

Title: Failed Intubation in Obstetrics		Policy No: WC/Obs/51A Version No: 5
Document Type:	Corporate / Directorate:	Effective from:
Clinical Guideline	Anaesthetics	18/12/17
Responsibility:	Essential Reading for:	Information for:
Obstetric Anaesthesia Lead	Anaesthetists, Obstetricians, Midwife and ODPs	All Directorate Staff
Original Issue Date:	Date of Last Review:	Next Review Date:
February 2014	November 2023	November 2026

Reason for amendment:

- 1) Routine review and update
- 2) Changes to reporting structure to Divisional Board

Linked Trust Policies:	Consulted:	Stored:
	Directorate Board All Anaesthetists All Obstetricians Senior Midwives	Division of Anaesthesia Intranet Server

Approved by: Clinical Director for Surgery	 <hr style="border-top: 1px dotted black;"/> Clinical Director Date: 18th December 2017
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**Burton Hospitals NHS Foundation Trust
Directorate of Women & Children's Services**

Obstetric Difficult Airway and Failed Tracheal Intubation

This guideline is based on the first OAA and DAS collaboration for the Difficult Airway and Failed Tracheal Intubation in Obstetrics. The Tables are copied and the guideline has been adapted to Burton Hospitals NHS Foundation Trust. This guideline should be read in conjunction with management of a potentially difficult airway and the Acid Prophylaxis Guidelines.

Overview:

Urgent Caesarean sections occur round the clock hence anaesthetists covering labour ward have to be very familiar with this guideline. Parturients are prone to several factors that may make their intubation more difficult. Airway oedema compounded by an increase in oxygen consumption and decreased functional capacity are but some of these factors and may lead to rapid desaturation.

Foetal compromise is a more common indication for urgent caesarean section than maternal compromise. Maternal safety is a greater priority for the anaesthetist despite women willingly accepting some risk to themselves. The overriding indications to proceed with general anaesthesia are maternal compromise not responsive to resuscitation, and acute foetal compromise secondary to an irreversible cause such as placental abruption or cord prolapse (especially when an alternative of rapid spinal anaesthesia or awake intubation is not feasible).

Decision:

Even in an emergency, a multidisciplinary approach and a quick but structured WHO checklist will help identify both anaesthetic and obstetric concerns so as to formulate the best management plan. The following table may help in the decision-making process by predicting problems with tracheal intubation, mask ventilation, insertion of 2nd generation supraglottic airway device (SAD) and front-of-neck airway access (FoNA).

X marks expected difficulty

	Tracheal intubation	Facemask ventilation	SAD insertion	Front-of-neck airway access
Body mass index > 35 kg/ m ²	X	X	X	X
Neck circumference > 50 cm	X	X	X	X
Thyromental distance < 6 cm	X	X	X	
Cricoid pressure	X	X	X	
Mallampati grade	X	X		
Fixed cervical spine flexion deformity	X			X
Dentition problems (poor dentition, buck teeth)	X		X	
Miscellaneous factors (obstructive sleep apnoea, reduced lower jaw protrusion, airway oedema)	X	X		
Mouth opening < 4 cm	X			

If the table above predicts difficulty in airway management then, LSCS should preferably be delayed until a second anaesthetist is present. A conversation should be had between the surgeon and anaesthetist, before the induction of anaesthesia. This is to discuss the course of action in an event of declared failed intubation (wake up or proceed with surgery). The

table below describes in light of the urgency of the LSCS; the factors to consider before and after the declaration of failed intubation.

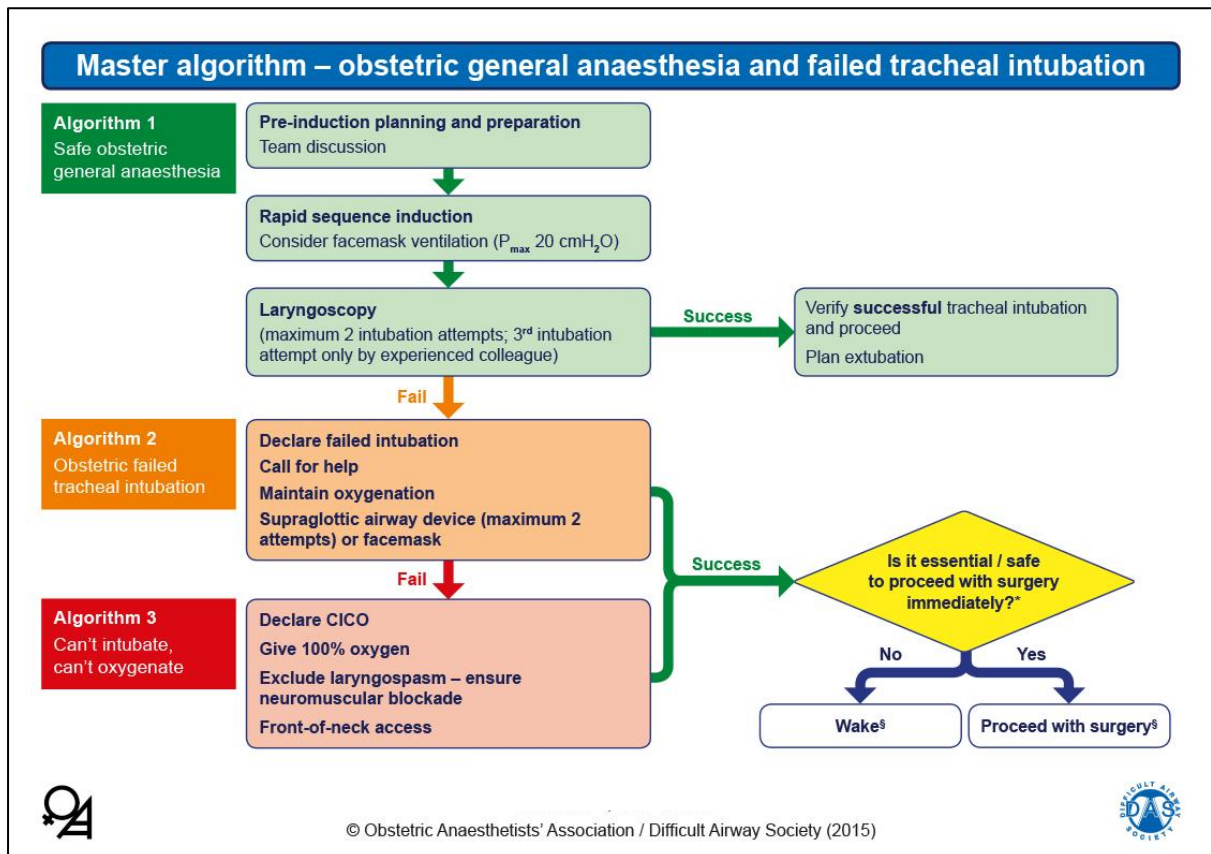
Wake up or Proceed with surgery?

Factors to consider		WAKE		PROCEED	
Before induction	Maternal condition	• No compromise	• Mild acute compromise	• Haemorrhage responsive to resuscitation	• Hypovolaemia requiring corrective surgery • Critical cardiac or respiratory compromise, cardiac arrest
	Fetal condition	• No compromise	• Compromise corrected with intrauterine resuscitation, pH < 7.2 but > 7.15	• Continuing fetal heart rate abnormality despite intrauterine resuscitation, pH < 7.15	• Sustained bradycardia • Fetal haemorrhage • Suspected uterine rupture
	Anaesthetist	• Novice	• Junior trainee	• Senior trainee	• Consultant/specialist
	Obesity	• Supermorbid	• Morbid	• Obese	• Normal
	Surgical factors	• Complex surgery or major haemorrhage anticipated	• Multiple uterine scars • Some surgical difficulties expected	• Single uterine scar	• No risk factors
	Aspiration risk	• Recent food	• No recent food • In labour • Opioids given • Antacids not given	• No recent food • In labour • Opioids not given • Antacids given	• Fasted • Not in labour • Antacids given
	Alternative anaesthesia • regional • securing airway awake	• No anticipated difficulty	• Predicted difficulty	• Relatively contraindicated	• Absolutely contraindicated or has failed • Surgery started
After failed	Airway device/ventilation	• Adequate facemask • Front-of-neck	• First generation supraglottic airway device	• Second generation ventilation supraglottic airway device	ventilation
	Airway hazards	• Laryngeal oedema • Stridor	• Bleeding • Trauma	• Secretions	• None evident

Table 2 – management after failed tracheal intubation

Wake	Proceed with surgery
<ul style="list-style-type: none"> • Maintain oxygenation • Maintain cricoid pressure if not impeding ventilation • Either maintain head-up position or turn left lateral recumbent • If rocuronium used, reverse with sugammadex • Assess neuromuscular blockade and manage awareness if paralysis is prolonged • Anticipate laryngospasm / can't intubate, can't oxygenate 	<ul style="list-style-type: none"> • Maintain anaesthesia • Maintain ventilation - consider merits of: <ul style="list-style-type: none"> □ controlled or spontaneous ventilation □ paralysis with rocuronium if sugammadex available • Anticipate laryngospasm / can't intubate, can't oxygenate • Minimise aspiration risk: <ul style="list-style-type: none"> □ maintain cricoid pressure until delivery (if not impeding ventilation) □ after delivery maintain vigilance and reapply cricoid pressure if signs of regurgitation □ empty stomach with gastric drain tube if using second-generation supraglottic airway device □ minimise fundal pressure □ administer H₂ receptor blocker i.v. if not already given • Senior obstetrician to operate • Inform neonatal team about failed intubation • Consider total intravenous anaesthesia
<p>After waking</p> <ul style="list-style-type: none"> • Review urgency of surgery with obstetric team • Intrauterine fetal resuscitation as appropriate • For repeat anaesthesia, manage with two anaesthetists • Anaesthetic options: <ul style="list-style-type: none"> □ Regional anaesthesia preferably inserted in lateral position □ Secure airway awake before repeat general anaesthesia 	





Position:

A 20–30° head-up position increases functional residual capacity in pregnant women and decreases difficulty with insertion of the laryngoscope caused by large breasts. This position also improves the view at laryngoscopy and possibly reduces gastro-oesophageal reflux. In the morbidly obese patient, the ‘ramped’ position (either with the Oxford Help pillow, or multiple pillows), aligning the external auditory meatus with the supra-sternal notch, has been shown to be superior to the standard ‘sniffing position’ for direct laryngoscopy.

Pre-oxygenation:

This increases the oxygen reserve in the lungs during apnoea. End-tidal oxygen fraction (FETO₂) ≥ 0.9 is the best marker of lung denitrogenation. Computer modelling shows that at fresh oxygen flow of over 10l/min over 2 minute period is adequate for the term pregnant woman.

If the patient is apnoeic and the airway is not being instrumented, continued administration of 100% oxygen with a tightly fitting facemask and maintenance of a patent airway allows continued oxygenation by bulk flow to the alveoli (apnoeic oxygenation). Consider attaching 2-4L/min oxygen via nasal cannula before starting pre-oxygenation, and increasing to 10-15L/min once anaesthetised, to maintain bulk flow of oxygen during intubation attempts.

Induction:

Propofol or Thiopentone are the usual induction agents according to preference. However the anaesthetist should be aware that low doses of thiopental (< 4 mg/kg) carry a higher risk factor for awareness. Further induction agent doses should immediately be available should difficulty with intubation be encountered.

Suxamethonium has been the standard neuromuscular blocking drug for rapid sequence induction as it has a fast onset and short duration. However, hypoxia may occur well before

the spontaneous offset of suxamethonium after 9 minutes. Fasciculations also increase oxygen consumption.

Rocuronium (1.0–1.2 mg/kg) with sugammadex (16 mg/kg) reversal for backup works within 3 minutes. The sugammadex dose should be calculated in advance and the number of vials needed made immediately available before induction.

