IAPA Advisory for Paediatric Airway Management

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Introduction

The paediatric airway poses a challenge particularly for those who do not anaesthetise small children on a regular basis. Anatomical and physiological variations of the airway at different ages have an impact on the decision of which medication to administer with regard to route, dosage, and duration of action as well as the choice of equipment *(Table 1&2).* Knowledge of this helps in the routine management of airway in children.[1] Technological advancements and research have rendered numerous paediatric airway devices available for securing the airway in elective and emergency scenarios. However, their availability alone does not solve all problems. Having the knowledge, the ability to promptly recognise difficulty and to know when to call for help early are key factors for a favourable outcome.

This advisory is formulated as a guide for a successful and safe airway management in children for the occasional paediatric anaesthesiologist.

***Table 1*. Anatomical differences in the paediatric airway, their anaesthetic implications and solutions**

Paediatric Anatomy	**Anaesthetic Implications**
Large head size and short neck (child < 2 years)	Neck flexion in supine position can cause airway obstruction *Use a shoulder roll for neck extension and proper positioning. Aim to bring tragus and manubrium sterni in one plane*
Small mouth, large tongue	Likelihood of upper airway obstruction *Use an oro/nasopharyngeal airway to maintain airway patency*
High, anteriorly placed larynx, C2 in infants, C3/4 in children	More acute angle between oral and laryngeal axes
Leaf like, hanging epiglottis which is difficult to lift and glottic opening is difficult to visualise Large tonsil and adenoids	*Choose an appropriate laryngeal blade (Miller blade) to directly lift the epiglottis* Likelihood of upper airway obstruction and bleeding during oral/nasal intubation *Gentle laryngoscopy and ETT insertion*

Short and narrow trachea	Chances of unilateral lung ventilation or accidental extubation are higher High airway resistance after inflammation making them prone to hypoxia *Check for bilateral ventilation of lungs after ETT fixation*
Short thick neck makes localisation of cricothyroid membrane difficult	Cricothyroidotomy difficult in children aged < 8 years. Higher risk of puncture of posterior tracheal wall *Pre-define and mark the landmarks if a difficult airway is anticipated. Surgical tracheotomy preferred over scalpel technique in a 'can't intubate can't ventilate' (CICV) scenario in children aged <8 years*

***Table 2*: Physiological differences in the paediatric airway and their anaesthetic implications**

Paediatric Physiology	**Anaesthetic Implications**
Highly compliant chest wall	After induction of anaesthesia, loss of FRC causes atelectasis and rapid desaturation
Type II fibres in diaphragm	Prone to early fatigue adding to early desaturation
Rib cage is more horizontal	Restricted deep breathing
Higher respiratory and metabolic rate	Higher O_2 consumption and less apnoea time to desaturation
Higher vagal tone	More chances of bradycardia during airway instrumentation. Bradycardia leading to low cardiac output further aggravating hypoxemia Hypoxia itself causes bradycardia *Ensure adequate depth of anaesthesia and oxygenation while managing the airway*

Preoperative airway assessment

Evaluation of the airway is an integral part of preoperative assessment for every child who undergoes sedation or anaesthesia. The following details of history should alert the anaesthetist to the possibility of a difficult airway:

1. Abnormal cry, hoarseness of voice
2. Snoring or sleeping in a semi prone/prone position. Obstructive sleep apnea
3. Any known congenital or acquired disorders involving airway.
4. Upper respiratory tract infections (URTI), asthma, bronchitis, pneumonia
5. Previous trauma, burns involving the head and neck
6. Previous surgery, radiotherapy of head and neck or documentation of difficult airway management

In addition, a history of full stomach, gastroesophageal reflux, hiatus hernia, gastric outlet obstruction, pyloric stenosis, bowel obstruction, ascites or abdominal mass causing raised intra-abdominal pressure should be noted.

During airway assessment, anatomical factors predisposing to difficult airway management as well as signs of airway compromise, such as stridor and use of accessory muscles of ventilation should be looked for. The following measurements can help to identify possible anatomical abnormalities.

1. Lower lip to chin distance (LCD) < 2.2 cm
2. Tragus to corner of mouth (TMA) < 7.3 cm
3. Thyromental distance (TMD) < 4 cm
4. Neck circumference (NC) > 21.4 cm
5. Ratio of height to TMD (RHTMD) > 15.77 cm
6. BMI < 12.7 cm

All the above measures have a good negative predictive value and can be used as screening tools for preoperative assessment. A combination of LCD, TMD and BMI, have been found to be more accurate at predicting difficult laryngoscopic view.[2-4] The Mallampati score can assess the airway only in a cooperative older child. In children, aged 4-8 years, the Mallampati score can be correlated with the Cormack Lehane scoring assessed during direct laryngoscopy.[2,5]

Availability of appropriate airway equipment

A simple **mnemonic** to remember the list of drugs and equipment required in difficult airway cart is explained in *Table 3*. *Figure 1* is an example of a portable airway cart. *Table 4* details the appropriate size of equipment recommended for various age groups.

