Management of the Difficult Airway Guidelines 2022



2022 American Society of Anesthesiologists Practice Guidelines for Management of the Difficult Airway*

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Definition of Difficult Airway

For these practice guidelines, a difficult airway includes the clinical situation in which anticipated or unanticipated difficulty or failure is experienced by a physician trained in anesthesia care, including but not limited to one or more of the following:

-facemask ventilation,

- laryngoscopy,

- ventilation using a supraglottic airway,

- tracheal intubation,

- extubation,

.or invasive airway -

.Difficult Facemask Ventilation

It is not possible to provide adequate ventilation (e.g., confirmed by end-tidal carbon dioxide detection), because of one or more of the following problems:

- inadequate mask seal,
- excessive gas leak,

or excessive resistance to the ingress or egress of gas.

Difficult Supraglottic Airway Ventilation

It is not possible to provide adequate ventilation because of one or more of the following problems:
- difficult supraglottic airway placement,
- supraglottic airway placement requiring multiple attempts,
- inadequate supraglottic airway seal,
- excessive gas leak,
or excessive resistance to the ingress or egress of gas.

Difficult Laryngoscopy

It is not possible to visualize any portion of the vocal cords after multiple attempts at .laryngoscopy

Difficult or Failed Tracheal Intubation

Tracheal intubation requires multiple attempts or .tracheal intubation fails after multiple attempts

Difficult or Failed Tracheal Extubation

The loss of airway patency and adequate ventilation after removal of a tracheal tube or supraglottic airway from a patient with a known or suspected difficult airway (i.e., an “at risk” .extubation)

Difficult or Failed Invasive Airway

Anatomic features or abnormalities reducing or preventing the likelihood of successfully placing an airway into the trachea through the front of .the neck

Inadequate Ventilation.

Indicators of inadequate ventilation include:
- absent or inadequate exhaled carbon dioxide,
- absent or inadequate chest movement,
- absent or inadequate breath sounds,
- auscultatory signs of severe obstruction,
- cyanosis,
- gastric air entry or dilatation,
- decreasing or inadequate oxygen saturation,
- absent or inadequate exhaled gas flow as measured by spirometry,
- anatomic lung abnormalities as detected by lung ultrasound,
- and hemodynamic changes associated with hypoxemia or hypercarbia (e.g., hypertension, tachycardia, bradycardia, arrhythmia).

Additional clinical symptoms may include changed mental status or .somnolence

Evaluation of the Airway

:Airway evaluation topics include

risk assessment to predict a difficult airway -1
or risk of aspiration, and

.airway examination (bedside and advanced) -2

Evaluation of the Airway

An airway examination is intended to identify the presence of upper airway pathologies or anatomical anomalies. Issues addressed in these guidelines include:
1-measurement of facial and jaw features,
,anatomical measurements and landmarks-2
imaging with ultrasound or virtual -3
laryngoscopy/bronchoscopy,4- three-dimensional printing, and
.bedside endoscopy-5

Preparation for Difficult Airway Management

Topics related to interventions intended to prepare for diff icult airway management include:

(1 the availability of equipment for airway management (e.g., items for anesthetizing locations, portable storage unit, cart, or trolley for diff icult airway management);

(2 informing the patient with a known or suspected difficult airway;

(3 preoxygenation;

(4 patient positioning;

(5 sedative administration;

(6 local anesthesia;

(7 supplemental oxygen during difficult airway management;

(8 patient monitoring; and

##.human factors 9)

Recommendations

Evaluation of the airway

1a. Before the initiation of anesthetic care or airway management, ensure that an airway risk assessment is performed by the person(s) responsible for airway management whenever feasible to identify patient, medical, surgical, environmental, and anesthetic factors (e.g., risk of aspiration) that may indicate the potential for a difficult airway.

1b. Before the initiation of anesthetic care or airway .management, conduct an airway physical examination

Recommendations

Preparation for Difficult Airway Management

2a. If a difficult airway is known or suspected, ensure that a skilled individual is present or immediately available to assist with airway management.

2b. If a difficult airway is known or suspected, inform the patient or responsible person of the special risks and procedures pertaining to management of the difficult airway.

