Managing difficult airway in adults… A comparison of popular guidelines with Indian guidelines.

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Airway management is one of the key skills in anaesthesia practice. Various guidelines and protocols are available for managing a difficult airway. The commonly used one is 'Practice Guidelines for Management of the Difficult Airway: An Updated Report by the American Society of Anesthesiologists'published in 2013. The other popular one is from Difficult airway society from United kingdom published in 2015. As a welcome move, in December 2016 difficult airway guidelines were published from All India difficult airway association, India. This write-up is to compare the different aspects in difficult airway management suggested by above three societies. Full text PDF is available for all three guidelines. Kindly refer to the original articles for detailed explanations.

ASA 2013:

Anesthesiology. 2013;118:251-70. **Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway.** Apfelbaum JL, Hagberg CA, Caplan RA, Blitt CD, Connis RT, Nickinovich DG, Hagberg CA, Caplan RA, Benumof JL, Berry FA, Blitt CD, Bode RH, Cheney FW, Connis RT, Guidry OF, Nickinovich DG, Ovassapian A; American Society of Anesthesiologists Task Force on Management of the Difficult Airway.

DAS 2015:

Br J Anaesth. 2015;115:827-48. Difficult **Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults.** Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, O'Sullivan EP, Woodall NM, Ahmad I; Difficult Airway Society intubation guidelines working group.

AIDAA 2016:

Indian Journal of Anaesthesia. 2016;60:885-898. **All India Difficult Airway Association 2016 guidelines for the management of unanticipated difficult tracheal intubation in adults.** Myatra, SN, Shah, A, Kundra, P, Patwa, A, Ramkumar, V, Divatia J. Garg, R.

Factors	ASA 2013	DAS 2015	AIDAA 2016
Evaluation of Airway	1.History 2.Physical examination 3. Additional details if needed Assessment directed towards identifying the likelihood and clinical impact of basic management problems: • Difficulty with patient cooperation or consent • Difficult mask ventilation • Difficult supraglottic airway placement • Difficult laryngoscopy • Difficult intubation • Difficult surgical airway access	Assessment directed towards identifying factors that might lead to difficulty with face-mask ventilation, SAD insertion, tracheal intubation, or front-of-neck access.	Pre-operative airway assessment directed towards identifying difficulty in 1. Facemask ventilation, 2. Supraglottic airway device insertion 3.Tracheal intubation and 4.Emergency surgical access.
Basic Preparation	1. At least one portable storage unit that contains specialized equipment for difficult airway management should be readily 2. If a difficult airway is known or suspected: • Inform the patient of the special risks and procedures • Ascertain that there is at least one additional individual who is immediately available to serve as an assistant. Desirable equipments in difficult airway cart described including exhaled CO2 detector.	- - - -	Mandatory and desirable equipments in airway cart is described along with suggestions for arrangement of airway gadgets described.

Planning	Adequate planning is emphasised depending upon the preop airway evaluation and before induction of anesthesia, Options include: 1.Awake intubation, 2.Video-assisted laryngoscopy, 3.Intubating stylets or tube-changers, 4.SGA for ventilation 5.SGA for intubation (*e.g.*, ILMA), 6.Rrigid laryngoscopic blades of varying design and size, 7.Fiberoptic-guided intubation, and 8. Lighted stylets or light wands.	The anaesthetist should have a strategy in place before the induction of anaesthesia, and this should be discussed at the team brief and the sign-in (pre-induction) phase of the WHO Surgical Safety Checklist.	Pre-operative sedation should be used with caution in patients with an anticipated difficult airway. In patients with a compromised airway sedation is best avoided.
Aspiration prophylaxis	- - -	1.Steps should be taken before surgery to reduce the volume and pH of gastric contents by fasting and pharmacological means. 2.Mechanical drainage by nasogastric tube should be considered in order to reduce residual gastric volume in patients with severely delayed gastric emptying or intestinal obstruction. 3.rapid sequence intubation and Cricoid pressure during induction recommended.	1.Reduction of the gastric volume and increase in pH should be done before surgery by adequate fasting and pharmacological means. 2.In conditions with delayed gastric emptying or intestinal obstruction, mechanical drainage using a nasogastric tube should be considered.
Preoxygenation	Emphasised. But no endpoint defined	Emphasised. But no endpoint defined	Emphasised. Technique and end points were also defined (EtO2 >90% or end tidal nitrogen <4%). CPAP or Pressure support ventilation can also be used.