Table 3. **Requirement for airway cart for a child (SOAPME)[6]**

Mnemonic	Full form	Equipment
S	Suction	Working, effective suction and appropriate size suction catheter.
O	Oxygen	Oxygen source, tubing, flow meters.

A	Airway Devices	Appropriate sizes of face masks, self-inflating bag, oropharyngeal and nasopharyngeal airways, laryngoscope blades (MacIntosh: 1, Miller: 0,1,2) video laryngoscope, supraglottic airway (SGA, 1st and 2nd generation), ETT, intubating stylet, tube exchanger, FOB.
P	Positioning	"Sniffing" position, shoulder roll for smaller children.
	Pharmacy	IV anaesthetics, muscle relaxants.
		Resuscitation drugs: adrenaline, flumazenil.
M	Monitors	SpO_2, ECG, NIBP, $EtCO_2$, RR, temperature.
E	Equipment	Defibrillator, cricothyroidotomy, tracheostomy sets for emergency front of neck access (FONA).

***Figure 1*: Portable difficult airway cart with list of contents in each drawer**

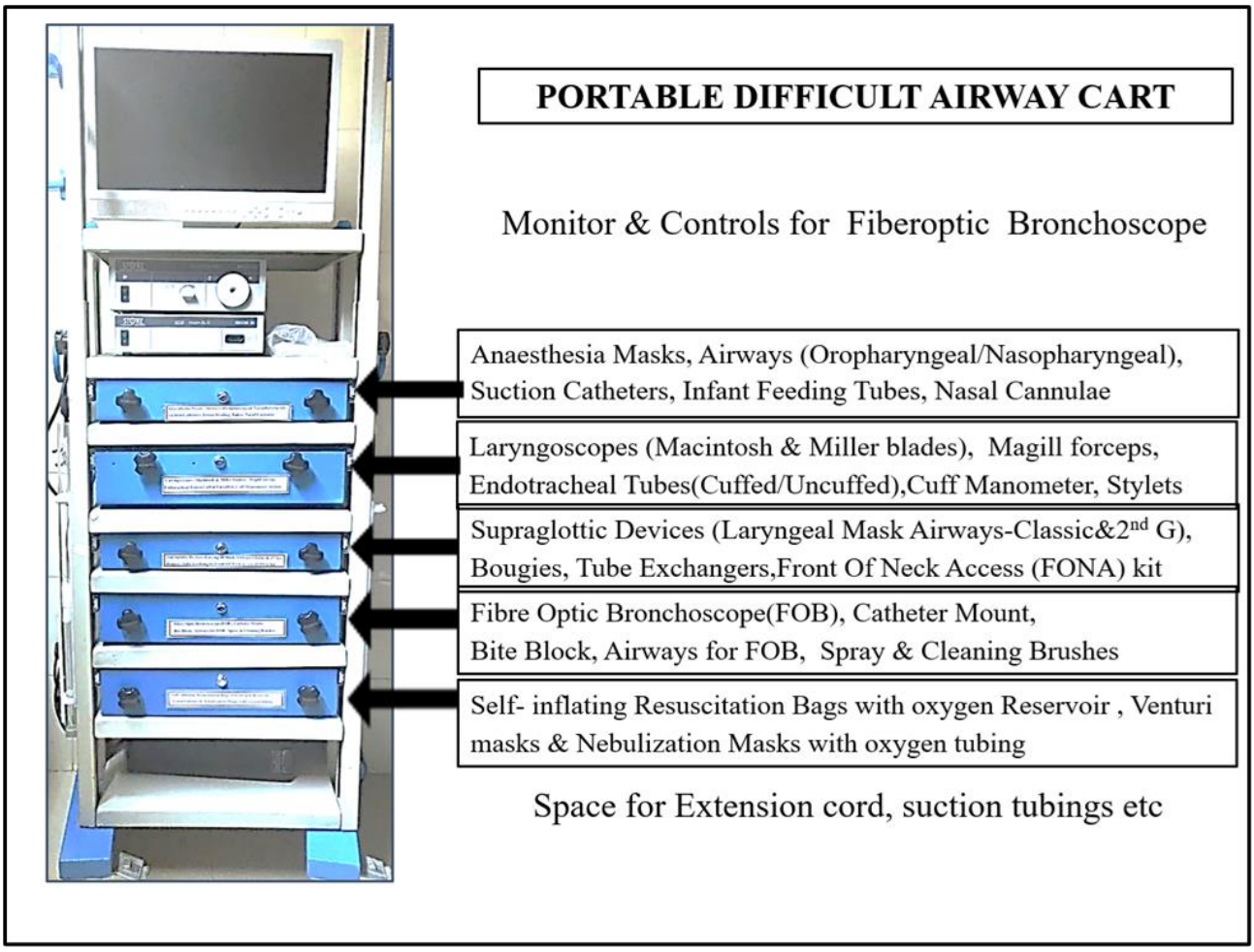

Table 4: **Paediatric airway equipment chart**

Age Group	**Neonate**			**Infant**		**Toddler**	**Pre school**	**Child**	**Adolescent**
	Weeks of Gestation			**Months**		**Years**			
	Microprimi < 28	Preterm 28 - 37	Term >37-40	1-6	6-12	1-3	> 3 - 5	> 5 - 8	>8-12
Weight (kg)	<1	1 - 2.5	2.5-3.5	>3.5-7	>7-10	>10-15	>15-20	>20-30	>30-50
Face mask size	00	0	0	0,1	1	2	2, 3	3	3, 4
Oropharyngeal airway size (mm)	00 (40)	00 (40)	00,0 (40,50)	0 (50)	0 (50)	1 (60)	1,2 (60,70)	2 (70)	3,4 (80-90)
Nasopharyngeal airway (ID mm)	2.5	3.0	3.0	3.0	3.0, 3.5	3.5, 4.0	4.0, 4.5	5.5, 5.5	6,7
Nasogastric tube (Fr G)	6	6, 8	8	10	10	10, 12	12, 14	14, 16	14, 16
