Supraglottic Airway Devices

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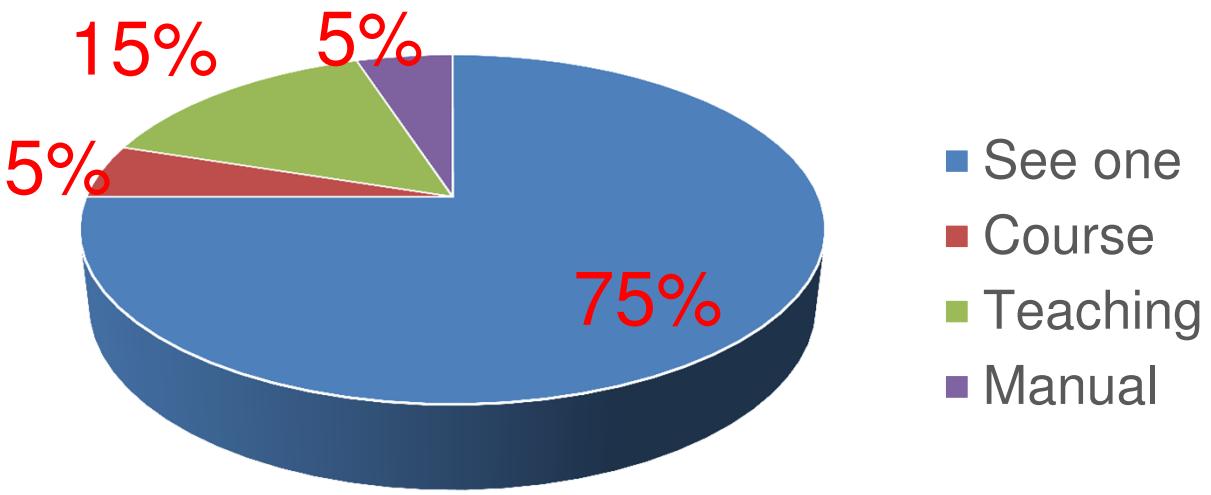
Supra-glottic Airway Devices

Supra-glottic Airway Devices
How do trainees learn the skill?



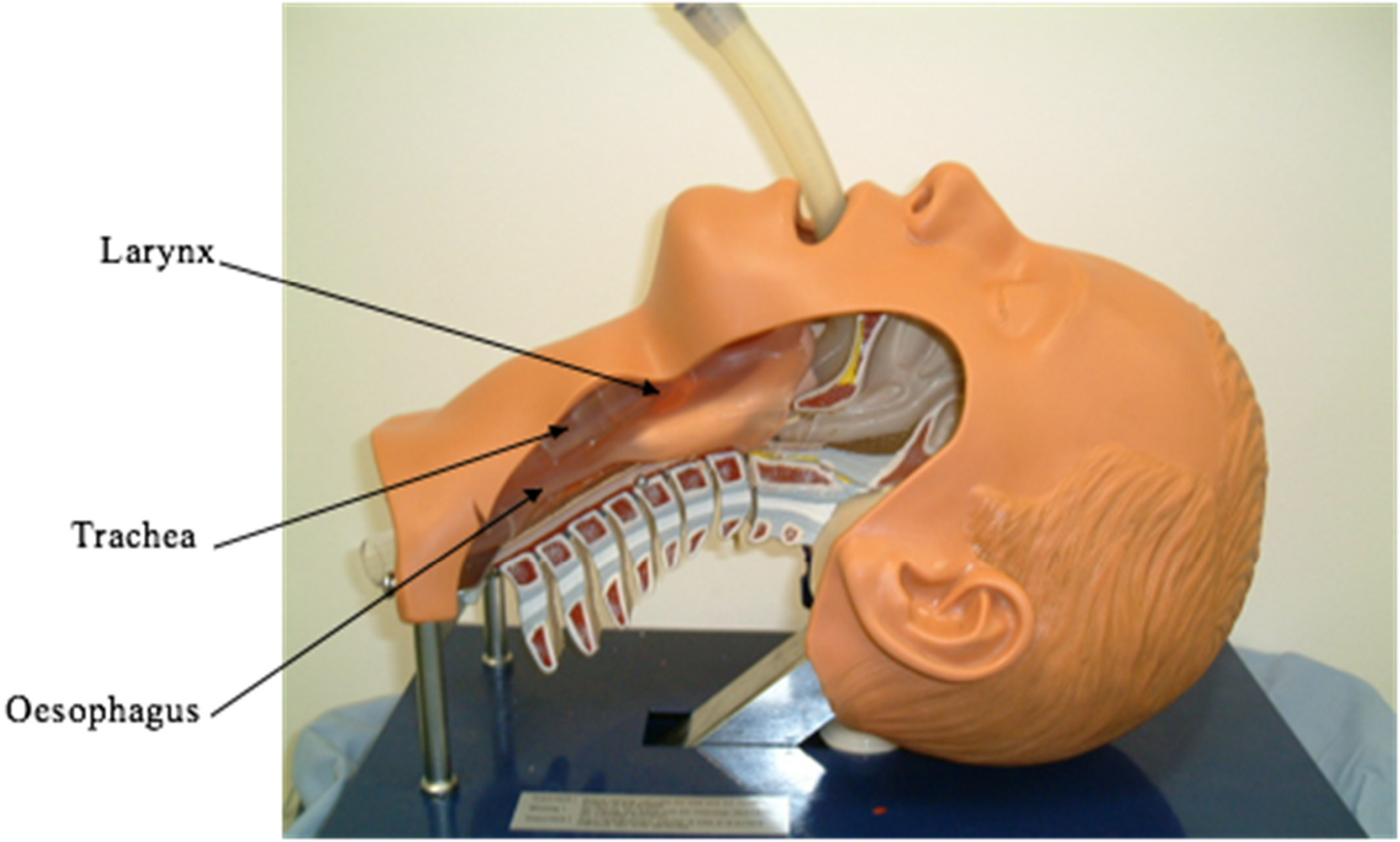
Knowledge and skills of supra-glottic airway devices insertion techniques amongst anaesthetic trainees. WAM meeting , 2015; Dublin

Supraglottic airway devices

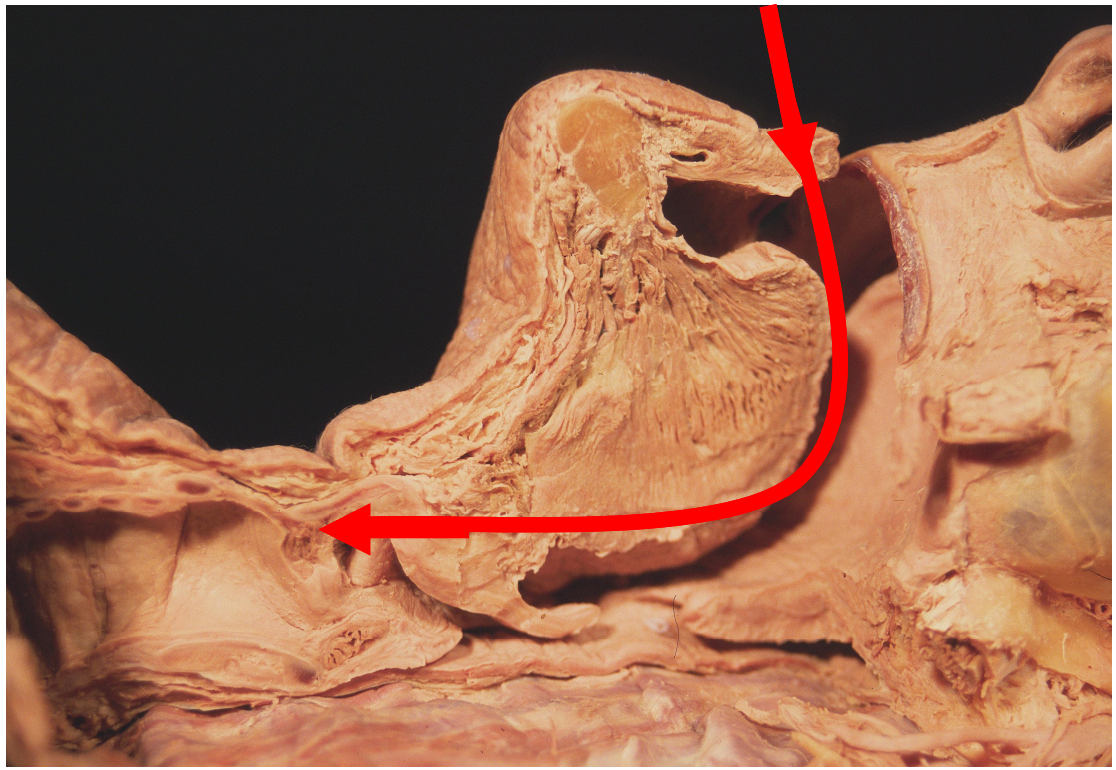
- **How do they work?**
- What is an ideal SAD
- Problems associated with SAD use
- Clinical uses of SAD
- A Practical approach of using SAD

