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# **GASLAB**

**GLASGOWAIRWAYSILLSLAB**

## **FIBREOPTICS AND RESCUE TECHNIQUES**

**MONDAY 6TH DECEMBER 2010**

**EBENEZER DUNCAN CENTRE VICTORIA**

**INFIRMARYGLASGOW**

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# Fibreoptics and Rescue Techniques

## Monday 6<sup>th</sup> December 2010 Programme

Venue: Ebenezer Duncan Centre, Victoria infirmary, Glasgow



09.00 - 09.20 Registration & Introduction

09.20 - 09.50 Rescue Techniques - Dr. Suzie Thomson

09.50 - 10.20 Fiberoptic Intubation - An Introduction - Dr. Kevin O'Hare

10.20 – 10.45 Coffee

10.45 - 12.45 Workstations A-D

A - Fiberoptic Technique and Oral Intubation

B - Nasal Fiberoptic Intubation and Aids

C - Cricothyroidotomy

D - Jet Ventilation

12.45 - 13.30 Lunch

13.30 - 15.30 Workstations E - H

E - Local Anaesthesia and Anatomy of the Airway

F - Intubating Laryngeal Masks

G - Rescue Techniques - LMA and the Aintree catheter

H – Venner APA videolaryngoscope (Intavent)

15.30 – 16.30 Coffee and Case Scenarios and Group Discussion

**Course organizer:** Dr. Suzie Thomson      e:suzie@gaslab.co.uk

<b>Faculty:</b>	Dr. Val Cunningham	e:val@gaslab.co.uk
	Dr. Kevin O'Hare	e:kevin@gaslab.co.uk
	Dr. Stephen Jeffrey	e:steve@gaslab.co.uk
	Dr. Craig Urquhart	Dr. Paul Harrison
	Dr. Phil Jacobs	Dr. Nick Brown
	Dr. Kevin Fitzpatrick	Dr. Paul McConnell

This course is recognised by the Royal College of Anaesthetists and is eligible for 6 CPD points.

# Fibreoptic Intubation – Dr. Kevin O’Hare

## Difficult Airway

The clinical situation in which a conventionally trained anaesthesiologist experiences difficulty with mask ventilation, difficulty with tracheal intubation or both.

Introduced by the American Society of Anaesthesiologists Task Force on the management of the difficult airway.

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### Fibreoptic intubation – why?

“Ideal” intubating devices

Flexibility

Continuous visualisation

Less trauma

Equipment is lightweight & portable

Can be used with other intubating techniques (e.g. direct laryngoscopy) & ventilatory devices (e.g. LMA)

### Indications

Previous difficult intubation / mask ventilation

Anticipated difficult laryngoscopy / mask ventilation

Difficult airway & risk of aspiration

Haemodynamic stability required

Neurological assessment

Training

### Contraindications

Inexperience

Patient refusal / uncooperative

Local anaesthetic sensitivity

Massive haemorrhage in mouth

## Training in FOI

Trepidation & anxiety → impossible task. @frustration

Complex intubating tool requiring a degree of skill.

Structured training programme.

Pre-clinical & clinical components.

Consolidation of skills on anaesthetised patients.

## FOI in Anaesthetised Patients

Consent

Ethics of teaching FOI in anaesthetised patients.

AAGBI – “unnecessary to detail individual procedures to the patient if it is routinely performed”.

FOI under GA causes additional risks to the patient? Is it a routine procedure?

## Apnoeic Technique

IV induction, muscle paralysis, maintenance with inhalational or TIVA.

Apnoea limited to 2-3 mins; if trainee fails or SaO<sub>2</sub> < 95% then manual ventilation is established, procedure is usually repeated only once.

Safe & effective, controlled conditions, no coughing or laryngeal spasm.

BUT longer time required so potential for hypoxia & hypercarbia.

## Spontaneously Breathing Technique

IV induction, maintenance with inhalational or TIVA.

Intubation performed under deep inhalational anaesthesia or after obtunding reflexes with lignocaine spray.

O<sub>2</sub> delivered by nasal catheter or using a fiberoptic airway aid.

Higher incidence of spasm, coughing & airway obstruction.

## Essential components

Explanation & consent

Premedication

Sedation

Monitoring

Oxygenation

Local anaesthesia

Back-up plan

### **Explanation**

Thorough, unhurried explanation, emphasising safety

Explain that LA will remove some discomfort but not provide complete numbness

Establish rapport

Formal consent – either verbal or written

### **Premedication**

Reduce anxiety & produce a dry mouth

Prophylaxis for aspiration

Benzodiazepines – orally or i.v.