Continuous supply of oxygen	Emphasised. Techniques like oxygen by nasal cannulae, facemask, LMA, insufflations, etc.	Passive oxygenation or Apnoeic oxygenation by 15 litres/min O2 through nasal cannulae or Transnasal humidified high-flow oxygen up to 70 L/min O2.	Oxygen by nasal cannula or Transnasal humidified rapid insufflation ventilatory Exchange (THRIVE).
Positioning	- - -	Sniffing or ramped position whenever possible	Sniffing or ramped position whenever possible. (HELP – Head elevated laryngoscopic position)
Neuro muscular block	- - -	Emphasised as it improves intubating and ventilating conditions.	Emphasised as it improves intubating and ventilating conditions.
Steps in airway management. *(Plans with failure of each step mentioned for easy comparison. For full description refer flow charts below)*	**Initial attempt of intubation** ↓ unsuccessful **Facemask ventilation** ↓ unsuccessful **Supra glottis airway** ↓ unsuccessful **Non invasive airway ventilation** ↓ unsuccessful **Invasive airway ventilation**	**Facemask ventilation & Tracheal intubation** ↓ unsuccessful **Maintaining oxygenation: Supra glottis airway** ↓ unsuccessful **Facemask ventilation** ↓ unsuccessful **Emergency front of neck access**	**Laryngoscopy & Tracheal intubation** ↓ unsuccessful **Insert Supra glottis airway device** ↓ unsuccessful **Rescue Facemask ventilation** ↓ unsuccessful **Emergency cricothyrotomy** Steps can be by passed and proceeded to cricothyrotomy
Terminology for intubation and ventilation failure		**CICO:** Can't intubate, Can't oxygenate	**CVF:** Complete ventilation failure
Recommendations for number of attempts	- - - -	Initial intubation: 3 attempts + 1 attempt by experienced person. Each attempt should be aimed at optimising intubation condition with change of position / gadget. Supra glottis airway : 3 attempts. 3rd attempt with different gadget or different size	Intubation attempts : 3. Repeated attempts only when SpO2 ≥ 95%. Change of position / gadget / operator recommended. Bougie, external laryngeal manipulation and stylet can be used. Supraglottic airway: Two attempts with 2nd generation devices