1981 ⟶ 1988

Supraglottic Airway Devices

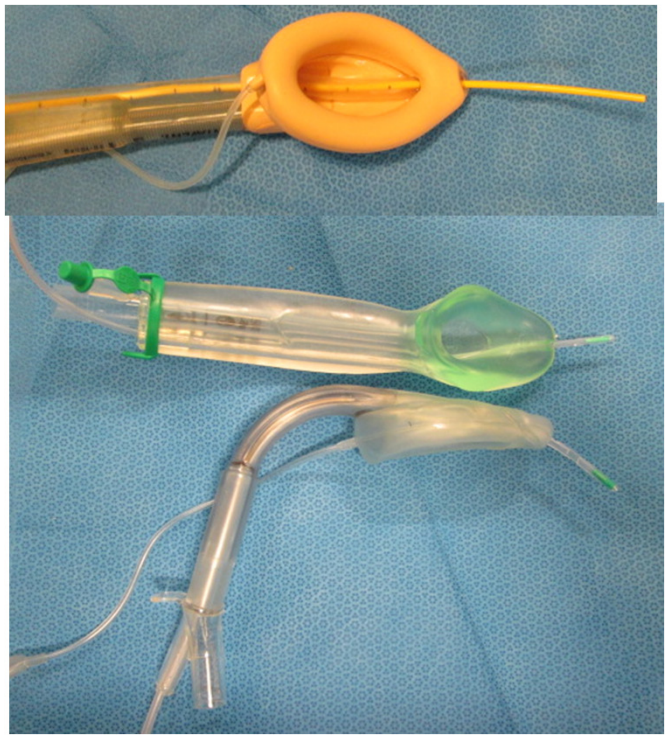

Larynx
Trachea
Oesophagus

Positive pressure ventilation

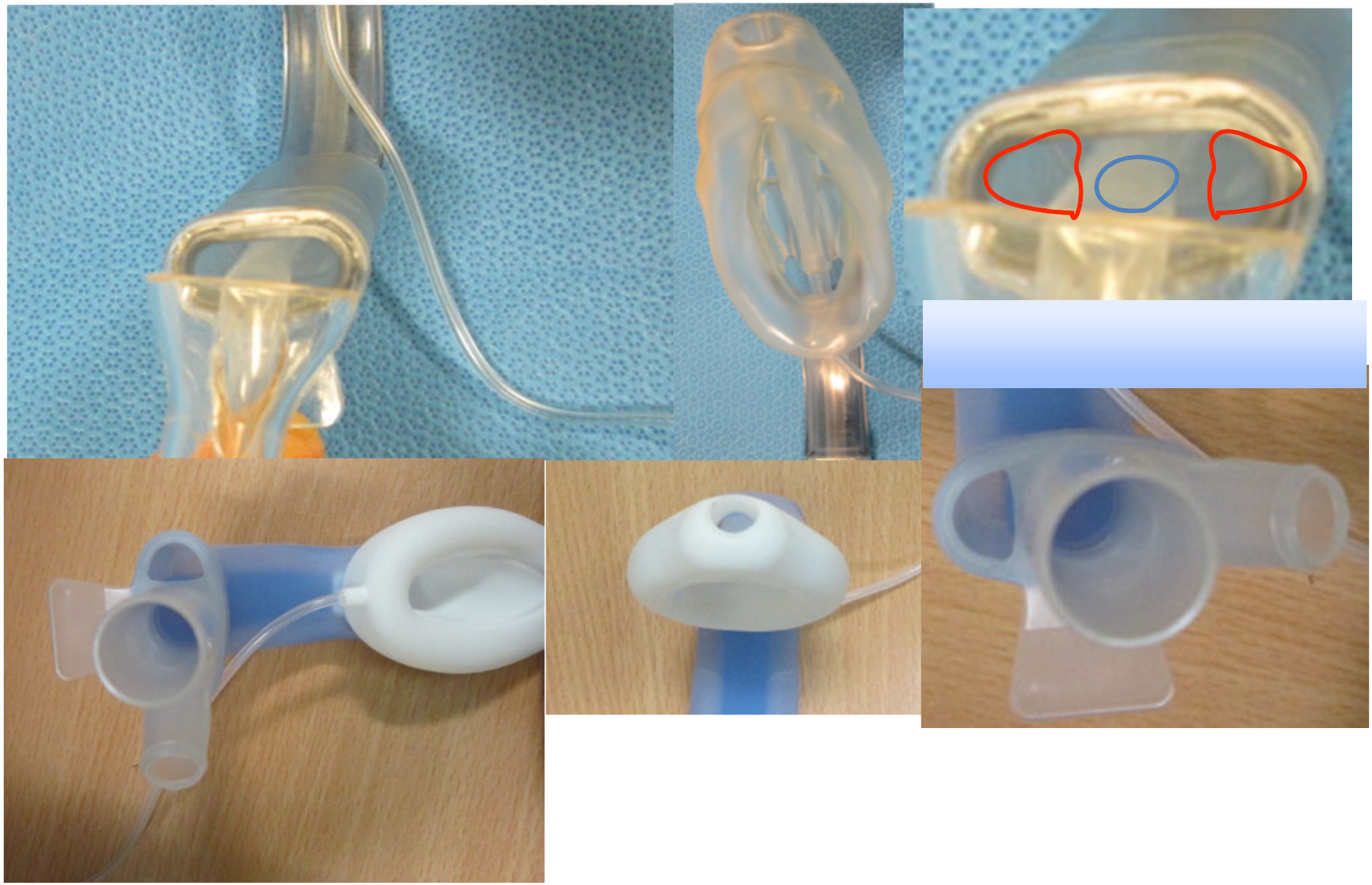


Second generation SAD

- Improved pharyngeal seal
- Improved oesophageal seal
- Gastric drain tube
- Integrated bite block



LMA supreme vs LMA Protector




Ambu® AuraGain™

LMA Protector™ vs LMA Supreme™

- One stage Intubation possible
- Two drainage tubes
- 16, 18 Fr size naso-gastric tube (through size 3, 4 and 5)

LMA Supreme vs LMA Proseal

	Proseal	Supreme
Leak Pressure: Cm H_2O	**25 (6)**	21 (5)
First attempt success rate	88	**98**

Seet E, et al. Safety and efficacy of laryngeal mask airway Supreme versus laryngeal mask airway ProSeal: a randomized controlled trial. *Eur J Anaesthesiol* 2010 **27**:602–7

Coventry Airway Course

Predictors of failed LMA unique™

- Failure in 1.1%
- 3 fold increase in failed mask ventilation
- 60% of failed LMA- hypoxia, hypercapnia, airway obstruction
- 42% inadequate ventilation

Ramachandran SK. Predictors and Clinical Outcomes from Failed Laryngeal Mask Airway Unique™. *Anesthesiology* 2012; **116**: 1217–26

Predictors of failed LMA unique™

- Risk Factors
- Surgical table rotation
- Male sex
- Poor dentition
- Increased BMI

Ramachandran SK. Predictors and Clinical Outcomes from Failed Laryngeal Mask Airway Unique™. *Anesthesiology* 2012; **116**: 1217–26

A proposal for a new scoring system to predict difficult ventilation through a supraglottic airway

T. Saito[1,*], S. T. H. Chew[2], W. L. Liu[3], K. K. Thinn[4], T. Asai[1] and L. K. Ti[3,4]

British Journal of Anaesthesia, 117 (S1): i83–i86 (2016)

14480 patients- difficult ventilation in 74 patients (0.5%)

Risk factors (score)