Opioids – i.m. morphine

Antisialagogues – a dry mouth produces better contact between local anaesthetics & mucous membranes, prevents dilution by saliva & reduces secretions that interfere with endoscopy

### **Sedation**

Conscious sedation

Midazolam – amnesia

Fentanyl – suppress cough reflex

Propofol (TCI: 0.8-1.2mcg/ml) – weakens upper airway reflexes, beware of unconsciousness & respiratory depression

Remifentanil – 0.05-0.175 mcg/kg/min

### **Antisialagogues**

Atropine best avoided as has weak drying effect & causes tachycardia

Hyoscine is powerful, but best avoided in over 60s

Glycopyrrolate does not cross BBB, hence produces no sedation

### **Oxygenation**

Conscious sedation should be titrated to avoid hypoxia

But useful to increase oxygen reserves

Nasal cannula

Can deliver oxygen through working channel of scope – may push secretions away from tip of scope

### **Local anaesthesia**

Nasal cavity

Tongue & oropharynx

Larynx – supraglottic / infraglottic

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### **Problems**

Inability to advance scope through nose

Vision obscured by blood & secretions

Inability to advance scope due to reduced airspace

Inability to railroad the tube

### **Nose**

Choose the more patent nostril under direct vision

Don't introduce the scope blindly as may cause bleeding

Use a soft nasopharyngeal airway prior to passing the scope

Use oral route if nasal fails

### **Secretions**

Blood may be suctioned, but if massive then endoscopy may have to be abandoned

Suction the nasopharynx before endoscopy

Use external suction

Ask patient to swallow

High flow oxygen

Insert tip of scope in warm water or clean with alcohol wipe before endoscopy

### **Reduced airspace**

Often happens with inappropriate sedation

Jaw thrust, neck extension

Tongue protrusion

Ask patient to sniff, swallow or breathe deeply

## **Railroading**

Size of tube – the larger the difference between the diameters of the scope & the tracheal tube, the greater the difficulty in passing the tubes through the cords.

When using an adult scope, 6-7mm ID tracheal tubes are satisfactory.

95% success rate with 6mm tubes compared to 55% with 8mm tubes (Koga, Asai 1997).

Flexibility of armoured tubes conforms best to the scope and results in a high first-pass success of 95% compared to 35% for standard tubes (Brull 1994).

## **Confirmation of Tube Position**

Confirm position with scope as pulling out

Connect to breathing system

Reconfirm position by bag movement & CO2 on monitor

Administer induction agent and/or muscle relaxant

## **Back-up plan**

Cancel operation & regroup!

Proceed with surgical airway under LA

Induce GA, if mask ventilation thought to be easy

Consider intubation options & surgical airway under GA

## **In Summary...**

Important to develop a technique & method in which you gain experience

Careful attention to detail & clinical experience are extremely important

# Basic Scope Care and Handling

## Basic principles behind fibre-optic instruments

- Light and image transfer via coherent(image transmission) and incoherent (light)bundles
- Fibre coating with lower refractory index allowing for clearer image
- Working channel port
- Diopter rings/focusing
- Distal mobile segment
- Portable lithium light source or light guide cable

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## Scope Cleaning and Maintenance

- Checking the scope cleaned(soapy water) and sterilised
- Checking working channel flushed and working e.g. patent

## Scope Handling

- Movement in 2 dimensions
- Body position/ straight scope technique
- Height of the patient/bed
- Angle of approach
- Lubrication
- Scope temperature/ Defogging

## Oxford Box

- Familiarise
- Straight arm technique and planes of movement
- Orientation marker
- Emphasis on fine movements
- Emphasis on damaging the scope on withdrawal if tip bent

## Demonstration - Oral Fibreoptic Intubation

- Recognise conduit airways-Ovassapian/Berman/VBM mask
- Tube introduction via oral route
- Repositioning Manoeuvres

# Nasal Fibre-optic Techniques

## Preparation

- Scope handling and body positioning
- Drying Agents
- Sniff Test
- Vasoconstrictors

## Differences in asleep technique

- Apnoea technique or ventilated technique
- Jaw thrust
- Laryngoscopy
- Pulling tongue forward

## Tubes and Aids

- Tube Sizes 6/6.5/7/7.5
- Chimney airway/endoscopy mask/ nasal airway
- Best success rates ILMA soft tip reinforced best first pass success
- Lubrication
- External Scope diameter: internal tube diameter ratios for best first pass success
- Tongue protrusion in awake patients
- Suction-oral via yankauer and via scope

## Demonstration - Fibre-optic intubation using AIRSIM manikin

*Stay in the black and out of the red!*

- Check for tracheal rings
- Orientation/ post tracheal ring defect
- Check scope not advanced with tube (bronchospasm as carina tickled)

## Correct Tube Placement

- Capnography
- Bag + chest movement
- Check Carina

## Discussion Points

- Reversible short acting sedation
- Adrenaline nebulisers
- Prophylactic Cricothyroid Oxygenation
- Split Nasopharyngeal Airways
- Awake Tracheostomy

# Needle Cricothyroidotomy

## Equipment

- Manikin
- Needles –Ravussin, Patil, Venflon, Quicktrack
- Manujet

## Principles behind Cricothyroid Puncture

- Oxygenation not ventilation
- Quick fix. Maximum 40 mins
- Airway obstructed completely –air outlet required
- Elective Cricothyroid insufflation
- Local Anaesthesia with vasoconstrictor