2c. If a difficult airway is known or suspected, administer oxygen before initiating management of the difficult airway and deliver supplemental oxygen throughout the process of difficult airway .management, including extubation

Recommendations

Anticipated Difficult Airway Management

3. Identify a strategy for
1- awake intubation,
2- the patient who can be adequately ventilated but is difficult to intubate,
3- the patient who cannot be ventilated or intubated, and
.alternative approaches to airway management failure -4

Recommendations

4a. When appropriate, perform awake intubation if the patient is suspected to be a difficult intubation and difficult ventilation (face mask/supraglottic airway) is anticipated.

4b. When appropriate, perform awake intubation if the patient is suspected to be a difficult intubation and increased risk of aspiration is anticipated.

4c. When appropriate, perform awake intubation if the patient is suspected to be a difficult intubation and anticipated to be incapable of tolerating a brief apneic episode.

4d. When appropriate, perform awake intubation if the patient is suspected to be a difficult intubation and difficulty with emergency invasive airway rescue is anticipated.

Recommendations

5. If a noninvasive approach is selected, identify a preferred sequence of noninvasive devices to use for airway management.

5a. If difficulty is encountered with individual techniques, combination techniques may be performed.

5b. Be aware of the passage of time, the number of attempts, and oxygen saturation.

5c. Provide and test mask ventilation between attempts.

5d. Limit the number of attempts at tracheal intubation or supraglottic airway placement to avoid potential injury and

Recommendations

6. If an elective invasive approach to the airway (e.g., surgical cricothyrotomy, tracheostomy, or large-bore cannula cricothyrotomy) is selected, identify a preferred intervention.

6a. Ensure that an invasive airway is performed by an individual trained in invasive airway techniques, whenever possible.

6b. If the selected invasive approach fails or is not feasible, identify an alternative invasive intervention

Recommendations

unanticipated and Emergency Difficult Airway Management

7a. upon encountering an unanticipated difficult airway, determine the benefit of waking and/or restoring spontaneous breathing.

7b. upon encountering an unanticipated difficult airway, determine the benefit of a noninvasive versus invasive approach to airway management.

8. If a noninvasive approach is selected, identify a preferred sequence of noninvasive devices to use for airway management.

Recommendations

8a. If difficulty is encountered with individual techniques, combination techniques may be performed.

8b. Be aware of the passage of time, the number of attempts, and oxygen saturation.

8c. Provide and test mask ventilation between attempts.

8d. Limit the number of attempts at tracheal intubation or supraglottic airway placement to avoid potential injury and complications

Recommendations

9. If an invasive approach to the airway (e.g., surgical cricothyrotomy, tracheostomy, or largebore cannula cricothyrotomy) is necessary (i.e., cannot intubate, cannot ventilate), identify a preferred intervention.

9a. Ensure that an invasive airway is performed by an individual trained in invasive airway techniques, whenever possible.

9b. Ensure that an invasive airway is performed as rapidly as possible.

9c. If the selected invasive approach fails or is not feasible,

Recommendations

Confirmation of tracheal intubation

10. Confirm tracheal intubation using capnography or end-tidal carbon dioxide monitoring.

When uncertain about the location of the tracheal tube, determine .11 whether to either remove it and attempt ventilation or use additional .techniques to confirm positioning of tracheal tube

Extubation of the difficult airway

Have a preformulated strategy for extubation and subsequent airway .12 .management

.Ensure that a skilled individual is present to assist with extubation .13

Recommendations

14. Select an appropriate time and location for extubation when possible.

15. Assess the relative clinical merits and feasibility of the short-term use of an airway exchange catheter and/or supraglottic airway that can serve as a guide for expedited reintubation.

16. Before attempting extubation, evaluate the risks and benefits of elective surgical tracheostomy.

17. Evaluate the risks and benefits of awake extubation versus extubation before the return to consciousness.

Recommendations

Assess the clinical factors that may produce an adverse .18
.impact on ventilation after the patient has been extubated

Follow-up care

Inform the patient (or responsible person) of the airway .19
difficulty that was encountered to provide the patient (or
responsible person) with a role in guiding and facilitating the
.delivery of future care

Document the presence and nature of the airway difficulty .20
in the medical record to guide and facilitate the delivery of
.future care

Table 1. Airway Management Items for Anesthetizing Locations

Self-inflating resuscitation bag
Suction tubing, Yankauers, suction catheters, and appropriate connectors
Various sizes of face masks
Various sizes of oral and nasal airways
Various sizes and types of laryngoscope blades and handles
Various sizes and types of tracheal tubes
Tracheal tube introducer (bougie) for adult patients
Tracheal tube stylets (malleable and rigid)
Equipment for emergency invasive airway management
Various sizes of supraglottic airways
Water-soluble medical lubricant
Nasal cannula and oxygen face masks
Video laryngoscope with appropriate stylets
Standard ASA monitors
Anesthetic induction, maintenance, and rescue medications

The examples listed in this table represent basic minimum contents for an anesthetizing location cart or trolley. The cart may be customized to meet the specific needs, preferences, and skills of the practitioner and healthcare facility.