Male (1)
Age > 45 (1)
Short thyromental distance (3)
Limited neck movement(2)
Score >4 predicts difficult ventilation

Supraglottic airway devices

- How do they work?
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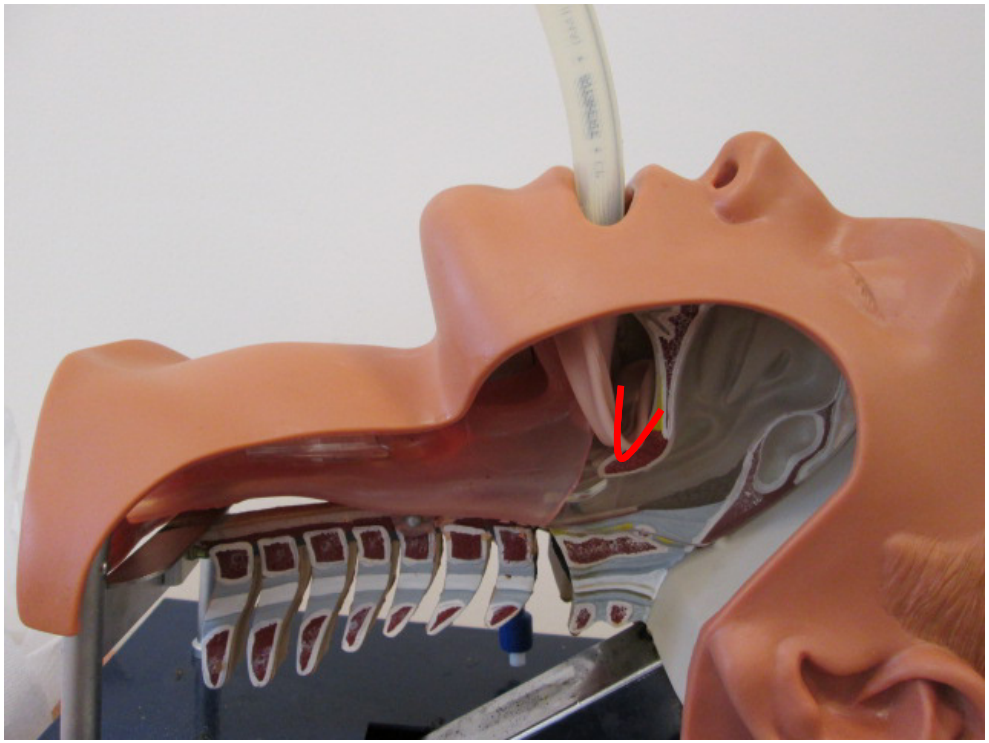
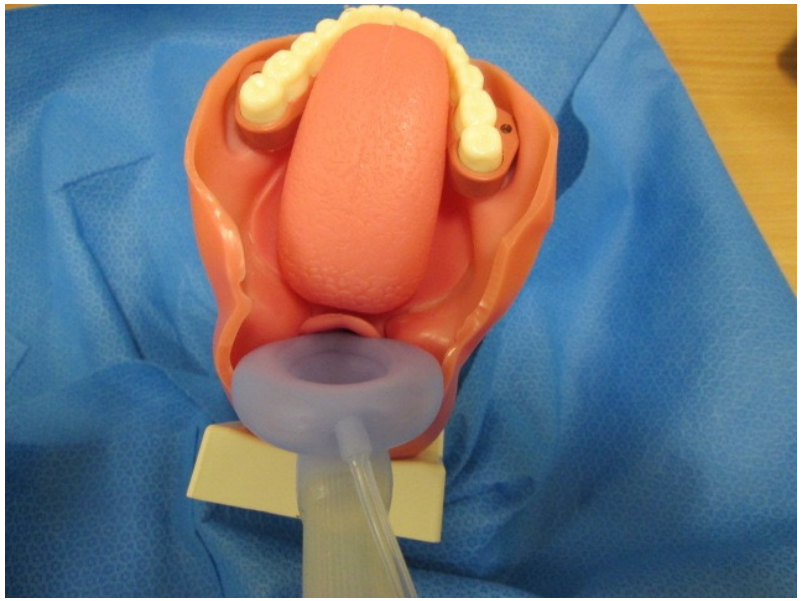
Problems with LMA insertion

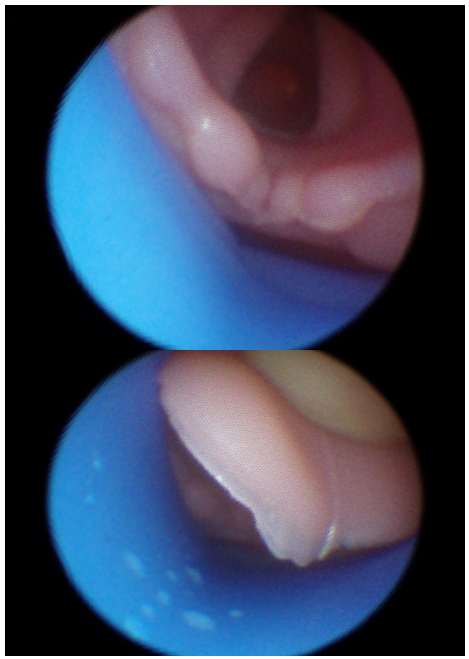
- Mask tip folded backwards



Problems with LMA insertion

- Down folding of Epiglottis
- Mask tip entering the glottis
- Epiglottis entering the orifice of SAD





NAP4 and SAD events :Total 34 events

1 ICU and 33 Anaesthesia related events

- Aspiration: 17 cases
- Airway Trauma
- Failed insertion
- Displacement after insertion
- Loss of airway during maintenance
- Extubation/ emergence

2 deaths and one temporary hypoxic brain damage

Common Themes

- Poor Patient Selection
- Use for inappropriate surgery
- Inexperience

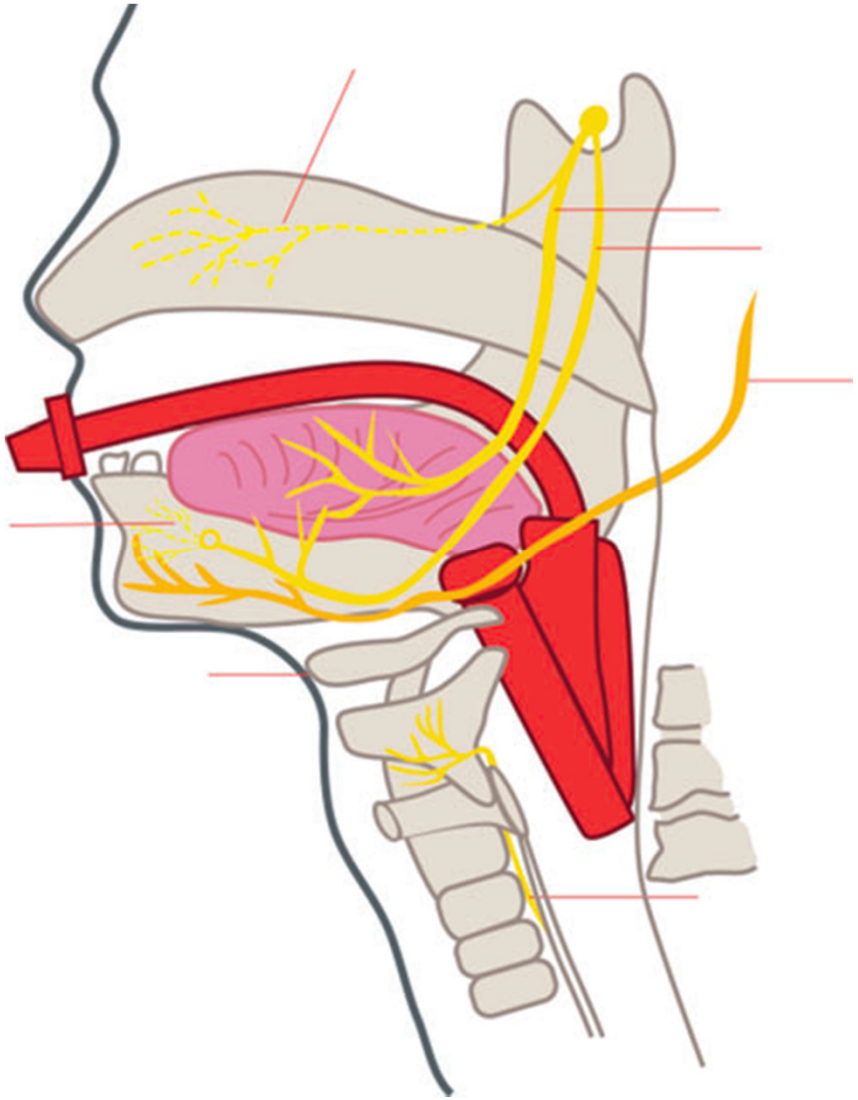
Concerns with SAD

- Risk of Aspiration
- Air leak during PPV and hypoventilation/ gastric ventilation
- Intra-operative displacement
- Side effects

Sore throat, dysphagia, dysphonia.