## Limitations of needle Cricothyroidotomy

### Ravussin Cannulae

- Luer lock connector
- 15mm standard circuit connector
- Discuss conversion via guide wire to larger airway
- 13g kink resistant

### Practical Technique

- Positioning
- Laryngeal stabilisation
- 90 degree puncture aspiration
- Turn to 60 degree angle
- Advance cannula over needle
- Check air aspiration
- Manujet Ventilation and connections
- Ravussin/Quicktrack/Patil/Venflon

### Recognise

- Patil Set/ Quicktrack
- Quicktrach very short and only 4mm internal diameter i.e. unlikely to sufficiently ventilate only oxygenation possible
- Minitracheostomy performs poorly compared to needle and surgical and seldinger techniques

# Surgical Cricothyroidotomy

## Understand

- Traditional Cricothyroidotomy- Thyroid cartilage lifted cephalad
- Rapid Four Stage Technique- Cricoid cartilage lifted caudad
- Seldinger approach- insertion of a guide wire

## Complications of Cricothyroidotomy

- Bleeding
- Misplaced tube and subsequent problems
- Surgical Ephysema, Pneumothorax
- Trauma

## Prior Preparation and Planning ABC

- Infiltration with local anaesthetic and adrenaline

## Practical Skill of Rapid Four Stage Technique (RFST)

- Stand cephalad
- Positioning like intubation
- ? More anaesthetist friendly
- Size 10/11 Blade
- Tracheal hook (double hook less likely to snap cricoid ring)
- Patient positioning
- Immobilise the larynx
- 1cm incision through membrane (single step or skin sweep first)
- Insert hook and lift cartilage
- Insert size 6 tube cuffed
- Check ventilation

## Melker Seldinger Set

- pre peel set
- set comes disassembled
- Size 6 malleable tube cuffed or uncuffed
- Cuffed tube longer
- Flexible tip guide wire to avoid piercing trachea and aids passage
- 90 deg skin puncture and air aspiration followed by re-angulation to 600
- Insertion of guide wire removal needle
- Stab incision at least 1cm to skin and membrane
- Melker dilator over guide wire
- Remove guide wire- obturator complex leaving Melker tube in situ
- Inflate cuff
- Check ventilation

# Intubating and Proseal Laryngeal Mask Airways

## Principles behind ILMA

- 93-99% (blind insertion) success rate with up to 2 attempts
- Oesophageal placement
- Trauma
- Fiberoptic assistance increases success rate
- Avoids unnecessary trauma
- Slightly slower

## Clinical application

- Anticipated airway challenge
- Can ventilate cannot intubate

## Disadvantages

- Expensive
- Requires 20mm mouth opening
- Training and skill retention
- Lower success with cricoid pressure
- Trauma used blind
- End of tube/Murphy's eye mistaken for carina

## Practical Skills

- Anatomical curve aids insertion without head and neck manipulation
- Rigid airway tube –centralises tracheal tube minimises arytenoid trauma and misplacement
- Guiding handle
- Standard 15mm connector
- Elevating bar-rigid, elevates + protects epiglottis but may damage scope

## Tubes

- Multiuse or disposable tubes
- Reinforced
- Standard detachable end connector
- Bevelled end (lower risk of impinging on vocal cords)
- Specific Obturator

## Principles of Proseal LMA

- Drain tube -clinical confirmation of correct mask position
- Designed to protect against aspiration Drain tube may prevent gastric insufflation in artificial ventilation
- PPV
- Seal pressures greater
- Introducer reduces need to place fingers in the patient's mouth

## Proseal LMA Insertion

- Double cuff /Drain tube/Confirmation of placement/ use with NG tube

# Rescue Airway with LMA and Aintree Catheter

## Indications for Aintree assisted Oral Intubation

- Anticipated Difficult Airway e.g. spinal injury
- Can't intubate can ventilate via Berman or LMA

## Demonstrate Aintree

- 4mm internal diameter blue conduit specifically designed for use with fibre-scope
- Ability to jet ventilate – show connections to Manujet
- Ability to connect to circuit 15mm standard connector- show connections

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## Serious Considerations

- NOT a tube exchange catheter
- Too short and stiff for nasal route
- Barotrauma
- Direct Trauma to trachea/lungs and oesophagus
- Misplacement and inflation of stomach

## Demonstrate Limitations Intubation via LMA

- Size 4 reusable LMA will allow passage size 7 tube (NOT all reinforced 7's though)
- Disposable LMA's differ dramatically
- Reinforce- awareness of knowing if tube passes via LMA if using in rescue situation

## Practical Demonstration - Fiberoptic assisted Aintree Intubation

- Insert LMA/Berman- check ventilation
- Demonstrate placing aintree onto scope with lubrication
- Insert aintree scope complex and confirm tracheal rings
- Remove scope (**reinforce not** an aggressive aintree over scope railroad or trauma via bronchi will ensue; aintree left in situ as scope removed)
- Demonstrate aintree connections to 15mm & manujet
- Remove LMA
- Demonstrate tube over aintree
- Check ventilation
- Check rings