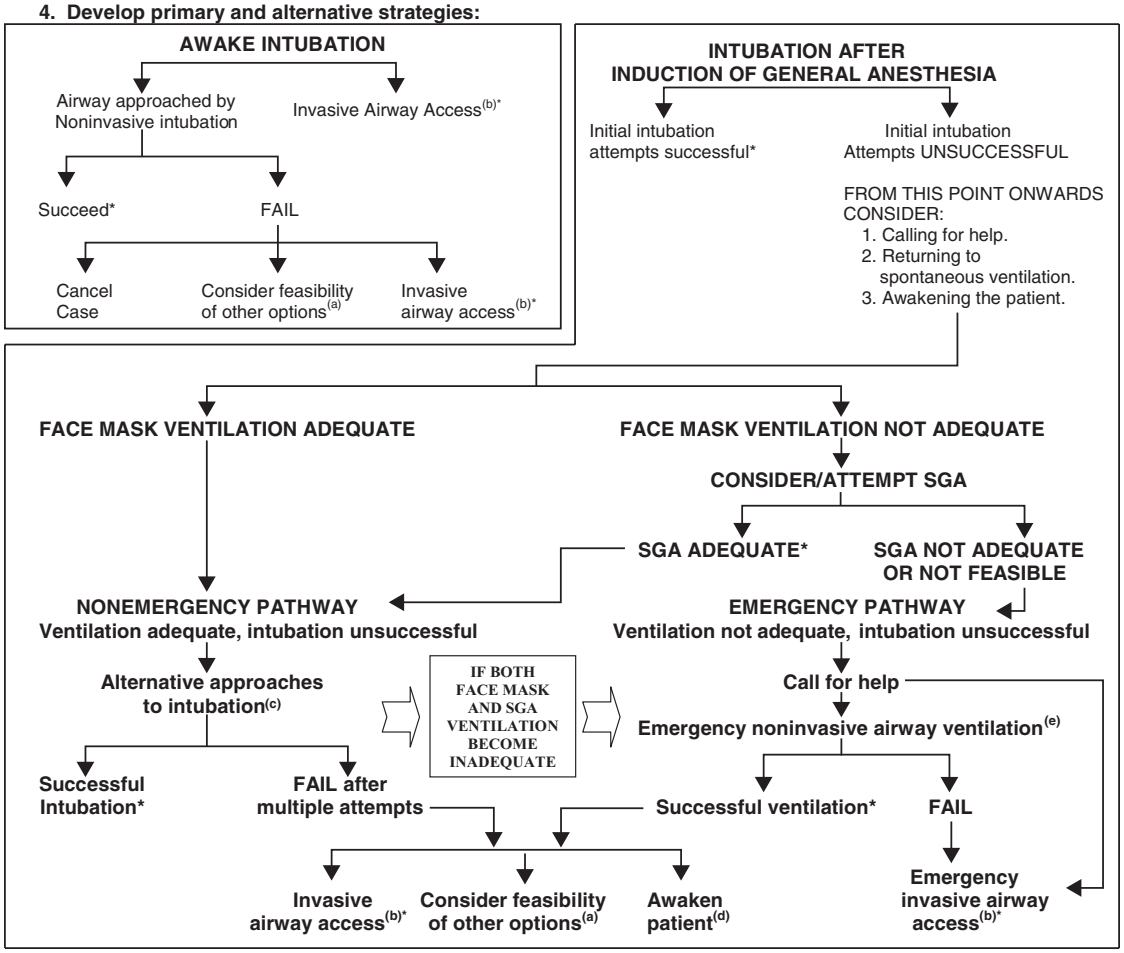
Recommendations for Extubation	1.Relative merits of awake extubation versus extubation before the return of consciousness. 2.General clinical factors that may produce an adverse impact on ventilation 3.An airway management plan that can be implemented if extubation failure. 4. Short-term use of a device that can serve as a guide for expedited reintubation. (Stylet, intubating bougie etc..	- - -	- - -
Follow up care:	Immediate follow up after difficult airway Management: Complications like airway edema, bleeding, tracheal and esophageal perforation, pneumothorax, sore throat, difficulty in swallowing, subcutaneous emphysema and aspiration should be diagnosed and treated if necessary. Long term care: 1.The anesthesiologist should inform the patient / responsible person of the airway difficulty that was encountered. 2.The information conveyed may include, the presence of a difficult airway, the apparent reasons for difficulty, how the intubation was	Immediate follow up directed towards identifying and managing complications duw to airway management. The DAS Difficult Airway Alert Form can be used for documentation and communication purpose.	1.Follow up recommended for managing any immediate or late complications of difficult airway management. 2.A complete airway examination may be required to evaluate airway injury. 3.Cricothyroidotomy should be converted to a tracheostomy at the earliest to minimise the risk of tracheal stenosis. 4.Counselling of the patient and the family after the event and documentation in the case notes of the airway difficulty faced are important. 'Difficult airway alert form' should be filled by the attending physician and a copy must be given to the patient/surrogate for future reference and a copy to be maintained in the department. *(Model of alert form available in the article)*

	accomplished, and the implications for future care. 3.Notification systems, such as a written report / letter to the patient / communication with primary caregiver / notification bracelet / chart flags, may be considered.		