Nerve injury

Nerve injury



Lingual Nerve (22)

Recurrent Laryngeal (17)

Hypoglossal (11)

Glossopharyngeal (3)

Inferior Alveolar (2)

Infra-orbital (1)

Thiruvenkatarajan V. et al. Anaesthesia , 2015; 70: 344-59

Supraglottic airway devices

- How do they work?
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- **Clinical uses of SAD**
- A Practical approach of using SAD

Clinical use of SAD

- Airway during resuscitation
- Airway during Anaesthesia
- Airway following failed intubation
- Conduit for tracheal intubation
- Difficult mask ventilation
- In obese patients

Cochrane Library

Cochrane Database of Systematic Reviews

Supraglottic airway devices versus tracheal intubation for airway management during general anaesthesia in obese patients (Review)

Nicholson A, Cook TM, Smith AF, Lewis SR, Reed SS

2 RCTs , P LMA vs ETT
70 patients BMI 43-45 for laparoscopy
134 patients , BMI 30 to 32 for peripheral surgery
4.2% required change to ETT
Recovery profile was better in PLMA group

Plan B of Unanticipated failed intubation

Insertion of second generation SAD and oxygenation

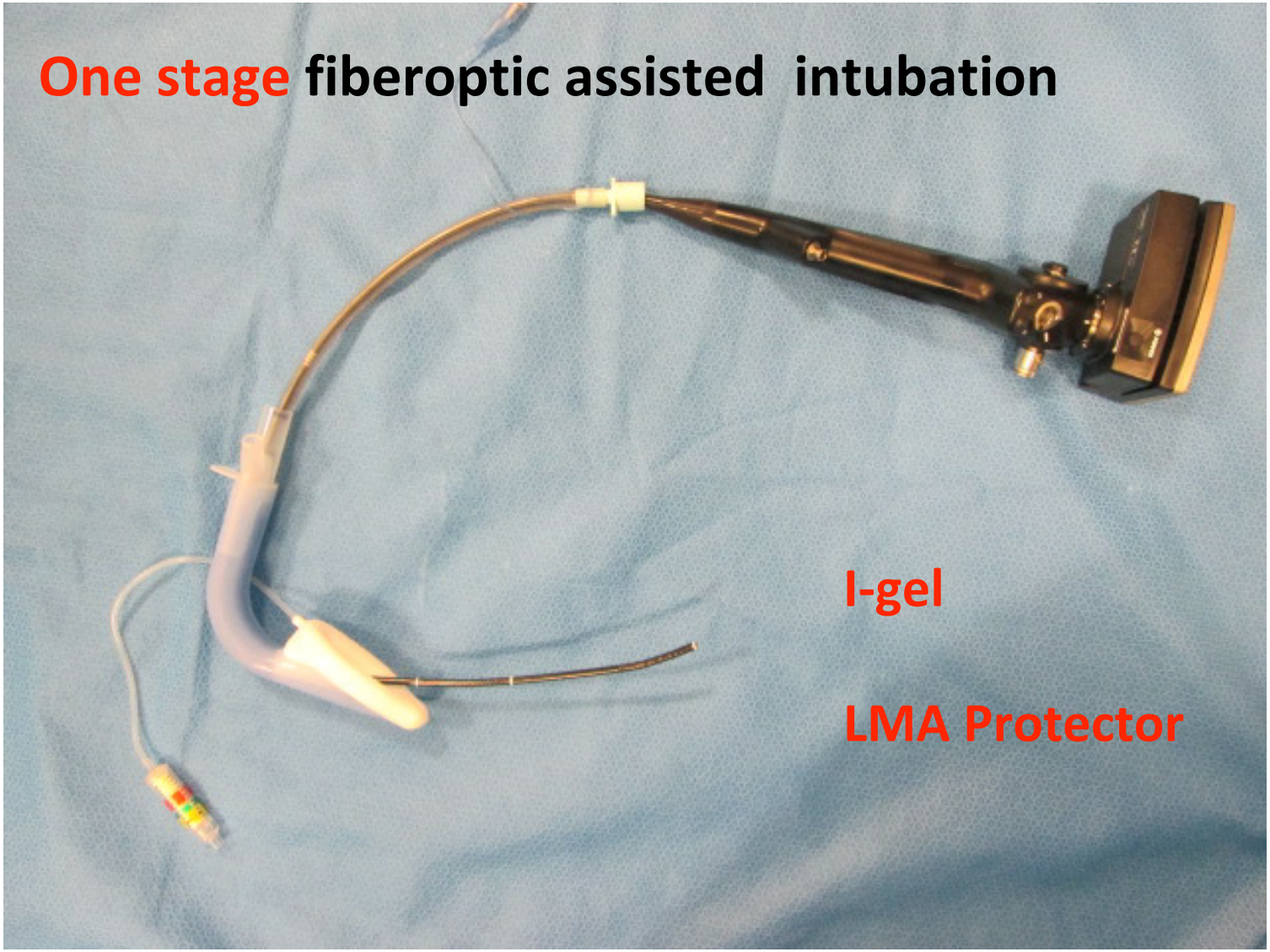
Wake the patient up

Intubate via SAD

Continue surgery with SAD

Tracheotomy or cricothyroidotomy

Fiberoptic assisted intubation via SADs



Insert second generation SAD
Ensure oxygenation

Load the size 6 to 6.5 ETT over the fibrescope

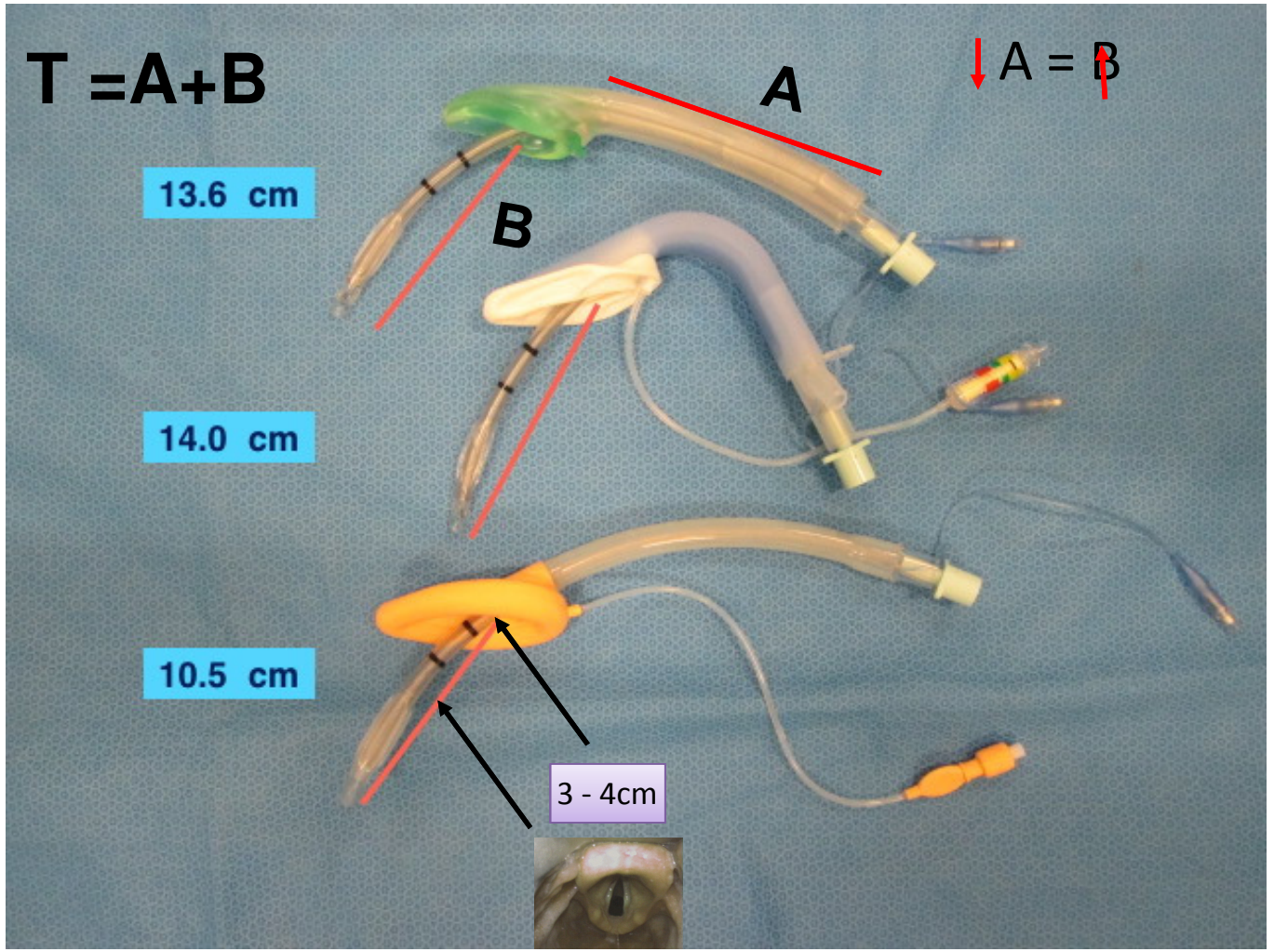
Visualise the glottis

Advance the FOS into the trachea

Railroad the ETT over FOS

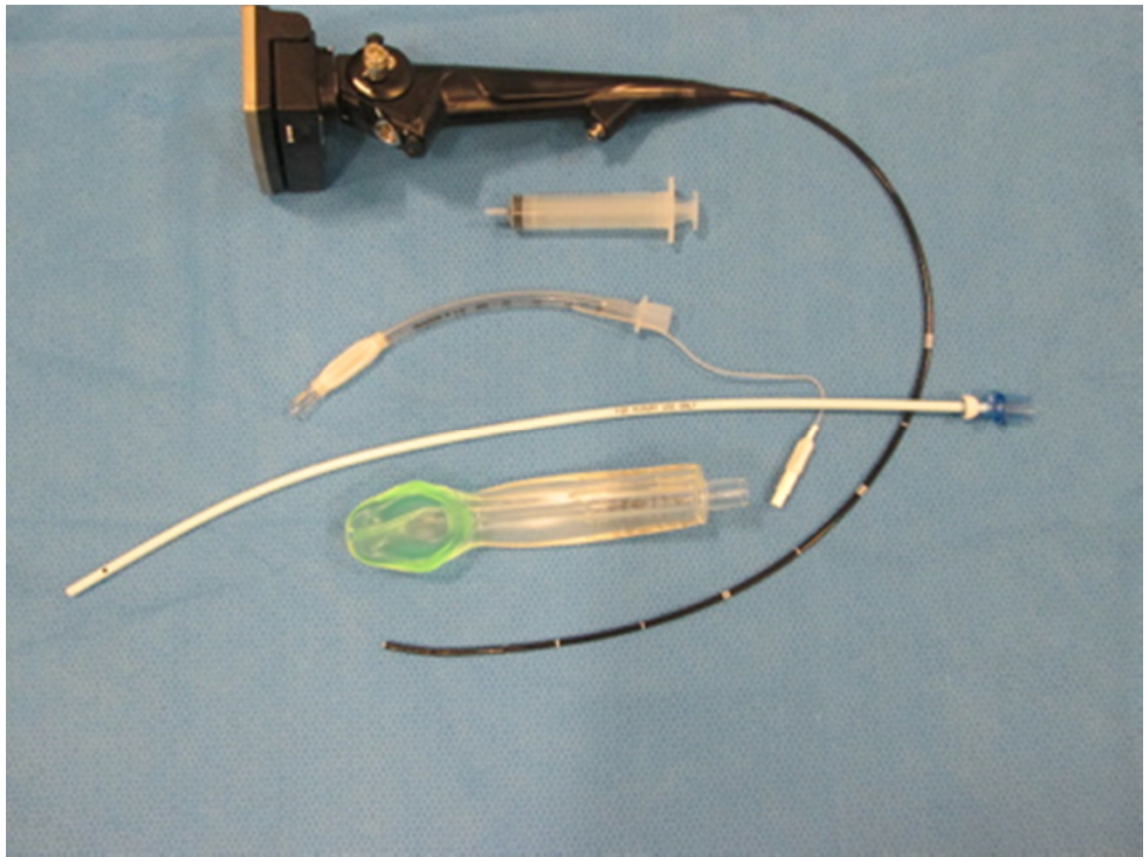
Confirm the correct placement

Fiberoptic assisted intubation via SADs


T =A+B
A = B
A
B
13.6 cm
14.0 cm
10.5 cm
3 - 4cm

Fiberoptic assisted intubation via SADs

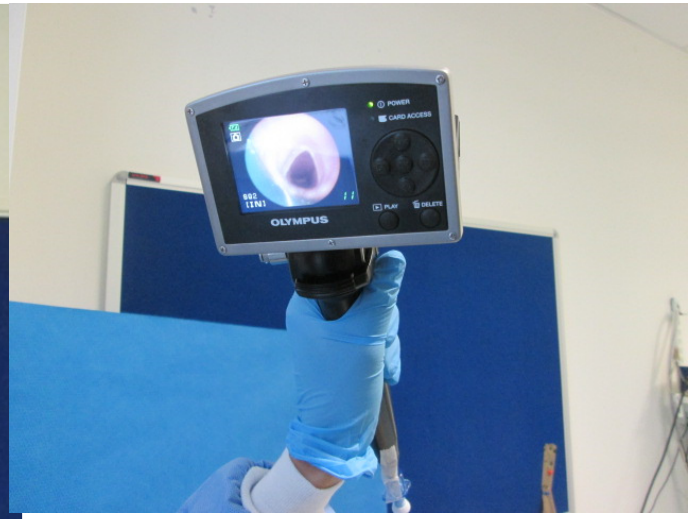
Two stage **fiberoptic assisted intubation**