Laryngoscope straight/curved	0	0	1	1	1	1, 2	2	2, 3	3, 4
ETT (uncuffed) (mm ID)	2.5	2.5, 3.0	3.0, 3.5	3.5, 4.0	4.0, 4.5	4.5, 5.0	5.0, 5.5	5.5, 6.0, 6.5	6.5,7.0, 7.5
ETT (cuffed) (mm ID)	-	-	3.0	3.0, 3.5	3.5, 4.0	4.0, 4.5	4.5, 5.5	5.0, 5.5	6.0, 6.5, 7.0
Tracheostomy tube (mm ID)	2.5, 3.0	2.5, 3.0	3.0	3.5	3.5, 4.0	4.5	4.5, 5.0	5.5, 6.0	6.0, 6.5, 7.0
LMA size **(ETT mm ID for LMA size)**	1	1	1(3.5)	1,1.5 (3.5, 4.0)	1.5 (4.0)	2.0 (4.5)	2.0 (4.5)	2.5 (5.0)	3.0,4.0 (6.0)
FOB (mm)	-		2.2	2.7	3.5	3.5	3.5	4.0	5.0

Endotracheal tube size calculations in children >1 year of age in mm ID:

Uncuffed ETT: Cole's formula = (age/4 + 4)

Cuffed ETT: Motoyama formula = (age/4 + 3.5)

Khine formula = (age/4 + 3.0)

Calculation of depth of insertion of ETT at lips or nares in cm:

	Oral	Nasal
Neonate**:**	weight in kg + 6	weight in kg +7
Child:	age in years/2 + 12	age in years/2 + 1

Conduct of anaesthesia

Premedication: is recommended to avoid physical struggle which increases the work of breathing and oxygen consumption. It is indicated in anxious children. Nonpharmacological methods include; behaviour interventions *e.g.*, showing videos and interactive books, music, and distraction methods (blowing bubbles, toys) or engagement with the anaesthetic process itself (choosing and handling the face mask, 'blowing up the balloon') and parental presence at induction of anaesthesia.

Medications for premedication include midazolam [oral 0.5–0.75 mg/kg, intranasal (0.3 mg/kg), rectal (0.5 mg/kg), or sublingual (0.3 mg/kg)], dexmedetomidine (intranasal 1-2 µg/kg), ketamine oral (5–8 mg/kg), intramuscular (4–6 mg/kg), or IV (1–2 mg/kg).

