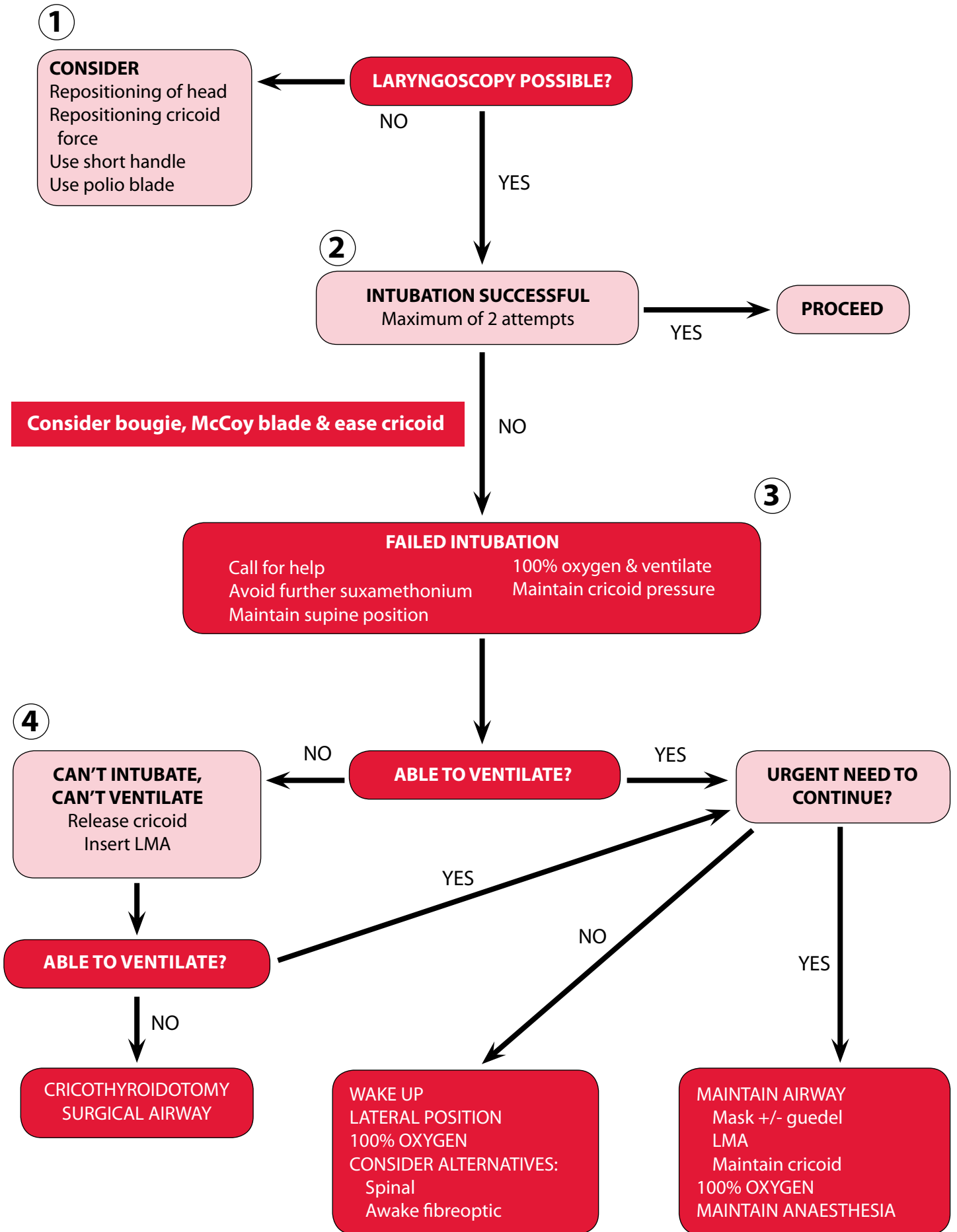


Obstetric failed intubation algorithm



Obstetric failed intubation algorithm (adapted from local algorithm, Royal Devon and Exeter NHS Foundation Trust, UK)

Figure 1. Available for download at: www.update.anaesthesiologists.org

Management of obstetric failed intubation

Alex Mills

Correspondence Email: adtmills@hotmail.com

There is no single definition for failed tracheal intubation. The inability to intubate following a single dose of succinylcholine is a pragmatic definition in the obstetric setting.¹

Failed intubation is an important factor contributing to both maternal and foetal mortality.^{2,3} Ideally we should be able to predict, and plan for, all difficult intubations. However, most airway tests are unreliable so we will inevitably be faced with some unexpectedly difficult or impossible intubations. The next best option is to have a robust plan for the management of such a situation.

The incidence of failed tracheal intubation in the general surgical population is approximately 1:2200, but the incidence in the obstetric population may be as high as 1:250.^{1,4} Pharyngeal oedema may explain some of this difference and it has been shown that Mallampati scores worsen throughout pregnancy.⁵

PREOPERATIVE ASSESSMENT

A clinical assessment of the airway and risk of difficult intubation can be performed in a matter of seconds. It should include the following:

1. Mouth opening (should be greater than three of the patient's fingerbreadths).
2. Mallampati view (pharynx should be visible).
3. Identifying large protruding incisors.
4. Jaw slide (should be able to push the lower incisors anterior to the upper incisors).
5. Neck movement (full, unhindered range of at least 90°).
6. Evidence or possibility of laryngeal swelling (severe pre-eclampsia or upper respiratory tract infection).
7. History of previous problems.

If difficulty is anticipated and surgery is not urgent a consultant anaesthetist should be present.

EQUIPMENT

The following should be readily available.

1. Selection of laryngoscopes (long and standard blade, short-handled or polio blade, McCoy).

2. Selection of tracheal tubes (size 5.0mm upwards).
3. Gum elastic bougie - with selected tracheal tube already threaded on.
4. Selection of oropharyngeal airways.
5. Laryngeal mask airway (size 3).
6. Alternative airway devices eg. ILMA/Airtraq optical laryngoscope (only to be used by those with prior experience).
7. Cricothyroidotomy kit (or equipment for transtracheal ventilation and suitable connectors).

Many obstetric centers have produced algorithms to guide clinicians in the failed intubation scenario. The following version is based upon the existing algorithm used within our hospital. It has been revised following an appraisal of a number of alternative local practice algorithms. No appropriate guideline was found that has been published by a national body. It is largely self-explanatory but a commentary is included to highlight the important aspects.

COMMENTARY ON ALGORITHM

Box 1 - Laryngoscopy not possible

- Obstruction to the insertion of the laryngoscope by the patient's breasts or the anaesthetic practitioner's hand can be overcome by using the polio blade. Alternatively, insert the ordinary blade into the patient's mouth before attaching the handle.

Box 2 - Initial attempts at intubation unsuccessful

- If intubation is difficult but the epiglottis is visible try using a gum elastic bougie and/or a McCoy blade. When railroading the ETT over a bougie rotate the ETT 90° anti-clockwise. This often helps to overcome resistance.
- A smaller ETT is often needed in obstetrics, especially if there is a history of URTI or pre-eclampsia, both of which predispose to laryngeal oedema.
- An obscured laryngeal view is often due to incorrectly applied cricoid pressure. Tilting the patient laterally can exacerbate this problem. Careful readjustment should improve the view.

Summary

Assess the airway before induction of anaesthesia.

Check all intubation equipment daily and be familiar with its use.

Position the patient correctly before induction.

Remember that oxygenation is more important than intubation.

Call for help early.

Maternal welfare is paramount and takes priority over foetal considerations.

Alex Mills

Specialist Trainee
Department of Anaesthesia
Royal Devon and Exeter
NHS Foundation trust
Barrack Road
Exeter
Devon
EX2 5DW
UK

- Do not persist with repeated intubation attempts. This will increase bleeding and swelling resulting in a higher rate of complications.

Box 3 - Failed intubation

- It is important to ventilate the lungs with 100% oxygen via bag and mask as soon as possible.
- Using a two hand technique to hold the mask may improve the seal for ventilation.
- Avoid a second dose of suxamethonium as the paralyzing effect may last for a significantly longer duration.

Box 4 - Can't intubate can't ventilate

- If ventilation of the lungs is impossible with a bag and mask, cricoid pressure should be eased as excessive force can obstruct the airway. If this is ineffective the problem is probably anatomical.
- Insertion of an oropharyngeal airway may help but the laryngeal mask airway (LMA) is generally considered to be the most useful device if ventilation is not achieved. Cricoid pressure should be released to allow correct insertion of the LMA. Once in place it may be possible to reapply cricoid pressure as long as ventilation is not compromised.

Box 5 - Consider the need to continue surgery

- As soon as satisfactory ventilation and oxygenation has been established, consideration should be given to the degree of urgency of the procedure. The following grades can be used to aid the anaesthetist in deciding between continuing general anaesthesia (GA) without the protection of an endotracheal tube, and using an alternative technique that will result in some delay.

BOX 6 - Cricoidotomy / surgical airway

- Needle cricothyrotomy should be attempted by the anaesthetist if ventilation is still impossible. All anaesthetists should familiarise themselves with the local cricothyroidotomy kit.

Surgical cricothyroidotomy

1. Place the patient supine.
2. Consider extending the neck to improve access. Otherwise, maintain a neutral alignment.
3. Identify the cricothyroid membrane.
4. Prepare the skin and, if the patient is conscious, infiltrate with local anaesthetic.
5. Place your left hand on the neck to stabilise the cricoid and thyroid cartilages, and to protect the lateral vascular structures from injury.
6. Make a small vertical incision in the skin, and press the lateral edges of the incision outwards, to minimise bleeding.
7. Make a transverse incision through the cricothyroid membrane, being careful not to damage the cricoid cartilage.
8. Insert tracheal spreader, or use the handle of the scalpel by inserting it through the incision and twisting it through 90° to open the airway.
9. Insert an appropriately sized endotracheal or tracheostomy tube. It is advisable to use a slightly smaller size than would have been used for an oral or nasal tube.
10. Ventilate the patient and check that this is effective.
11. Secure the tube to prevent dislodgement.
12. If you have performed a cricothyroid puncture you may need to use intravenous agents such as propofol to keep the patient asleep.

Table 1. Urgency of procedure – decision making⁶

Grade	
1	Mother's life depends on completion of surgery e.g. cardiac arrest, massive haemorrhage. No alternative but to continue GA
2	Maternal pathology makes alternative regional techniques impossible e.g. decompensated heart disease or coagulopathy. Probably acceptable to continue GA but should consider awake fiberoptic intubation.
3	Sudden and severe fetal distress not recovering between contractions e.g. in placental abruption or prolapsed cord. This is the most difficult grade. Abandoning GA may lead to foetal death but it could be argued that maternal well-being is paramount and waking the patient for a regional technique would be appropriate. This decision must be made based on obstetric circumstances and the quality of the maintained airway.
4	Long standing fetal distress of varying severity with good recovery between contractions. The patient should be woken and a regional technique performed.
5	Elective procedure or maternal distress. Absolutely no indication to continue under GA and the patient should be woken and an alternative technique used.

- Cannula cricothyroidotomy is a temporary measure that allows oxygenation but not ventilation. A tube of 4mm internal diameter or greater is necessary to achieve adequate ventilation. The cannula should be replaced by a definite airway, when appropriate staff and equipment are available.
- Definitive (surgical) cricothyroidotomy should be undertaken by the clinician with the most experience. It is important not to delay this procedure if other attempts at oxygenation have failed.

CONCLUSION

The algorithm serves only as a guide to facilitate decision making and clinical judgement must be exercised. It is important to remember that patients do not die from failure to intubate but failure to oxygenate. Ensuring adequate pre-oxygenation may buy time if a problem is encountered.

REFERENCES

1. PD Barnardo, JG Jenkins. Failed tracheal intubation in obstetrics: a 6-year review in a UK region. *Anaesthesia* 2000; **55**: 685-94.
2. Anon. Report on Confidential Enquiries into Maternal Deaths in United Kingdom: 1985-87, 1988-90, 1991-93. London: HMSO.
3. Anon. 7th Annual Report of the Confidential Enquiry into Stillbirths and Deaths in Infancy: 2000, Maternal and child Health Consortium.
4. GLT Samsoon, JRB Young. Difficult tracheal intubation: a retrospective study. *Anaesthesia*, 1987; **42**: 487-90.
5. S Pilkington, F Carli et al. Increase in Mallampati score during pregnancy. *British Journal of Anaesthesia* 1995; **74**: 638-42.
6. Harmer M. Difficult and failed intubation in obstetrics. *International Journal of Obstetric Anaesthesia* 1997; **6**: 25-31.