I-gel
LMA Protector
Proseal LMA

Insert the SAD and oxygenate the patient

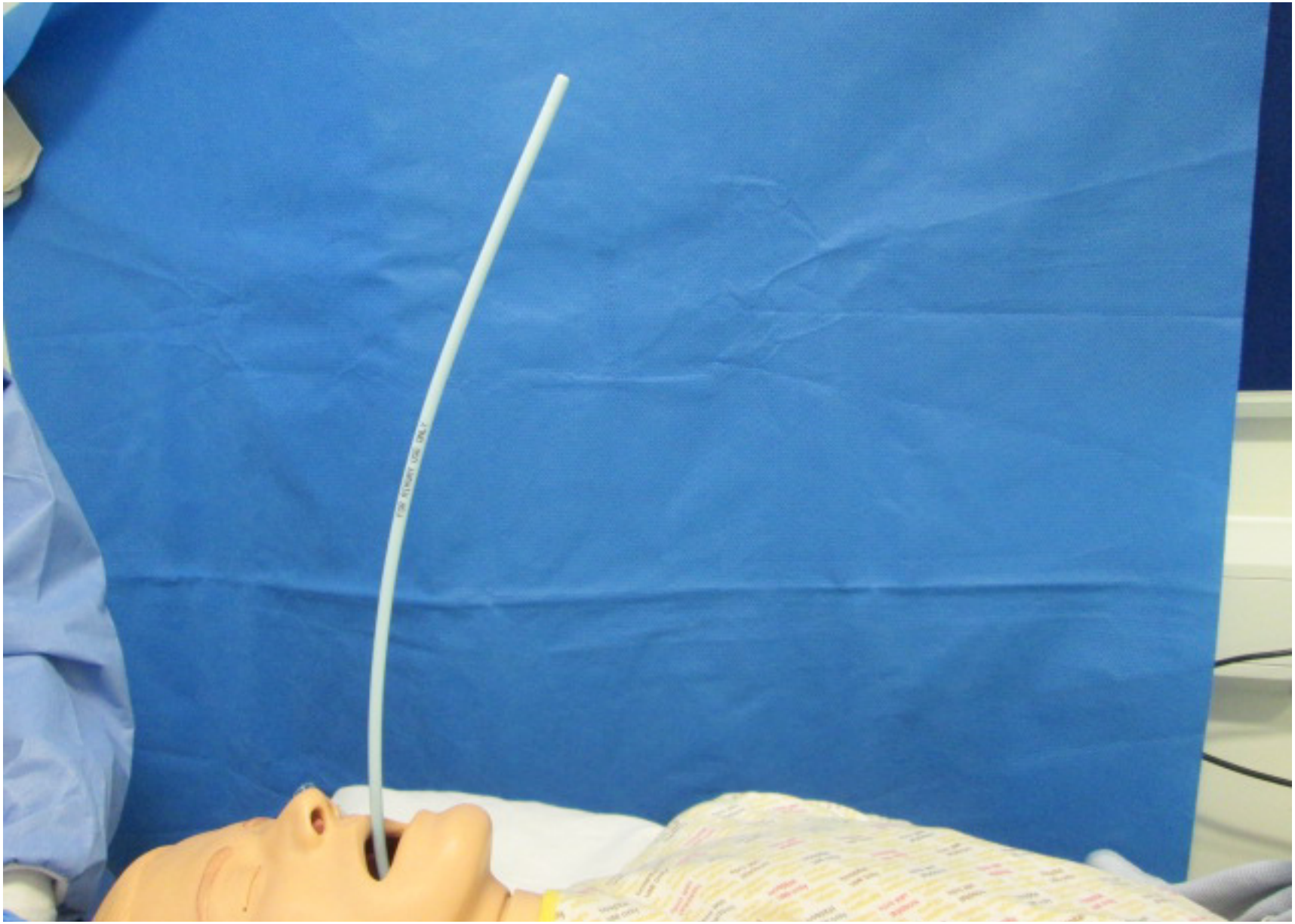
Load the AIC over the FOS and advance the FOS into the trachea