ASA, American Society of Anesthesiologists.

Table 2. Portable Storage Unit Items for Difficult Airway Management

Category*	Item†‡
Alternative/rescue ventilation equipment	Oral and nasal airways of assorted sizes
	Supraglottic airways of assorted sizes/cuffed pharyngeal sealer
	Nasal cannula
Alternative intubation equipment	Tracheal tubes of assorted sizes (including microlaryngeal tubes)
	Rigid blades of alternate design and size for intubation
	Tracheal tube guides. Examples include (but are not limited to) semirigid stylets, lighted stylets, forceps designed to manipulate the distal portion of the tracheal tube
	Intubating supraglottic airway
	Videolaryngoscope with appropriate stylet
	Optical laryngoscope
	Intubating video stylet
	Flexible intubating bronchoscope along with topical anesthetic and equipment, and airway/bite block
	Aintree catheter
Emergency airway equipment	Equipment for emergency invasive airway management
	Jet ventilation equipment
Miscellaneous	Airway exchange catheters of assorted sizes
	Multiple exhaled carbon dioxide detectors
	A laminated version of a local accepted difficult airway algorithm/cognitive aid/checklist
	Defogger

The examples listed in this table represent airway management equipment beyond what may be available in the anesthetizing location (see Table 1). In areas where these items are not available at the anesthetizing location, add them to this portable storage unit.

*Equipment and supplies sizes should match the intended population to be served (*e.g.*, neonates, pediatrics, adults). †The items listed in this table represent suggestions. The contents of the portable storage unit should be customized to meet the specific needs, preferences, and skills of the practitioner and healthcare facility. ‡Choice of some items (*e.g.*, videolaryngoscope, jet ventilation equipment) may depend on practitioner familiarity and experience with the device.

Table 3. Human Factors Relevant to Difficult Airway Management

- Practitioner factors
  - Before
    - Practitioner knowledge and training
    - Possible alternate outcomes (plan B)
    - Preoperative assessment
    - Complacency
  - During
    - Internal and external stressors (fatigue, illness, production pressure)
    - Decision-making (perseveration, judgment, situational awareness, interpretation of data)
    - Team dynamics (leadership, role assignment, empowerment, sterile cockpit)
    - Calling for assistance
  - After
    - Strategic debriefing
- External factors
  - Patient factors
    - Anatomical/physiological airway difficulty risk, aspiration risk, infection risk, exposure risk, urgency, comorbidities
  - Environment factors
    - Airway equipment
    - Monitoring
    - Personal protective equipment
  - Institutional factors
    - Culture, staffing, shift duration
    - Protocols, reporting
    - Supervision/support, training