American Society of Anesthesiologists®

DIFFICULT AIRWAY ALGORITHM

1. **Assess the likelihood and clinical impact of basic management problems:**
   - **Difficulty with patient cooperation or consent**
   - **Difficult mask ventilation**
   - **Difficult supraglottic airway placement**
   - **Difficult laryngoscopy**
   - **Difficult intubation**
   - **Difficult surgical airway access**
2. **Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management.**
3. **Consider the relative merits and feasibility of basic management choices:**
   - **Awake intubation *vs.* intubation after induction of general anesthesia**
   - **Non-invasive technique *vs.* invasive techniques for the initial approach to intubation**
   - **Video-assisted laryngoscopy as an initial approach to intubation**
   - **Preservation *vs.* ablation of spontaneous ventilation**
4. **Develop primary and alternative strategies:**



***Confirm ventilation, tracheal intubation, or SGA placement with exhaled CO_2.**

a. Other options include (but are not limited to): surgery utilizing face mask or supraglottic airway (SGA) anesthesia (e.g., LMA, ILMA, laryngeal tube), local anesthesia infiltration or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the Emergency Pathway.

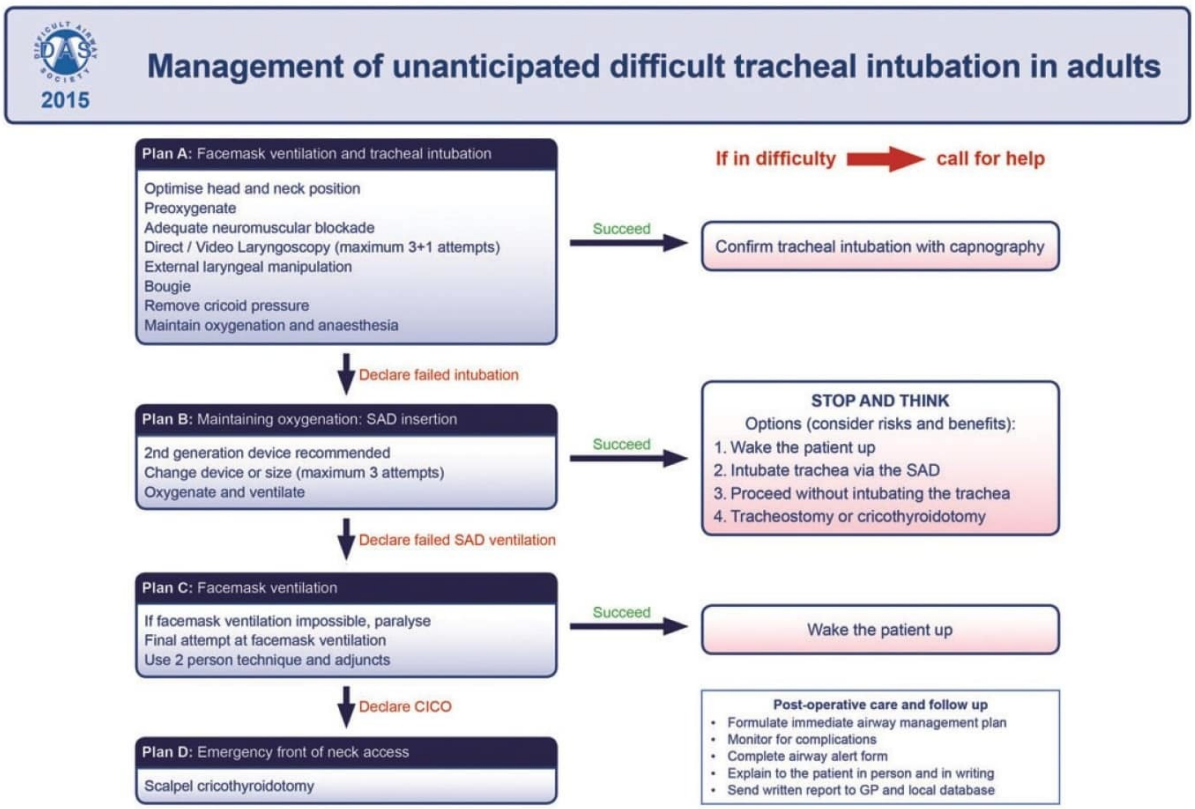
b. Invasive airway access includes surgical or percutaneous airway, jet ventilation, and retrograde intubation.