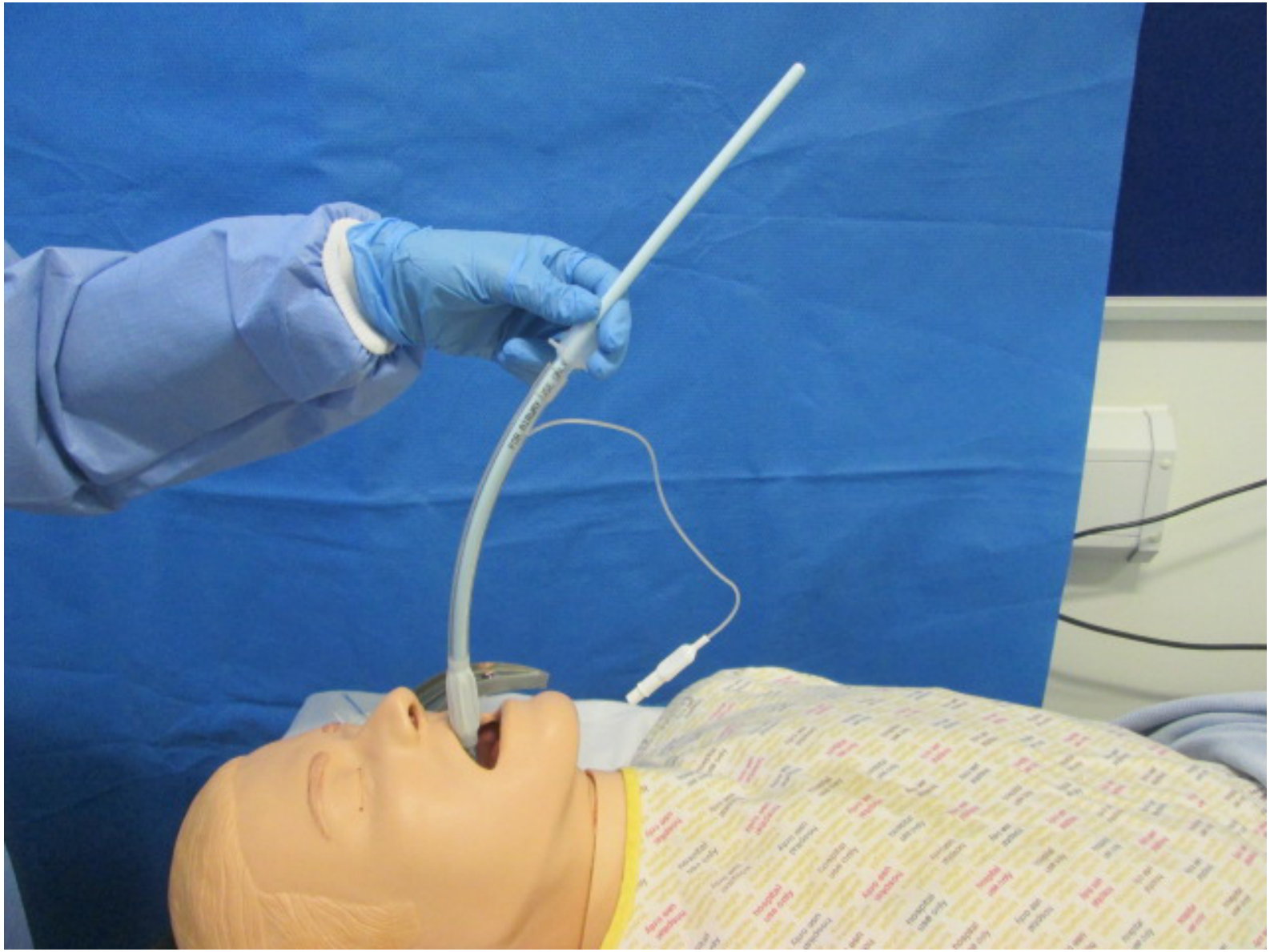
AIC placed in the trachea

Remove the SAD

AIC in the Trachea



Railroad the tube over AIC




hospital use only

Supraglottic airway devices

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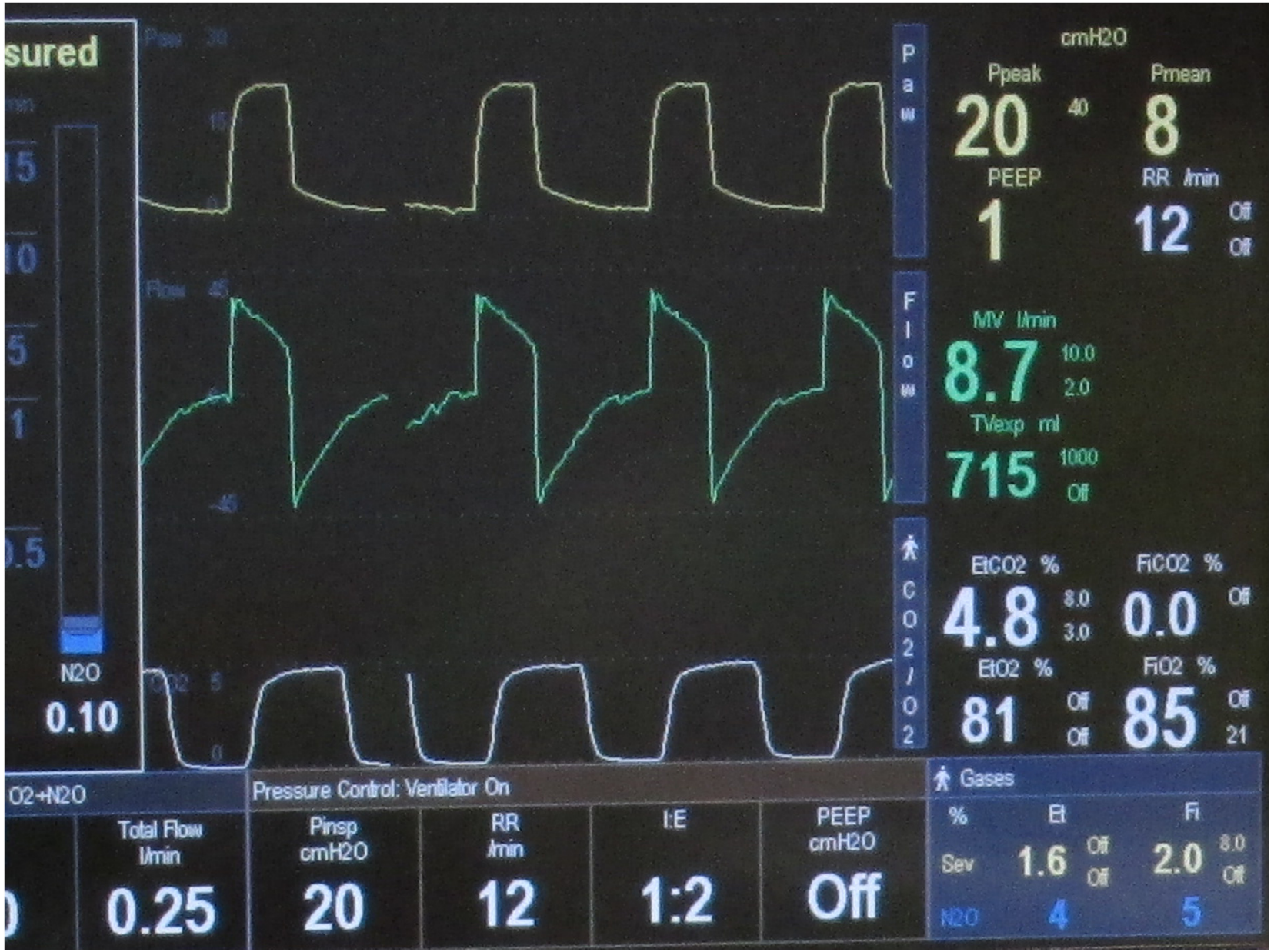
sured
N2O
0.10
Paw
Flow
CO2/O2
cmH2O
Ppeak
20
40
Pmean
8
PEEP
1
RR /min
12
Off
Off
MV l/min
8.7
10.0
2.0
TVexp ml
715
1000
Off
EtCO2 %
4.8
8.0
3.0
FiCO2 %
0.0
Off
EtO2 %
81
Off
Off
FiO2 %
85
Off
21
O2+N2O
Pressure Control: Ventilator On
Gases
Total Flow
l/min
0.25
Pinsp
cmH2O
20
RR
/min
12
I:E
1:2
PEEP
cmH2O
Off
%
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Fi
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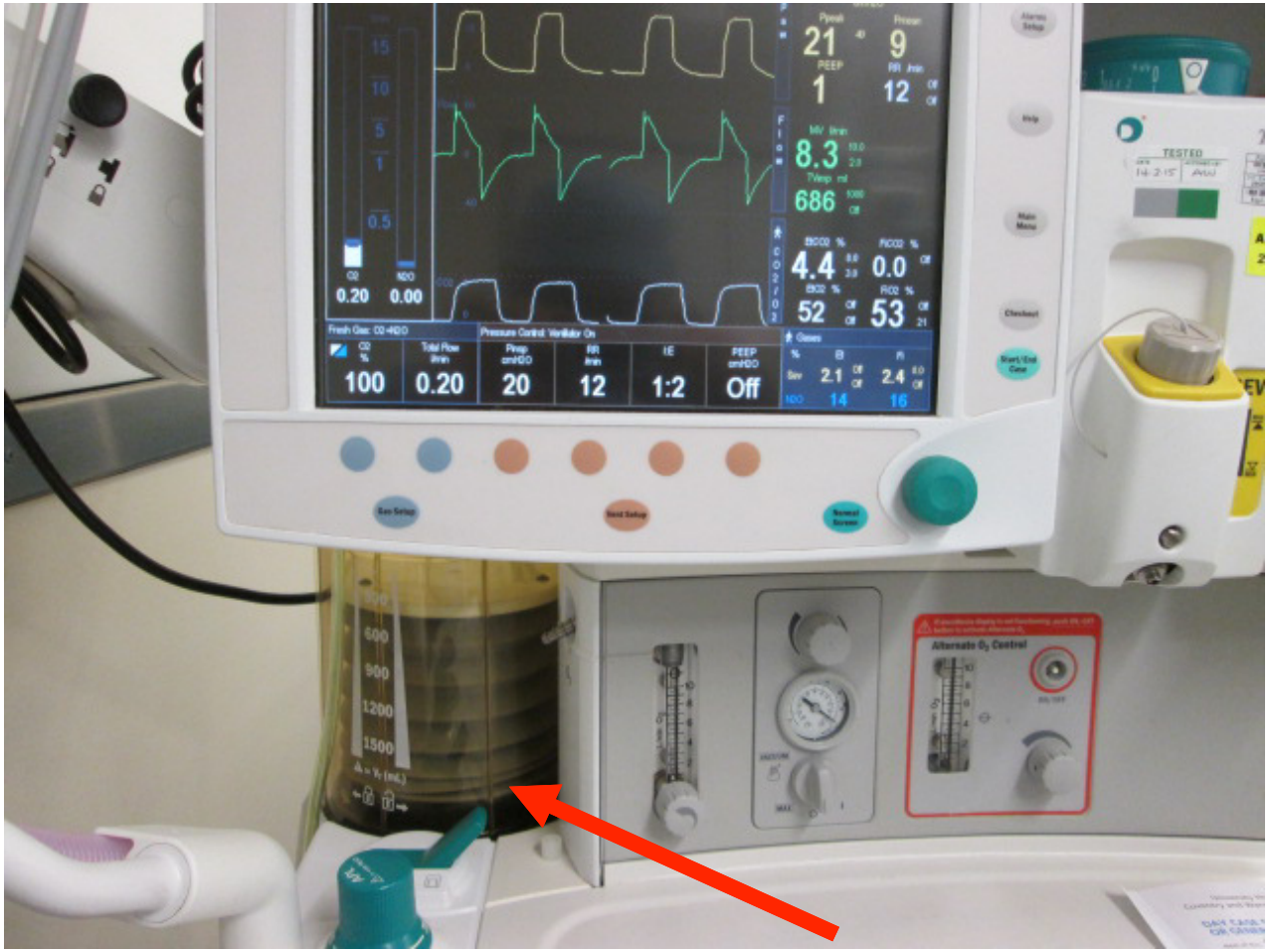
1.6
Off
Off
2.0
8.0
Off
N2O
4
5


21
PEEP
1
9
12
8.3
686
4.4
0.0
52
53
0.20
0.00
100
0.20
20
12
1:2
Off
2.1
2.4
14
16
TESTED

Clinical Scenario- 2

- A 83 year old female patient scheduled for hemi-arthroplasty. She has history ischaemic heart disease and AF. Her BMI is 26. Airway examination: normal. No aspiration risk. Normal coagulation tests.

1. Spinal anaesthesia
2. General anaesthesia with SAD
3. General anaesthesia with ETT

A clinical Scenario -2

- Spinal anaesthesia fails
- GA with SAD planned
- SAD inserted- good ventilation
- Transferred to theatre and positioned-good ventilation
- Hypotension, anaesthesia depth reduced
- Starts spontaneous breathing but slightly obstructed pattern
- Jaw thirst-adequate ventilation- SpO_2 96%

Only about 20 minutes left to complete surgery.

What you do next?