Consider facemask ventilation:

Mask ventilation before laryngoscopy while maintaining cricoid pressure and peak ventilatory pressures < 20 cmH₂O

First intubation attempt:

Anaesthetists must be familiar with the airway equipment available at the Trust. Videolaryngoscopes provide a better view and there is argument for their use as first-line device for all tracheal intubations.

If the larynx is poorly visualised, an improve view may be done by reducing or removing altogether the cricoid pressure, external laryngeal manipulation and repositioning the head and neck. The aid of a bougie or a stylet may be sought. Small (size 7.0) tracheal tubes should be used routinely to improve the success rate and minimise trauma.

Verification of tracheal intubation:

A sustained capnography trace is the most reliable method of confirming tracheal intubation. If a flat trace is seen after intubation, assume oesophageal intubation unless proven otherwise by videolaryngoscopy for example.

Second intubation attempt:

Second attempt by the most experienced anaesthetist present. If delay is anticipated, continue mask ventilation. Release cricoid pressure if suspected as cause of poor view. Blind insertions are usually unsuccessful and may cause airway trauma leading to loss of control over the airway.

If the second attempt is unsuccessful, a **failed intubation** must be declared to the theatre team who should call for further help from an experienced anaesthetist. The focus is to maintain oxygenation via either a facemask or a SAD, to prevent aspiration and awareness.

A third attempt at intubation is reserved to the most experienced anaesthetist. IV induction agents may be needed to avoid awareness. An oropharyngeal airway, a two-person technique and release of cricoid pressure should be used if facemask ventilation is difficult.

If following a failed intubation the pre-induction decision favours waking up the patient:

The best position for maintaining oxygenation while avoiding regurgitation or awareness, is to keep the patient in supine position (with or without 20-30° head up) and maintaining lateral uterine displacement.

Reassessment for urgency of delivery by the obstetrician is followed by an alternative anaesthetic plan that either includes regional anaesthesia or awake intubation using a fiberoptic or videolaryngoscopy. Sedation with or without remifentanyl should be kept to a minimum and only in expert hands.

If regional anaesthesia is contraindicated and the awake intubation appears to be difficult then a tracheostomy may be the only remaining option.

If following failed intubation the pre-induction decision favoured proceeding with surgery:

Insertion of an I-Gel preloaded with a suction catheter of the nearest colour (3 has white, 4 Green and 5 can pass an orange suction catheter), is the preferred choice for securing the airway before the induction agent and suxamethonium wear off. Cricoid pressure at 30N force may impede placement and should be released temporarily during insertion. Although cricoid pressure is unlikely to be effective for more than a few minutes because of fatigue, it should

then be reinstated as soon as the I-Gel and suction catheter are inserted. As with tracheal intubation, I-Gel insertion should be limited to two attempts to minimise the risk of trauma and loss of airway control. The surgeons should be instructed to minimise fundal pressure.

Failure to adequately ventilate despite seemingly good facemask or I-Gel attempts may be caused by laryngospasm. This denotes the wearing off of suxamethonium used at induction and is best managed by the rocuronium/sugammadex combination. A neonatologist should be informed as failed intubation is an independent predictor of NICU admission.

Can't intubate, can't oxygenate 'CICO'

If 'can't intubate, can't oxygenate' is declared, specialists in surgical airway such as ENT or ITU should be fast bleeped.

Front-of-neck Airway Access Procedure (FoNA)

The current DAS guidelines for emergency FoNA should be followed (<http://www.das.uk.com/guidelines/downloads.html>).

If FoNA procedure fails to restore oxygenation, activate the cardiac arrest protocol which in above 20 weeks gestation includes perimortem caesarean delivery.

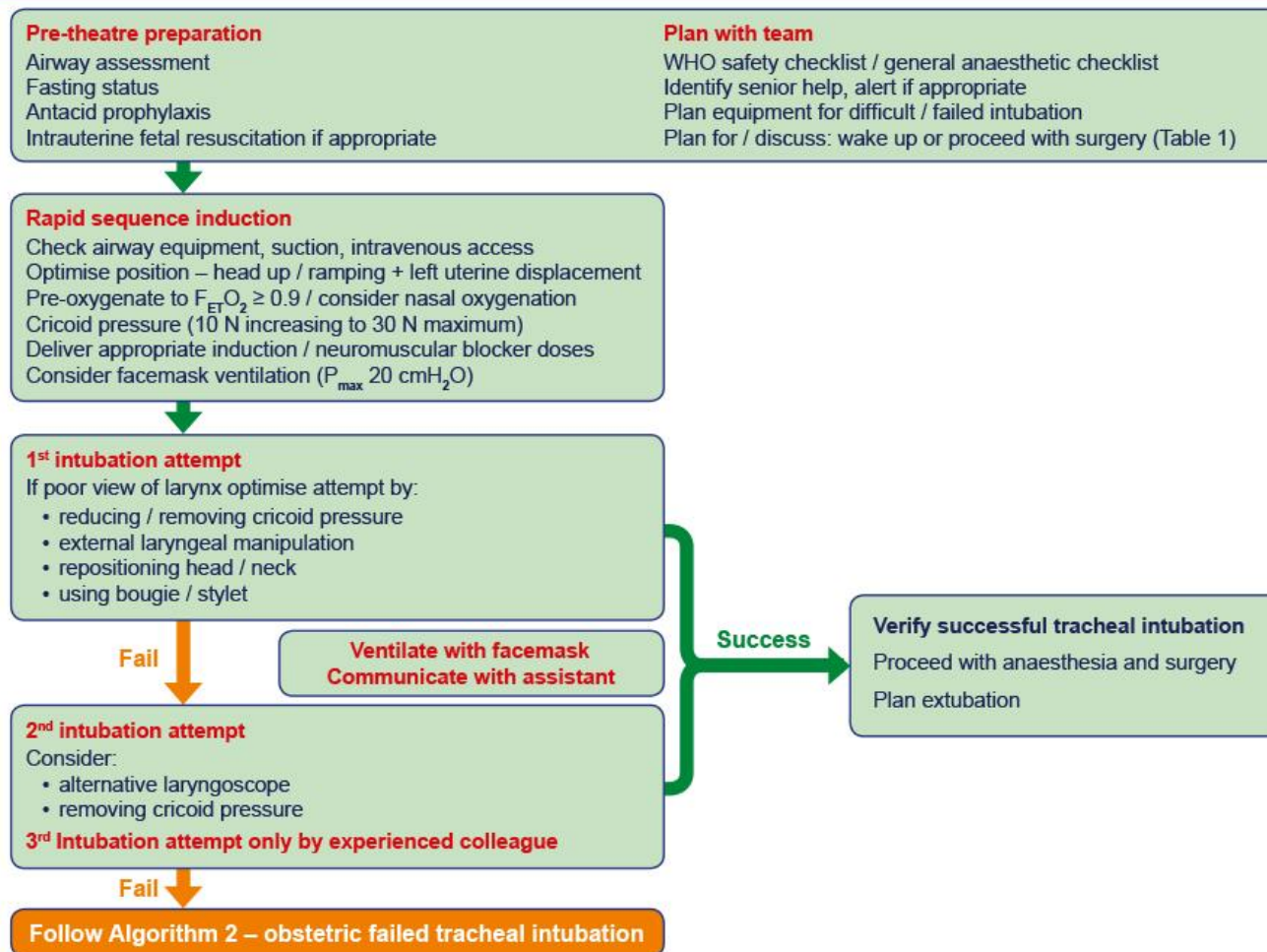
Extubation:

Almost 30% of anaesthetic adverse events occur during the recovery phase. Extubation should be done awake after complete return of reflexes and respiratory function. If the management of airway was difficult, then the endotracheal tube may be railroaded over an exchange catheter so as to be able to reintubate if required.

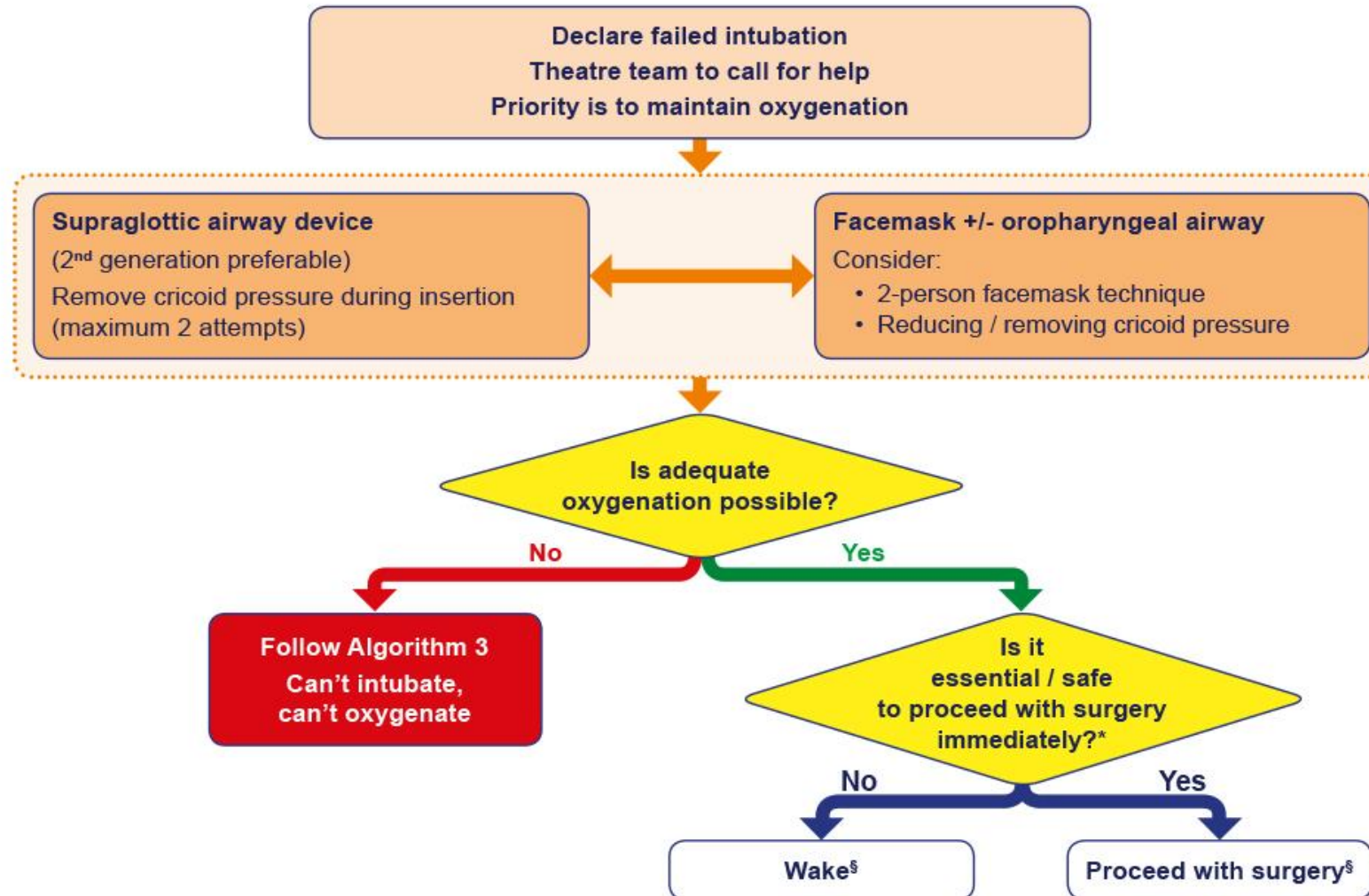
Documentation and Follow up:

The events of airway management should be documented in the anaesthetic chart and referred to in the patient's electronic notes on V6 with an alert added for difficult intubation as soon as possible with a full description of events. A debrief should occur at a convenient time for all staff involved and support given as needed. The patient should be asked to come for a follow up appointment and the events explained to her. A letter should then be sent to the patient and her GP including the Read code SP2y3.

Algorithm 1 – safe obstetric general anaesthesia



Algorithm 2 – obstetric failed tracheal intubation



Algorithm 3 – can't intubate, can't oxygenate