Preoxygenation: This maximizes the pulmonary oxygen reserve to prolong the period of safe apnea. An anxious awake child may be unwilling to have a face mask applied. Prior training of the child and using a scented facemask may help improve acceptance. It may help to initially keep the facemask at a distance to insufflate oxygen. Hypoxaemia in infants results in bradycardia. The cardiac output being heart rate dependent, when bradycardia occurs, the resulting reduction in cardiac output further aggravates hypoxaemia, predisposing to cardiac arrest.[3]

Measures to minimize apnoea and desaturation in a child

1. Proper planning and adherence to the difficult airway (DA) algorithm recommendations is mandatory. Alternative plans B, C should be made in the event of failure of plan A. Extubation should also be planned in advance.
2. Preoxygenation is the best strategy in an anticipated DA and unanticipated difficult airway management.
3. Preferably maintain spontaneous ventilation if a DA is anticipated.
4. Provide apnoeic oxygenation via a nasal cannula while attempting intubation in an anticipated DA.
5. A definitive airway should be inserted promptly after cessation of spontaneous or mask ventilation.

Optimum positioning for intubation

To facilitate a good view of the laryngeal inlet and perform endotracheal intubation, the three airway axes; laryngeal, tracheal and oral, should be maximally aligned. In children < 2 years of age, a small shoulder roll placed beneath the shoulders helps align these axes and maintain airway patency. In older children, the head is kept in "sniffing position" with the head and neck slightly extended Generally, for endotracheal intubation the child's ear lobule and tip of shoulder should be aligned in one horizontal plane

Choice of induction agent

Inhalational agents, sevoflurane or halothane are preferred as they are sweet smelling and non-irritant with less potential for laryngospasm compared with isoflurane and desflurane. Sevoflurane has the added advantage of rapid induction and rapid emergence. It is preferred in younger children especially when no intravenous access is in situ. If nitrous oxide (N_2O) is being used to escalate the inhalational induction, its concentration should not exceed 50% in order to avoid hypoxia. As soon as the child loses consciousness, N_2O should be discontinued followed by an oxygen-air mixture and volatile agent.

An intravenous induction is preferred in older children or those having an intravenous canula in situ preoperatively. Various induction agents like propofol, etomidate or thiopentone can be used depending on the clinical profile. However, if a DA is anticipated, these agents should be used with caution

Muscle relaxants

Adequate muscle relaxation is required to facilitate optimum viewing of the larynx and smooth endotracheal intubation.[7,8,9] They should be administered only after assisted facemask ventilation can be provided. Nondepolarizing muscle relaxants are preferred, except when a rapid sequence induction (RSI) is required. A modified RSI is preferred in children wherein *gentle* ventilation is performed in infants to maintain oxygenation without the application of cricoid pressure. The external laryngeal maneuvre helps bring the laryngeal inlet into view.

Mask ventilation

The face mask should be well fitting with minimum leak. The correct size covers the bridge of the nose and the mouth. The operator's thumb and the index finger press the mask on the face with the middle finger on the bony margin of the mandible. The index and little fingers can remain free or hooked under the angle of the mandible. The bony margin of the mandible should be pressed and not the soft tissue to avoid obstructing the airway. External laryngeal manipulation can be done with the operator's little/ring finger for better visualisation of the vocal cords or can be provided by an assistant. Optimum depth of anaesthesia needs to be maintained during mask ventilation.

Airway adjuncts

A relatively large tongue sticks to the palate, leading to difficulty in mask ventilation. An OPA or NPA can open the airway during mask ventilation. The OPA is used in unconscious patients as it stimulates a gag reflex. The appropriate size of OPA is chosen by measuring from the corner of mouth to the angle of mandible. Too large an OPA can obstruct the airway and cause trauma. If it is too small, one can further push the tongue back and fail to relieve obstruction. The appropriate size of NPA is measured from the tip of nose to the tragus. While inserting a NPA, blanching of surrounding skin tissue is suggestive of too large a size. Both devices should be well lubricated prior to insertion.

Supraglottic airway devices (SGAs)

SGAs are useful for both spontaneous and mechanically ventilated children. The second-generation SGAs with a port for the gastric tube are now routinely used for short surgical procedures as an alternative to endotracheal intubation, SGAs are useful rescue airway devices for maintaining oxygenation and anaesthesia in the failed intubation situation under general anaesthesia. SGAs in comparison to ETT have a lower incidence of perioperative respiratory adverse events (PRAE) in terms of laryngospasm or bronchospasm.[10] However, the SGA does not provide a definitive airway and therefore, not recommended for surgery of long duration in children with airway abnormalities and for transport of patients on a ventilator. Intubating LMAs can be used as a conduit for intubation in older children.[11] The maximum cuff pressure recommended for a SGA to prevent oropharyngeal leak in children should not exceed 40 cm H_2O.[12] These devices have also been used to maintain patency of the airway during extubation in difficult airway scenarios.

Endotracheal intubation

The epiglottis is elongated in infants and a straight laryngoscope blade is generally preferred to directly lift up the epiglottis. This provides better visualisation of the laryngeal inlet and insertion of endotracheal tube under vision. