
- Lack of experienced assistants e.g. ODPs

- ***Recommendation.***

Recommendation 1.

- Right practitioner
- Right training
- Right equipment
- Right preparation
- Right assistance
- Right location

Recommendation 2.

- Capnography.
- Teaching and training.
- Intubation checklist.
- Check list for patient preparation, equipment, Drugs and team.
- Algorithms for intubation, extubation, reintubation, tube and tracheostomy displacement.
- Patients at risk of airway problems identified with Plan A and B.

Recommendation 3.

- Obese patients need to be identified and care of airway needs to be paramount.
- Difficult airway trolley and FOS.
- Regular Manikin training for front of neck access.
- Mechanisms in place to access algorithms and senior help.
- Regular Audit.

- **Specific Algorithms.**

Difficult intubation trolley and algorithm

Check list for intubation

tracheal intubation of critically ill










management of displaced tube

management of displaced tracheostomy

Difficult intubation trolley and algorithm.



Suggestions for drawer labels

Plan A Initial Intubation strategy	Optimise position	Bougie	Alternative laryngoscope
Remember to <u>move on</u> if not making progress			
Plan B Secondary Intubation strategy	LMA device		Fibreoptic intubation
Remember to <u>move on</u> if not making progress			
Plan C Maintain oxygenation	Facemask +/- airway adjunct		LMA device
Postpone surgery Awaken patient			
Plan D Can't intubate, can't ventilate	Cannula cricothyroidotomy		
Remember to <u>move on</u> if not making progress			
Plan D Can't intubate, can't ventilate	Surgical cricothyroidotomy		
Remember to <u>move on</u> if not making progress			

Check list for intubation.



intensive care
society
care when it matters

Intubation Checklist : critically ill adults – to be done with whole team present.

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RCOA
Royal College of Anaesthetists

Prepare the patient

- ☐ **Reliable IV / IO access**
- ☐ **Optimise position**
 - ☐ Sit-up?
 - ☐ Mattress hard
- ☐ **Airway assessment**
 - ☐ Identify cricothyroid membrane
 - ☐ Awake intubation option?
- ☐ **Optimal preoxygenation**
 - ☐ 3 mins or $\text{ETO}_2 > 85\%$
 - ☐ Consider CPAP / NIV
 - ☐ Nasal O_2
- ☐ **Optimise patient state**
 - ☐ Fluid / pressor/ inotrope
 - ☐ Aspirate NG tube
 - ☐ Delayed sequence induction
- ☐ **Allergies?**
 - ☐ ↑ Potassium risk?
 - avoid suxamethonium

Prepare the equipment

- ☐ **Apply monitors**
 - ☐ SpO_2 / waveform ETCO_2 / ECG / BP
- ☐ **Check equipment**
 - ☐ Tracheal tubes x 2
 - cuffs checked
 - ☐ Direct laryngoscopes x 2
 - ☐ Videolaryngoscope
 - ☐ Bougie / stylet
 - ☐ Working suction
 - ☐ Supraglottic airways
 - ☐ Guedel / nasal airways
 - ☐ Flexible scope / Aintree
 - ☐ FONA set
- ☐ **Check drugs**
 - ☐ Consider ketamine
 - ☐ Relaxant
 - ☐ Pressor / inotrope
 - ☐ Maintenance sedation

Prepare the team

- ☐ **Allocate roles**

One person may have more than one role.

 - ☐ Team Leader
 - ☐ 1st Intubator
 - ☐ 2nd Intubator
 - ☐ Cricoid force
 - ☐ Intubator's assistant
 - ☐ Drugs
 - ☐ Monitoring patient
 - ☐ Runner
 - ☐ MILS (if indicated)
 - ☐ Who will perform FONA?
- ☐ **Who do we call for help?**
- ☐ **Who is noting the time?**

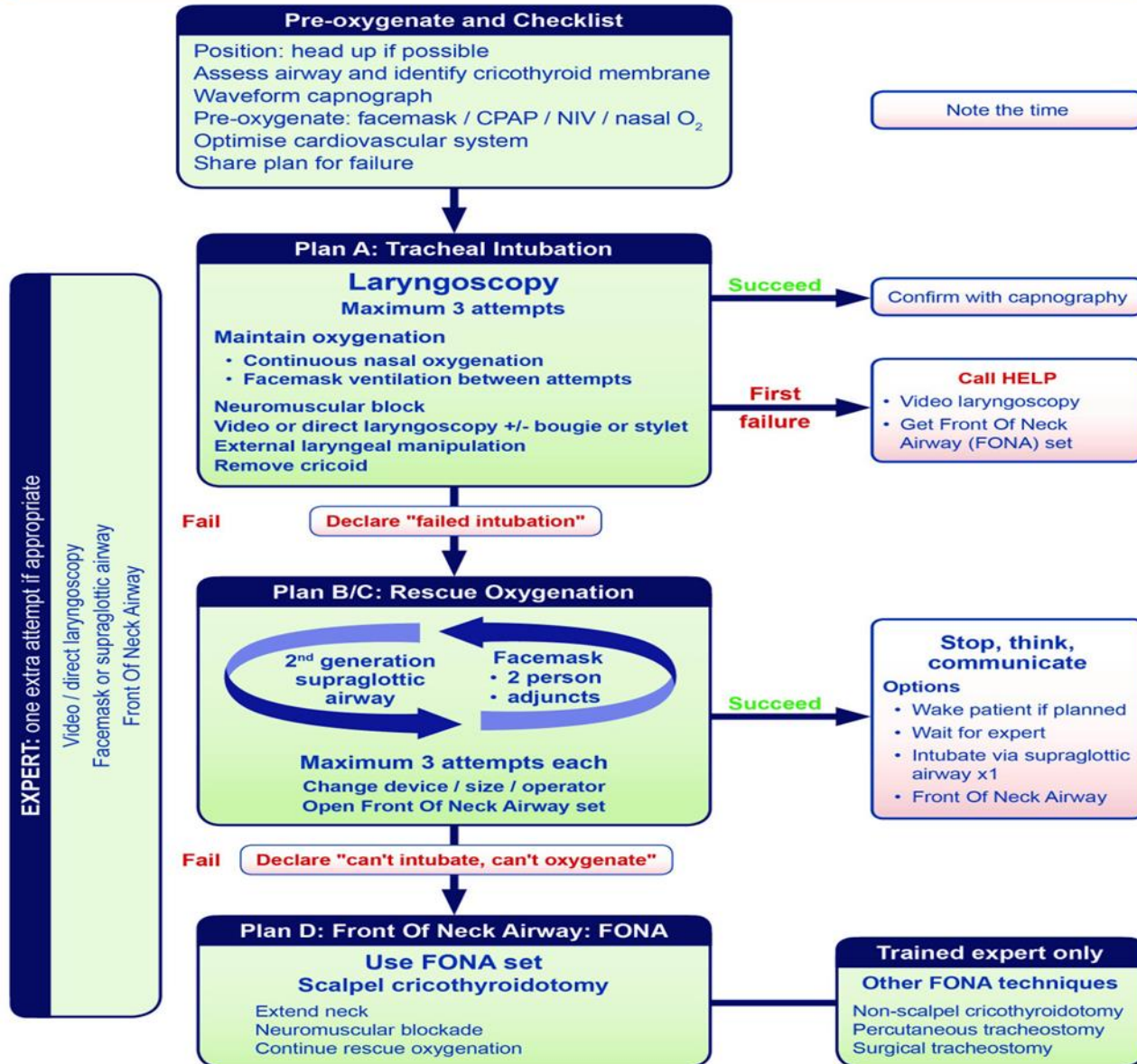
Prepare for difficulty

- ☐ **Can we wake the patient if intubation fails?**
- ☐ **Verbalise "Airway Plan is:"**
 - ☐ **Plan A:**
Drugs & laryngoscopy
 - ☐ **Plan B/C:**
Supraglottic airway
Face-mask
Fibreoptic intubation via supraglottic airway
 - ☐ **Plan D:**
FONA
Scalpel-bougie-tube
- ☐ **Does anyone have questions or concerns?**

Tracheal intubation of critically ill adults



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Displaced ETT.

Tracheal tube displacement algorithm [for patients *without* ICU airway alert]

KEY: Junior resident
Anaesthetist

Royal United Hospital Bath 
 Bath Trust

You have concern that **Tracheal Tube is displaced:**
 Consider if

1. hypoxia, CVS instability, failure to achieve set pressure/ventilation
2. Audible cuff leak despite appropriate cuff pressures

Step 1:

Call for help
Give 100% oxygen
Check the capnography (ETCO₂) - if not on, put it on
Call for difficult airway trolley


Re-assess

Step 2:

Attach Water's Circuit

Step 3:

LOOK

- Is ETCO₂ trace a normal square wave? 
- Is Water's circuit moving with spontaneous respiration?
- Is chest moving up and down?


yes

Suggests problem with tracheal tube unlikely

Consider other causes for deterioration
 eg pneumothorax, bronchospasm

Assess breathing and circulation, follow ALS algorithms if necessary

VENTILATE USING WATER'S CIRCUIT

- Is ETCO₂ trace a normal square wave? 
- Is chest moving up and down and easy to ventilate?

yes

no

no

Step 4:

SUGGESTS A PROBLEM WITH TRACHEAL TUBE (TT):

- Check TT markings at teeth – has TT been pushed in or partially fallen out?
- Is TT blocked? – pass suction catheter
- Is patient biting on TT? – give atracurium 50mg iv
- Has cuff herniated over end of TT? – deflate and reinflate cuff

Patient
deteriorating

Patient
stable

Step 5:

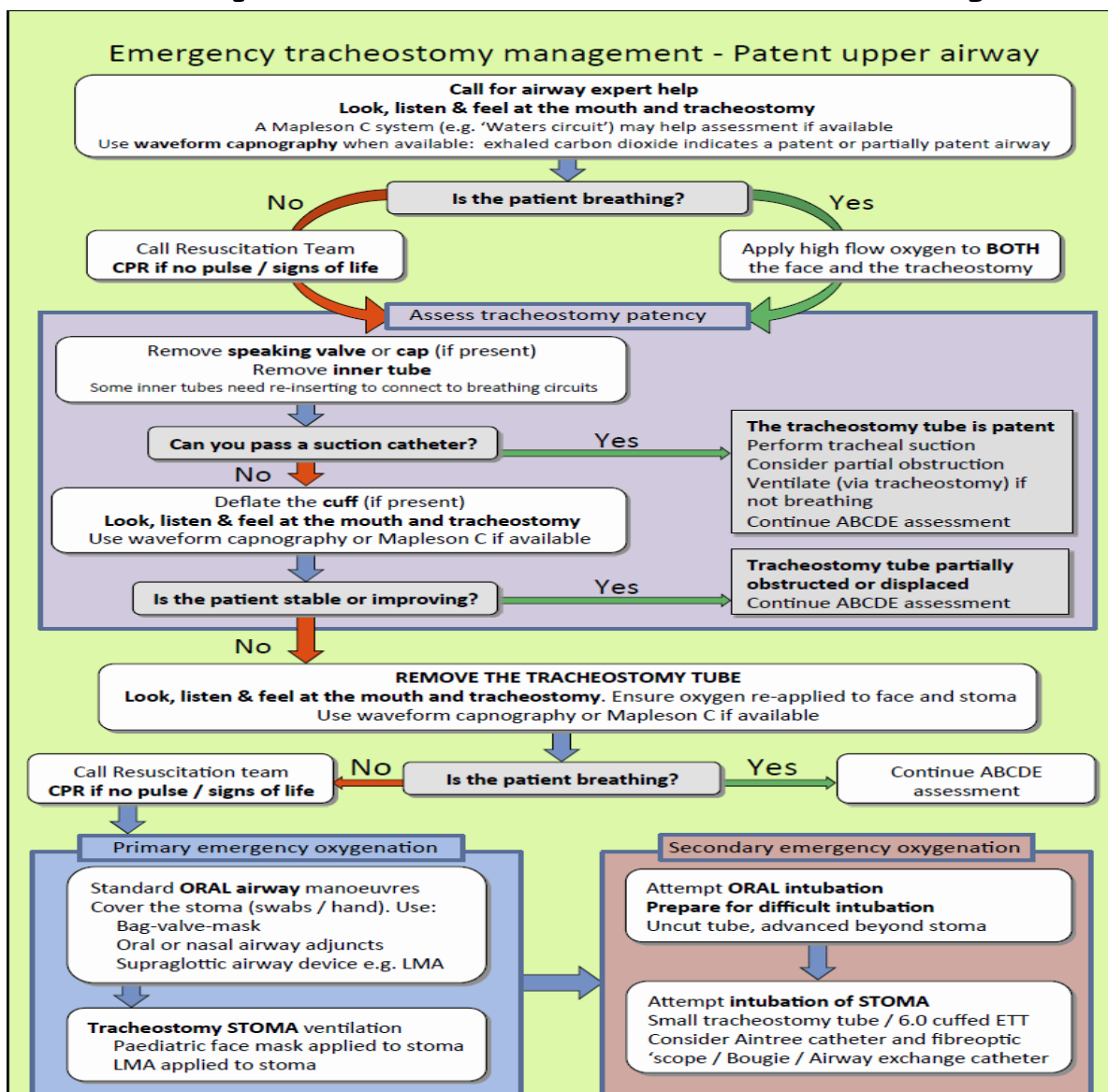
Remove tracheal tube and call for senior anaesthetist

- Ventilate with 100% O₂ using bag/mask with Guedel airway + two hands on mask
- Consider LMA/i-gel/ProSeal LMA
- Oral tracheal intubation if you have the skills

100% oxygen and await senior anaesthetist

- Paralyse
- Consider passing bronchoscope via TT +/- railroading TT into place
- If in doubt, laryngoscopy and re-intubation, possibly over

Displaced tracheostomy





**THANK
YOU
FOR
LISTENING
MY PRESENTATION**

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