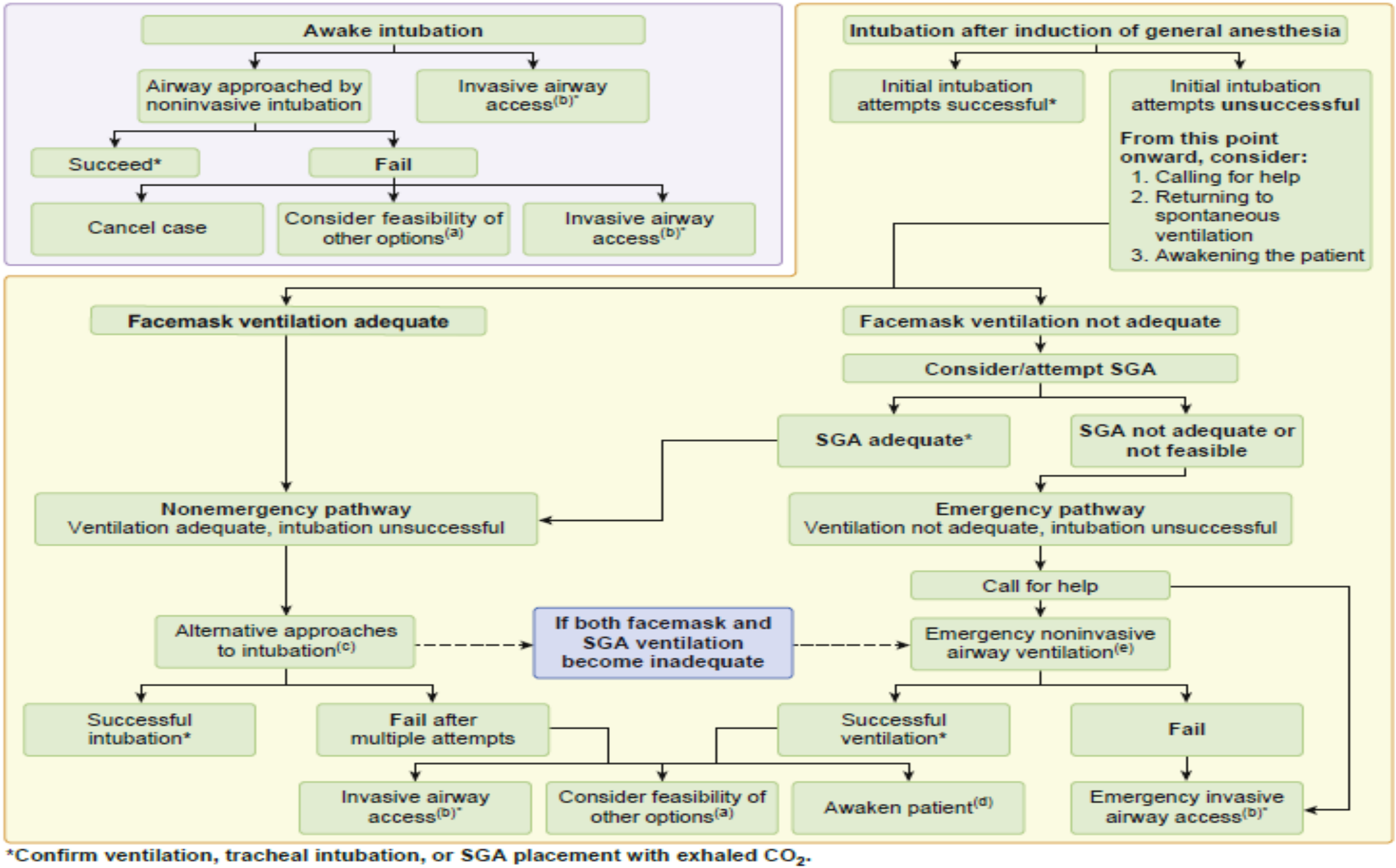
This table lists aspects of airway management that address how the practitioner may interact with patients, other clinicians, assistants, equipment, or the environment during the process of airway management. Practitioners may consider these factors before, during, and/or after the course of airway management. Factors are classified as related directly to or external to the practitioner.

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
   - Noninvasive 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