## **Airway Anatomy and Anaesthesia of the Airway**

### **Nerve Supply;**

- Nasal Mucosa- Trigeminal (Ethmoidal Nerves)
- Oropharynx- Glossopharyngeal
- Superior Larynx and Cords - Superior Laryngeal Nerves
- Infraglottic Airway-Recurrent Laryngeal Nerve

### **Methods of Anaesthesia**

- Nerve Blockade
- SAYG

### **LA Preparations -Amide**

- Infection and pH of tissues- lipid soluble free base release
- First pass metabolism- 70%
- Plasma lignocaine concentrations primarily from trachea and bronchial tree
- Toxic Doses 1-10mg/kg have been described but textbook 7mg/kg with vasoconstrictor

### **Topicalisation of Nasal Mucosa**

- Otrivine (Xylometazoline 0.1%)
- Nebulised lignocaine
- Instillagel (2%)
- Phenylephrine and Lignocaine preparations (cophenylcaine)
- Cocaine (5%)

### **Topicalisation Oropharynx**

- Nebulisers (smaller particles go further!)
- Swish and Swallow with Instillagel
- 10% spray (banana essence)
- SAYG
- Mucosal atomiser device (MAD)

### **Topicalisation Vocal Cords**

- SAYG directly via scope working channel port
- SAYG via epidural catheter via working channel
- MAD devices oral and nasal
- Mad devices and topicalisation via nasopharyngeal airways

### ***Practical Demonstration of Anaesthesia for Awake Fiberoptic Intubation***

- Drying agents
- Sedation
- Topicalisation
  
- Glossopharyngeal Nerve Block
- Superior Laryngeal Nerve Block
- Cricothyroid Puncture

# Difficult Airway Society Guidelines

www.das.uk.com

Unanticipated difficult tracheal intubation-  
during routine induction of anaesthesia in an adult patient

Direct laryngoscopy → Any problems → Call for help

## Plan A: Initial tracheal intubation plan

Direct laryngoscopy - check:  
Neck flexion and head extension  
Laryngoscope technique and vector  
External laryngeal manipulation -  
by laryngoscopist  
Vocal cords open and immobile  
If poor view: Introducer (bougie) -  
seek clicks or hold-up  
and/or Alternative laryngoscope

Not more than 4 attempts, maintaining:  
(1) oxygenation with face mask and  
(2) anaesthesia

succeed

Tracheal intubation

Verify tracheal intubation  
(1) Visual, if possible  
(2) Capnograph  
(3) Oesophageal detector  
"If in doubt, take it out"

failed intubation

## Plan B: Secondary tracheal intubation plan

ILMA™ or LMA™  
Not more than 2 insertions  
Oxygenate and ventilate

succeed

Confirm: ventilation, oxygenation,  
anaesthesia, CVS stability and muscle  
relaxation - then fiberoptic tracheal intubation  
through IMLA™ or LMA™ - 1 attempt  
If LMA™, consider long flexometallic, nasal  
RAE or microlaryngeal tube  
Verify intubation and proceed with surgery

failed oxygenation  
(e.g. SpO<sub>2</sub> < 90% with FiO<sub>2</sub> 1.0)  
via ILMA™ or LMA™

failed intubation via ILMA™ or LMA™

## Plan C: Maintenance of oxygenation, ventilation, postponement of surgery and awakening

Revert to face mask  
Oxygenate and ventilate  
Reverse non-depolarising relaxant  
1 or 2 person mask technique  
(with oral ± nasal airway)

succeed

Postpone surgery  
Awaken patient

failed ventilation and oxygenation

## Plan D: Rescue techniques for "can't intubate, can't ventilate" situation



Difficult Airway Society Guidelines Flow-chart 2004 (use with DAS guidelines paper)

### Unanticipated difficult tracheal intubation - during rapid sequence induction of anaesthesia in non-obstetric adult patient

Direct laryngoscopy → Any problems → Call for help

#### Plan A: Initial tracheal intubation plan

**Pre-oxygenate**  
 Cricoid force: 10N awake → 30N anaesthetised  
 Direct laryngoscopy - check:  
 Neck flexion and head extension  
 Laryngoscopy technique and vector  
 External laryngeal manipulation - by laryngoscopist  
 Vocal cords open and immobile  
 If poor view:  
 Reduce cricoid force  
 Introducer (bougie) - seek clicks or hold-up and/or Alternative laryngoscope

**succeed** → Tracheal intubation

Not more than 3 attempts, maintaining:  
 (1) oxygenation with face mask  
 (2) cricoid pressure and  
 (3) anaesthesia

Verify tracheal intubation  
 (1) Visual, if possible  
 (2) Capnograph  
 (3) Oesophageal detector  
 "If in doubt, take it out"

failed intubation

#### Plan C: Maintenance of oxygenation, ventilation, postponement of surgery and awakening

Maintain 30N cricoid force

Plan B not appropriate for this scenario

Use face mask, oxygenate and ventilate  
 1 or 2 person mask technique (with oral ± nasal airway)  
 Consider reducing cricoid force if ventilation difficult

succeed

failed oxygenation (e.g. SpO<sub>2</sub> < 90% with FiO<sub>2</sub> 1.0) via face mask

LMA™  
 Reduce cricoid force during insertion  
 Oxygenate and ventilate

succeed

Postpone surgery and awaken patient if possible or continue anaesthesia with LMA™ or ProSeal LMA™ - if condition immediately life-threatening

failed ventilation and oxygenation

#### Plan D: Rescue techniques for "can't intubate, can't ventilate" situation



Difficult Airway Society Guidelines Flow-chart 2004 (use with DAS guidelines paper)

Failed intubation, increasing hypoxaemia and difficult ventilation in the paralysed anaesthetised patient: Rescue techniques for the "can't intubate, can't ventilate" situation

failed intubation and difficult ventilation (other than laryngospasm)

Face mask  
Oxygenate and Ventilate patient  
Maximum head extension  
Maximum jaw thrust  
Assistance with mask seal  
Oral ± 6mm nasal airway  
Reduce cricoid force - if necessary

failed oxygenation with face mask (e.g. SpO<sub>2</sub> < 90% with FiO<sub>2</sub> 1.0)

call for help

LMA™ Oxygenate and ventilate patient  
Maximum 2 attempts at insertion  
Reduce any cricoid force during insertion

succeed

Oxygenation satisfactory and stable: Maintain oxygenation and awaken patient

"can't intubate, can't ventilate" situation with increasing hypoxaemia

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

or

**Cannula cricothyroidotomy**  
Equipment: Kink-resistant cannula, e.g. Patil (Cook) or Ravussin (VBM)  
High-pressure ventilation system, e.g. Manujet III (VBM)  
Technique:  
1. Insert cannula through cricothyroid membrane  
2. Maintain position of cannula - assistant's hand  
3. Confirm tracheal position by air aspiration - 20ml syringe  
4. Attach ventilation system to cannula  
5. Commence cautious ventilation  
6. Confirm ventilation of lungs, and exhalation through upper airway  
7. If ventilation fails, or surgical emphysema or any other complication develops - convert immediately to surgical cricothyroidotomy

fail

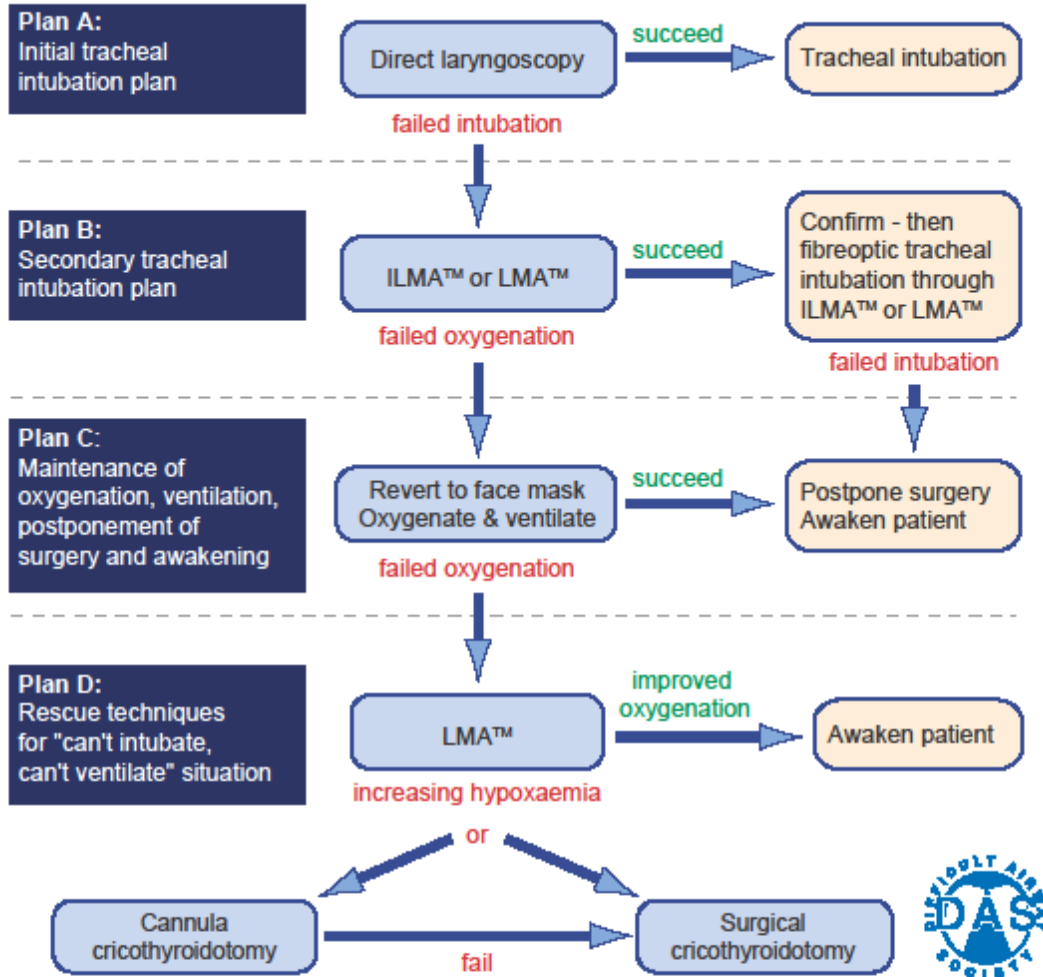
**Surgical cricothyroidotomy**  
Equipment: Scalpel - short and rounded (no. 20 or Minitrach scalpel)  
Small (e.g. 6 or 7 mm) cuffed tracheal or tracheostomy tube  
4-step Technique:  
1. Identify cricothyroid membrane  
2. Stab incision through skin and membrane  
Enlarge incision with blunt dissection (e.g. scalpel handle, forceps or dilator)  
3. Caudal traction on cricoid cartilage with tracheal hook  
4. Insert tube and inflate cuff  
Ventilate with low-pressure source  
Verify tube position and pulmonary ventilation