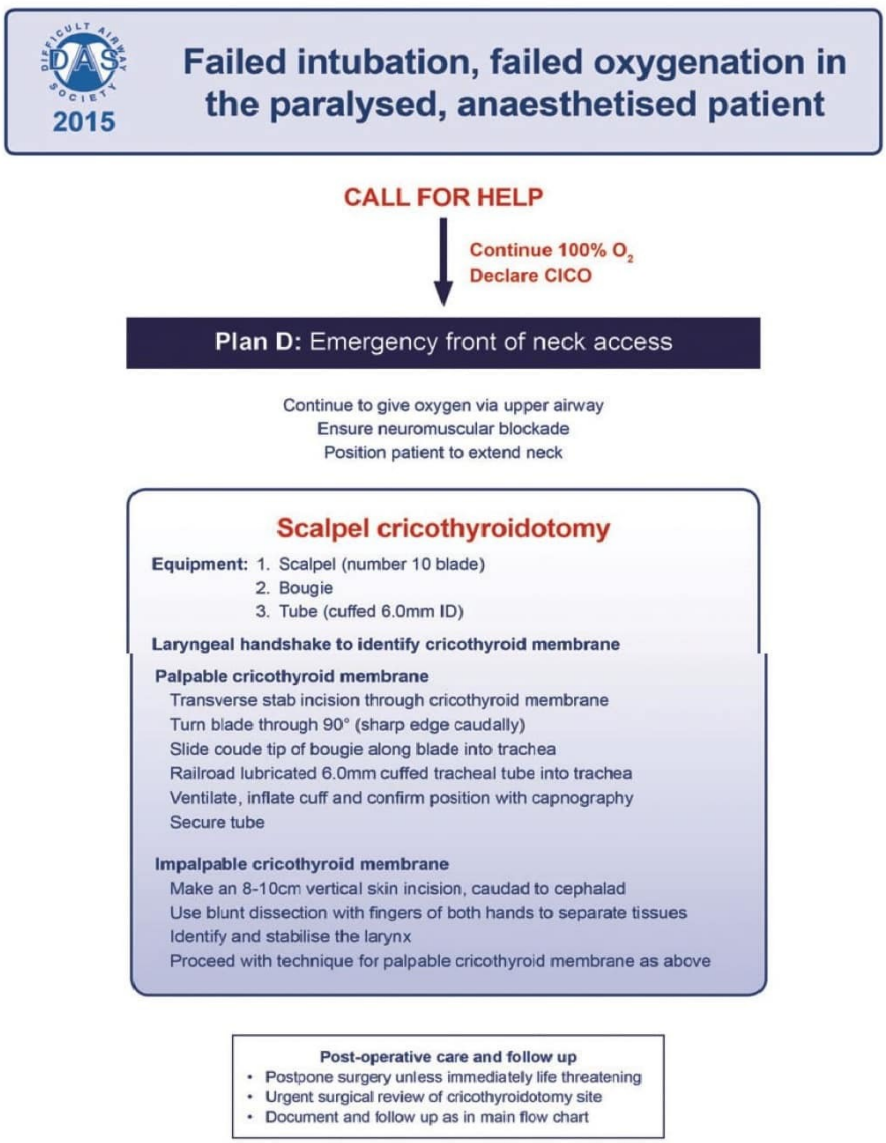
c. Alternative difficult intubation approaches include (but are not limited to): video-assisted laryngoscopy, alternative laryngoscope blades, SGA (e.g., LMA or ILMA) as an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, light wand, and blind oral or nasal intubation.

d. Consider re-preparation of the patient for awake intubation or canceling surgery.

e. Emergency non-invasive airway ventilation consists of a SGA.

Fig. 1. Difficult Airway Algorithm.





This flowchart forms part of the DAS Guidelines for unanticipated difficult intubation in adults 2015 and should be used in conjunction with the text.