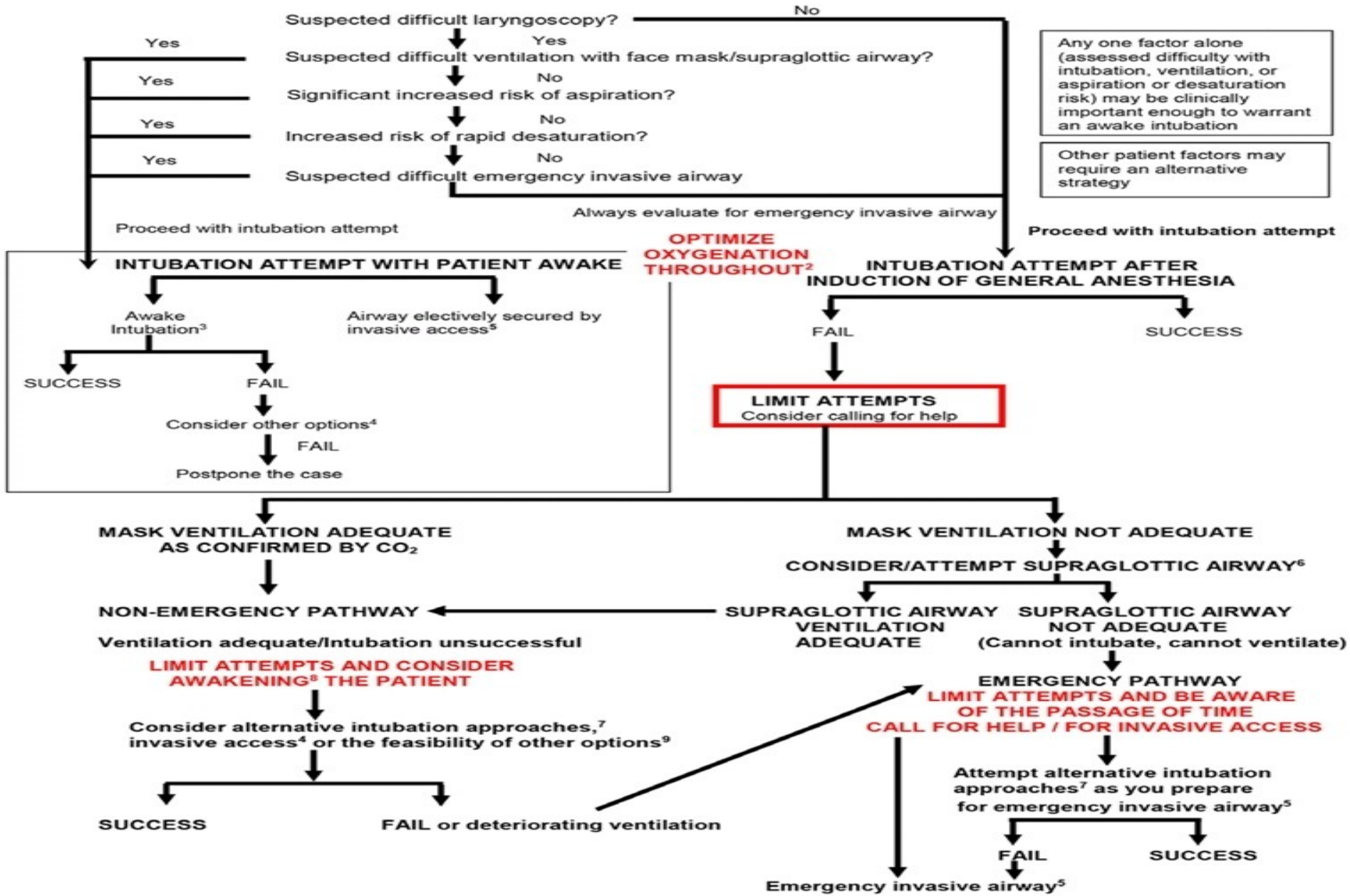
4. Develop primary and alternative strategies:



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

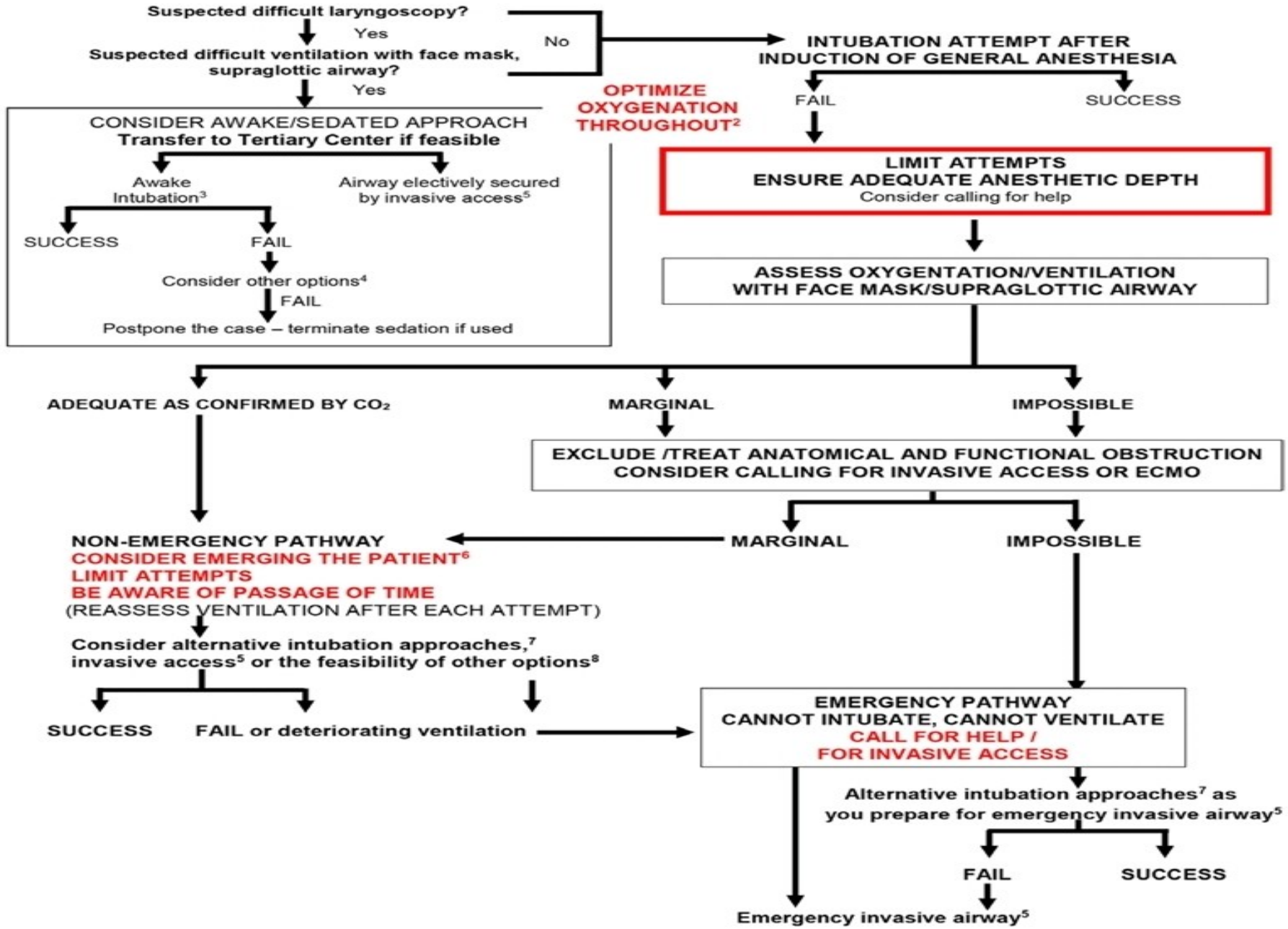
ASA DIFFICULT AIRWAY ALGORITHM: ADULT PATIENTS

Pre-Intubation: Before attempting intubation, choose between either an awake or post-induction airway strategy. Choice of strategy and technique should be made by the clinician managing the airway.[1]



ASA DIFFICULT AIRWAY ALGORITHM: PEDIATRIC PATIENTS

Pre-Intubation: Before attempting intubation, choose between either an awake or post-induction airway strategy. Choice of strategy and technique should be made by the clinician managing the airway.[1]



DIFFICULT AIRWAY INFOGRAPHIC: ADULT PATIENTS

Part 1: Pre-Airway Management Decision Making Tool (planning)

This tool can be used to choose between the awake or post-induction airway strategy. Each assessment should be made by the clinician managing the airway, using their techniques of choice.[a]