Scenario progression 1

- Continued jaw thrust
- Spontaneous ventilation continued
- Uneventful- Emergence & Recovery

Scenario Progression 2

- Jaw thrust continued
- Patients hyperventilates, isoflurane 0.7 Mac Fentanyl 50 mcg administered
- Hypoventilation—Apnoea
- IPPV –suboptimal but high FGF used to compensate leak
- SpO_2 maintained at 95 %
- Uneventful- Emergence & Recovery

Scenario progression 3

- Hypertension, tachycardia, isoflurane level increased
- Coughing
- Laryngospasm
- Airway obstruction
- Regurgitation
- Aspiration

Scenario 3

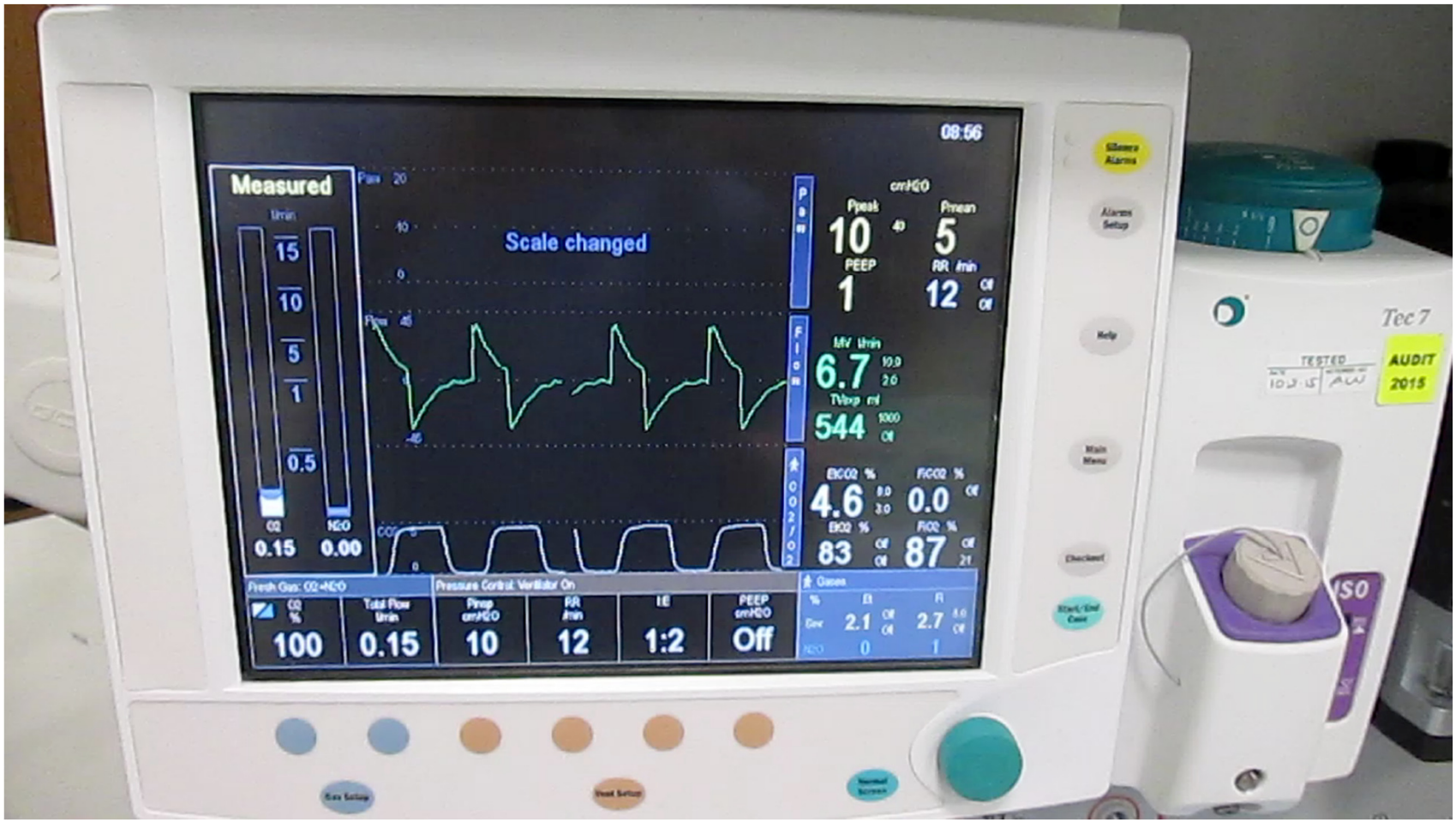
A 42 year old male patient, ASA 1, BMI 28

For Tympanoplasty = 30 minutes procedure

Pre-oxygenated
IV induction with propofol + remi + atracurium
SAD inserted

Indication to tracheal intubation

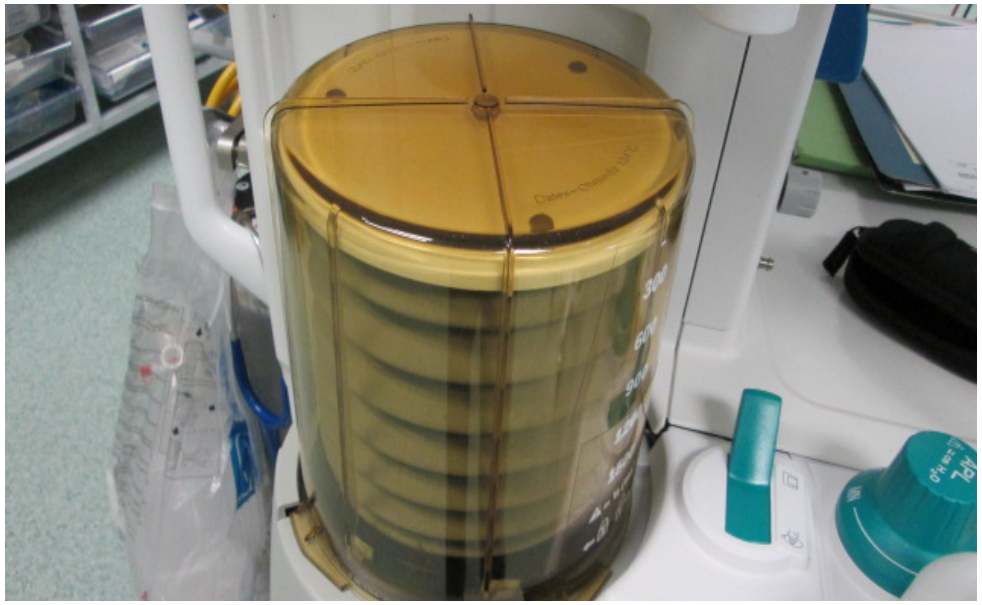
BMI 26, Arthroscopy-I gel size 4

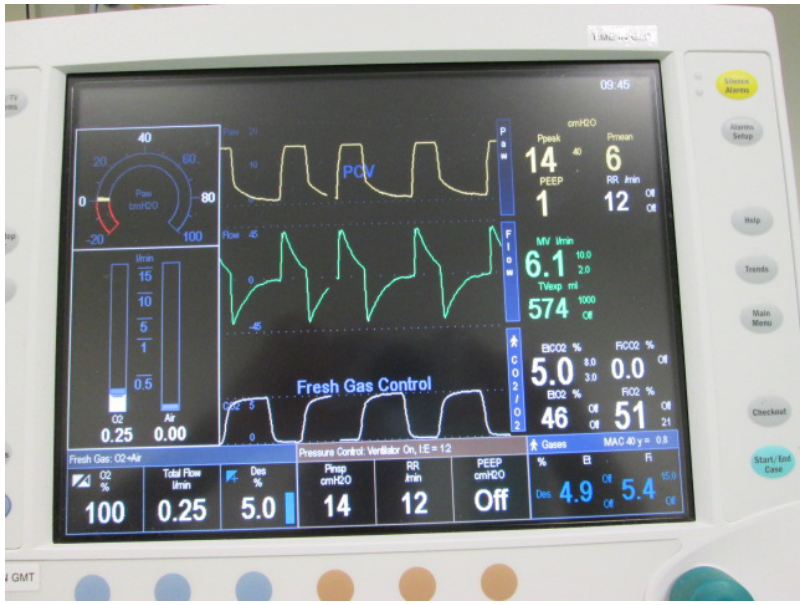


Check the cuff pressure

60 cmH_2O

Check CO_2 trace, tidal volume, use low flow, assess the leak



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use only

A Practical approach to SAD

- Airway assessment and plan
- What is the surgery? Who is the surgeon
- What position?
- Is the airway access limited
- Benefit and risks of SAD vs tracheal intubation

A Practical approach to SAD

- Choose appropriate SAD and correct size
- Ensure adequate depth anaesthesia
- Inset SAD with care to avoid trauma
- Avoid repeated attempts
- Check cuff pressure (LMA)
- Check ventilation
- Check for leak-use low flow
- Assess airway pressure/ tidal volume/CO_2 trace/spirometry

Thank you

Summary

- Understand the limitations
- Careful patient selection
- Careful selection of surgery
- Ensure adequate depth of anaesthesia
- Use second generation SAD
- What is the plan if SAD fails/ malfunctions?
- What is the plan if gets displaced?