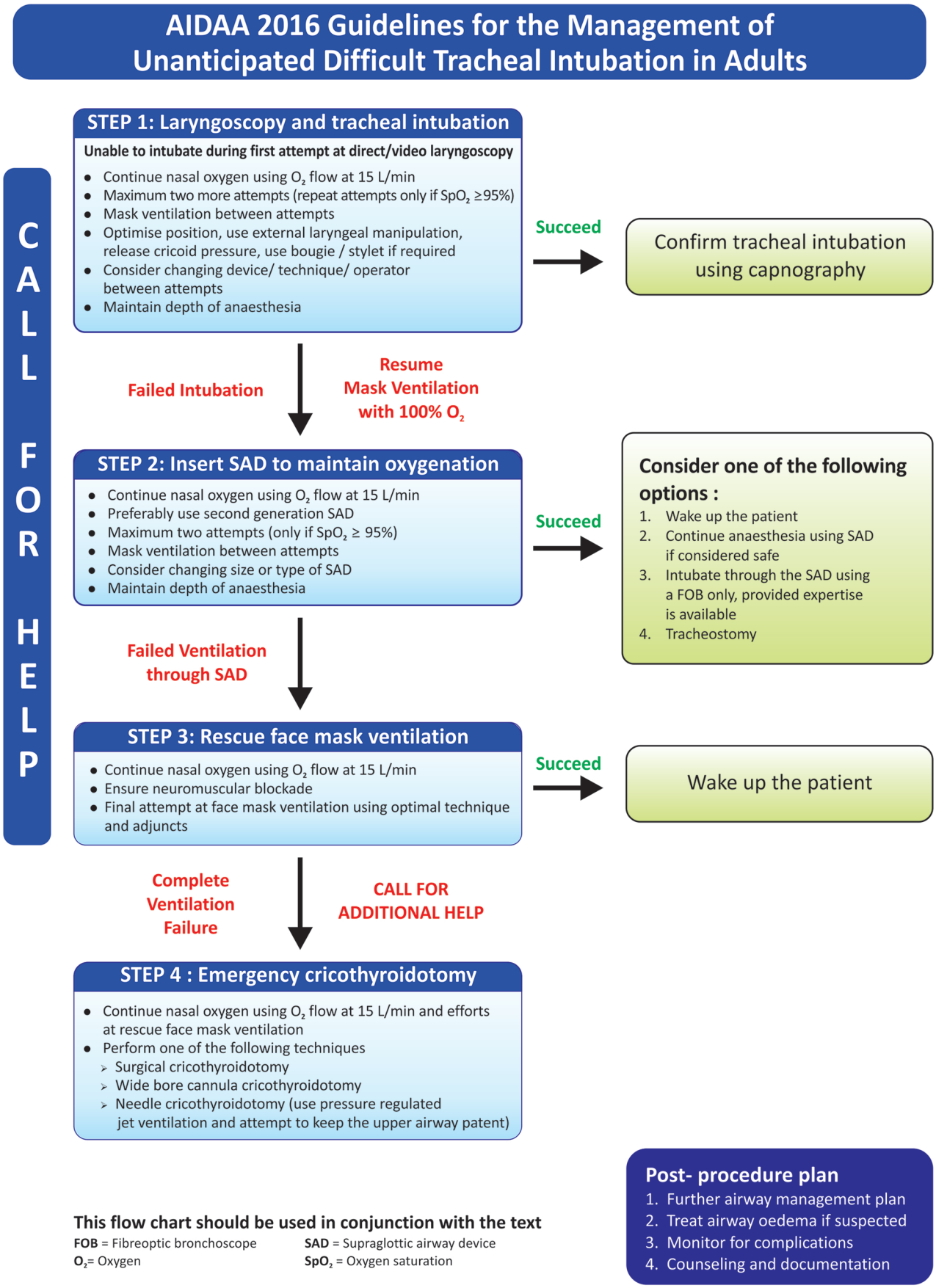


Figure 3: The All India Diffcult Airway Association 2016 algorithm for the management of unanticipated difficult tracheal intubation in adults