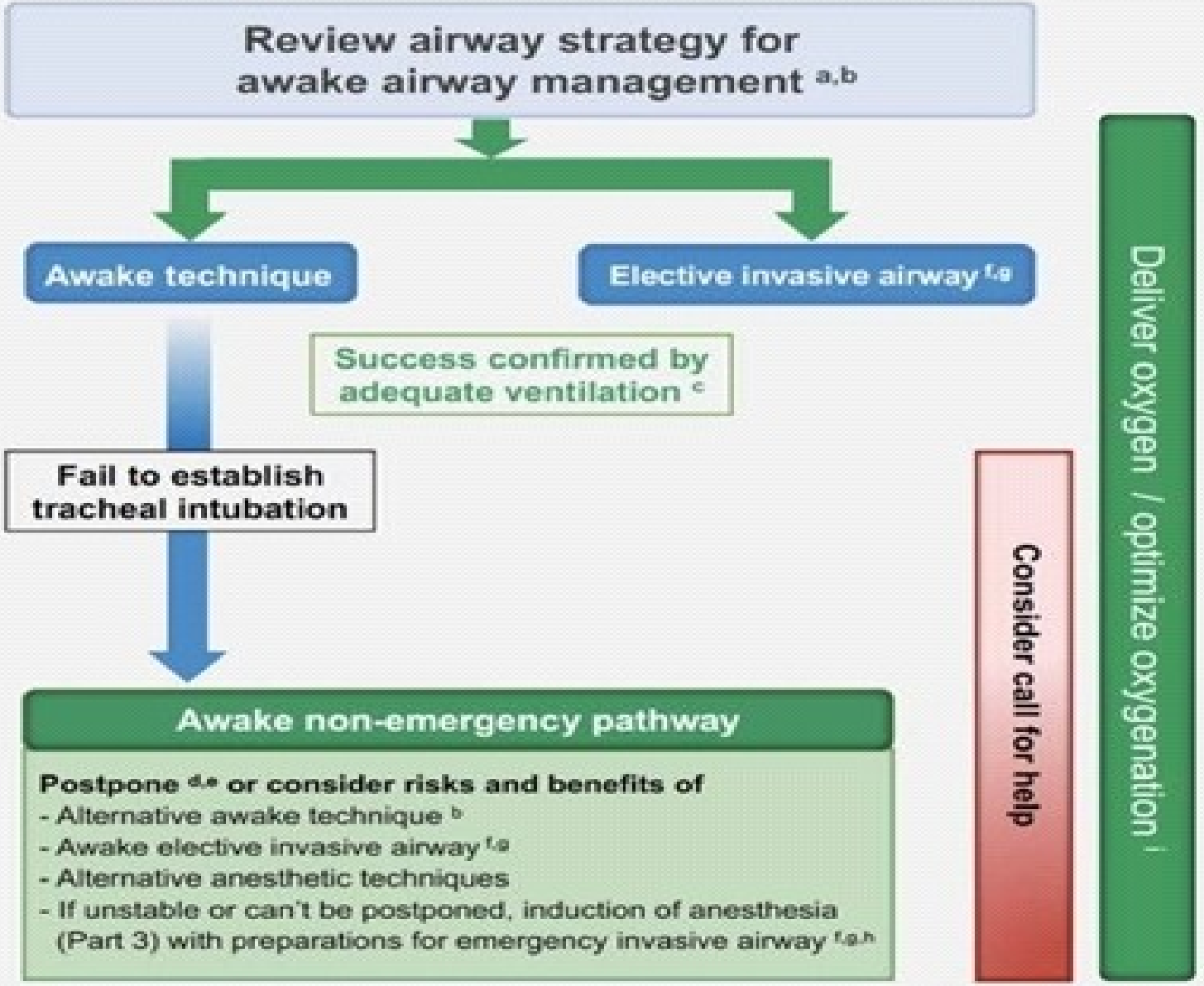
Suspected difficult laryngoscopy or intubation with direct or video laryngoscope?