Notes:  
1. These techniques can have serious complications - use only in life-threatening situations  
2. Convert to definitive airway as soon as possible  
3. Postoperative management - see other difficult airway guidelines and flow-charts  
4. 4mm cannula with low-pressure ventilation may be successful in patient breathing spontaneously

Difficult Airway Society guidelines Flow-chart 2004 (use with DAS guidelines paper)



# DAS Simplified Flowchart



## GAG Reflexes – The Glasgow Airway Guide

ALWAYS

- Ask for help early if you anticipate difficulties

ALWAYS

- Pre-oxygenate the patient properly

ALWAYS

- Wake the patient up if you can't intubate can't ventilate despite all reasonable early rescue attempts

ALWAYS

- Wake the patient up if you can't intubate can't ventilate and have rescued the airway with an LMA unless there is *NO ALTERNATIVE* but to proceed

NEVER

- Give a muscle relaxant before checking you can ventilate the patient unless you are performing a RSI

NEVER

- Extubate a patient that has had or has proven to be an airway problem without being sure that you can or they will maintain their own airway

NEVER

- Advance a bougie or exchange catheter further into the trachea with the endotracheal tube when railroading. The bougie should remain stationary. *AVOID* trauma to the airway!

NEVER

- Railroad an Aintree catheter over a fibre optic scope. They are designed to be advanced with the fibre optic scope under direct vision into the trachea and left in situ when the scope is withdrawn

REMEMBER

- When railroading over scopes bougies or catheters- there is a much greater chance of swift first pass success into the trachea *THE CLOSER THE INTERNAL DIAMETER OF THE TUBE IS TO THE EXTERNAL DIAMETER OF THE CATHETER IT IS PASSING OVER!*

ALWAYS

- Consider awake fibre optic intubation as a safe alternative in many complicated airways

# **Glasgow Airway Guide – The Obstetric Patient**

Compiled by Dr. Terese Duggan

## **Risk of difficult intubation increased by:**

High BMI  
Large breasts  
Airway mucosal oedema – worse in pre-eclampsia  
Potential bleeding from fragile airway mucosa  
Poor patient positioning  
Incorrectly applied cricoid pressure  
Anaesthetic anxiety  
Intubation attempts before relaxant worked

## **Risk of difficult intubation minimised by:**

Careful airway assessment  
Tape breasts laterally and caudally  
Remove any hair ties interfering with head position  
A range of ETT sizes  
A range of laryngoscopes eg standard/ short-handled/ Polio-bladed/ McCoy  
Difficult intubation adjuncts eg bougies, oral/nasal airways, LMA, access to fiberoptic scope

## **Pre-oxygenation is ESSENTIAL – rapid desaturation following apnoea:**

Oxygen consumption increased  
FRC reduced  
Airway closure may be present

**Risk of Aspiration increased by:**

Reduced function and tone of lower oesophageal sphincter → reflux and heartburn

Raised intragastric pressure → reflux and heartburn

Delayed gastric emptying

**Risk of Aspiration mimimised by:**

Supine position with lateral tilt

RSI

Extubate patient when awake and on their side

REMEMBER - SODIUM CITRATE IMMEDIATELY PRIOR TO RSI

**Remember:**

Call for help early

Avoid repeated attempts at intubation, make an early decision regarding whether intubation possible

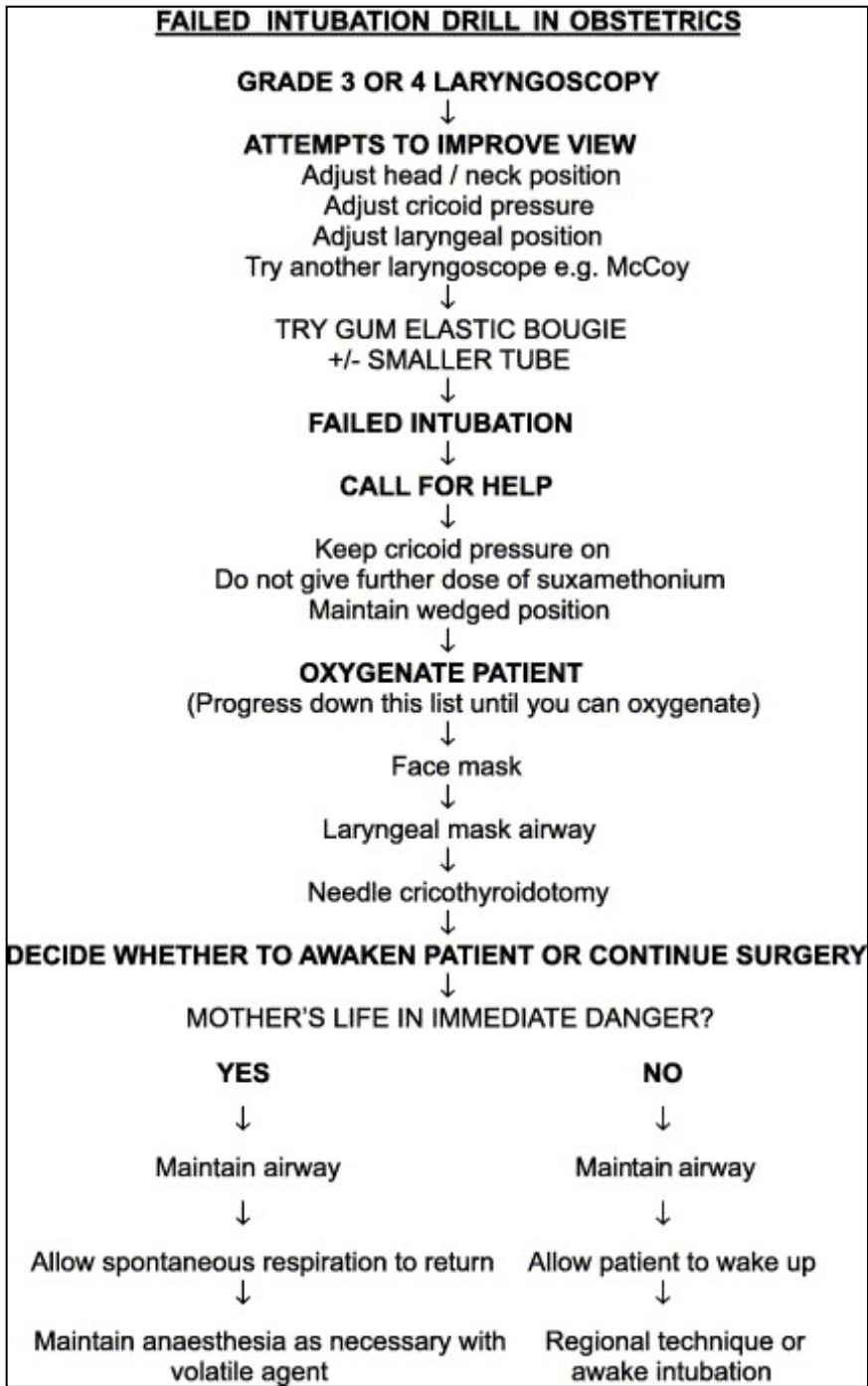
Avoid hypoxia, maintain oxygenation

Consider reducing/releasing cricoid pressure

General anaesthesia continued if mother's life in immediate danger eg maternal cardiac arrest, major haemorrhage, severe placental abruption

Primary responsibility is to ensure mother is not harmed

A heaving, spontaneously breathing patient is prone to regurgitation/vomiting, this also makes surgery more difficult – consider a muscle relaxant if patient easy to ventilate via airway/LMA and surgery must proceed



# Royal College of Anaesthetists - Competencies in Airway Management

## Intermediate Level – ST 3 and 4

### Airway Management:

Anatomy of the airway

Physiology of airway and airway reflexes

Pharmacology relevant to the airway:

- control of secretions

- control of airway reflexes in conscious sedation

- effect of anaesthetic drugs on airway reflexes

- reducing the prevalence and sequelae of gastro-oesophageal reflux

Evaluation of the airway:

- history

- general examination

- specific predictive tests

- special investigations

Airway strategy:

- aspiration risk

- predicted difficult direct laryngoscopy

- predicted difficult mask inflation

- known abnormal / narrowed tracheo-bronchial tree

- unexpected difficult ventilation

- unexpected difficult intubation

- can't intubate / can't oxygenate

Preoxygenation – techniques / purpose

Confirmation of position of tracheal tube within trachea

Monitoring of ventilation by pressure changes, gas flows and capnography

Application of cricoid force in a rapid sequence induction

Cricoid force induced difficulties with airway management

Airway equipment - difficult airway trolley

Tracheostomy tubes, types, fixation and care

Conscious sedated (awake) intubation:

- preparation of patient

- topical anaesthesia

- nerve blocks

- laryngoscopy, bronchoscopy

- specialised tubes

The obstructed airway:

- recognition

- immediate treatment of acute obstruction

- anaesthetic management of acute and chronic obstruction

- flexible nasendoscopy and imaging

Emergency cricothyrotomy

- needle

- purpose built cannula >4 mm ID

- surgical

Extubation strategies - routine, predicted and unexpected difficulty

Complications of difficult airway management

Follow-up care of patient, documentation and patient information

Surgical approach to the airway - indications, techniques, conduct

Percutaneous cricothyrotomy and tracheostomy

Skills:

- Recognition of the difficult airway
  - when to ask for help
- Failed rapid sequence intubation
  - performance of recognised 'drills' for failed intubation / ventilation
- Alternative methods of intubation
  - other laryngoscopy blades and bougies
  - low skill fiberoptic intubation e.g. via laryngeal mask or specialised airway
- Placement and checking of double lumen tubes
- Anaesthetic techniques for laryngoscopy, bronchoscopy and tracheostomy
- Extubation in abnormal airway
- Clinical review of patient to detect and treat airway instrumentation damage
- Interpretation of CT, MRI imaging and flow-volume loops
- Additional desirable clinical skills to be learnt primarily in the non-clinical environment (skills laboratory / manikin / simulator) but supplemented by some clinical experience. The availability of equipment to display the fiberoptic image on a screen will also extend the opportunities for clinical teaching.*
- Awake intubation:
  - indications
  - use with the compromised airway
- Fiberoptic intubation through the nose and mouth with and without concurrent ventilation
- Fibre-endoscopy skills to:
  - visualise tracheo-bronchial tree
  - confirm placement of single and double lumen tubes
  - intubate through the laryngeal mask
- Blind and fiberoptic assisted intubation via the intubating laryngeal mask
- Elective trans-tracheal ventilation to aid difficult intubation
- Retrograde intubation - blind and fiberoptic assisted
- Placement bronchial blockers
- Specialised bougies and airway exchange catheters
- Use of the combitube or other supraglottic balloon device
- Emergency cricothyrotomy:
  - landmarks
  - insertion of needle / cannula
  - confirmation of position within trachea
  - fixation
  - pressures required for adequate gas flows
  - ventilation through cannula / catheter
  - complications
- Application of 30 N cricoid force

**Higher and Advanced Level – ST 5, 6, and 7**

Become skilled in identifying the difficult airway and developing management strategies in ENT, maxillofacial and dental surgery, in trauma and orthopaedic cases, paediatric, burns, plastics and obstetric patients.

**Equipment Guide:**





## I-Gel Supraglottic Airway Device



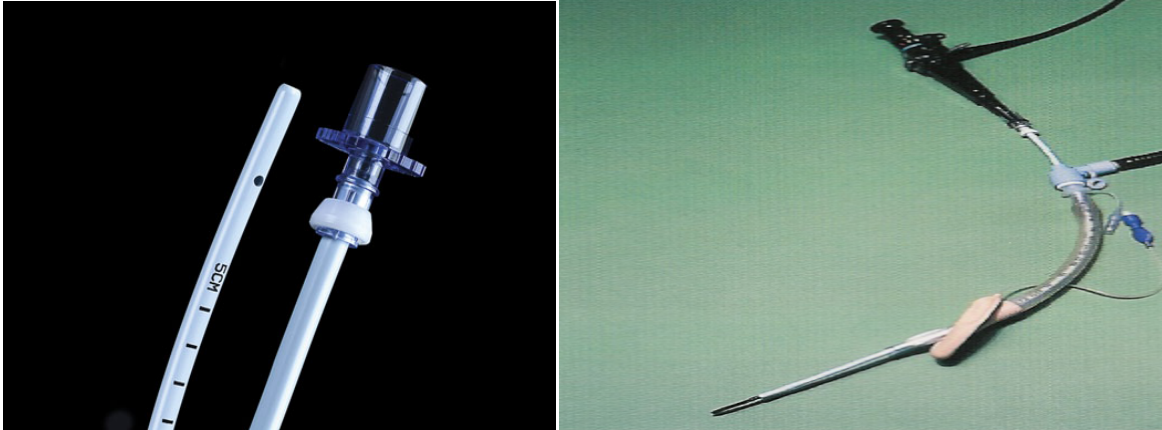
## Melker surgical cricothyroidotomy device - assembled



## Melker cricothyroidotomy cannulae – uncuffed and cuffed



Aintree intubating catheter



Cook Airway Exchange catheter



Ravussin cannula



Manujet II jet ventilation kit