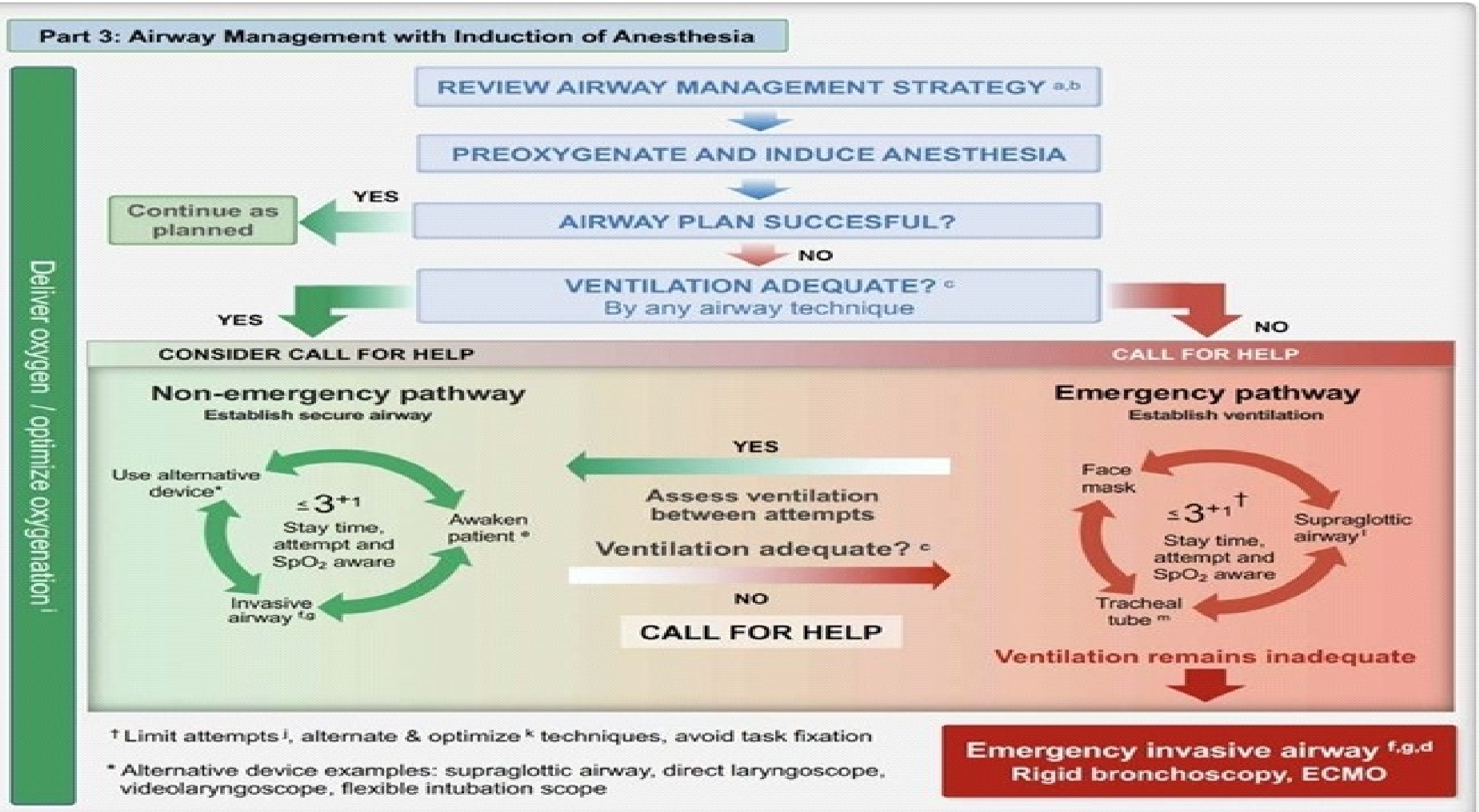
- YES → **Suspected difficult ventilation with facemask or supraglottic device?**
  - YES → **Part 2: Awake Airway Management**
  - NO → **Significantly increased risk of aspiration?**
    - YES → **Part 2: Awake Airway Management**
    - NO → **Increased risk of rapid desaturation?**
      - YES → **Part 2: Awake Airway Management**
      - NO → Always evaluate for emergency invasive airway
- No → **Part 3: Airway Management with Induction of Anesthesia**

Any one factor alone (assessed difficulty with intubation or ventilation, or aspiration or desaturation risk) may be clinically important enough to warrant an awake intubation.

Other patient factors may require an alternative strategy (e.g., patient inability to cooperate)

Part 2: Awake Airway Management




Part 3: Airway Management with Induction of Anesthesia
Deliver oxygen / optimize oxygenation[i]
REVIEW AIRWAY MANAGEMENT STRATEGY [a,b]
PREOXYGENATE AND INDUCE ANESTHESIA
AIRWAY PLAN SUCCESFUL?
YES
Continue as planned
NO
VENTILATION ADEQUATE? [c]
By any airway technique
YES
NO
CONSIDER CALL FOR HELP
CALL FOR HELP
Non-emergency pathway
Establish secure airway
Use alternative device*
≤ 3+1
Stay time, attempt and SpO2 aware
Awaken patient *
Invasive airway [f,g]
YES
Assess ventilation between attempts
Ventilation adequate? [c]
NO
CALL FOR HELP
Emergency pathway
Establish ventilation
Face mask
≤ 3+1 †
Stay time, attempt and SpO2 aware
Supraglottic airway[l]
Tracheal tube [m]
Ventilation remains inadequate
† Limit attempts [j], alternate & optimize [k] techniques, avoid task fixation
* Alternative device examples: supraglottic airway, direct laryngoscope, videolaryngoscope, flexible intubation scope
Emergency invasive airway [f,g,d]
Rigid bronchoscopy, ECMO

DIFFICULT AIRWAY INFOGRAPHIC: PEDIATRIC PATIENTS

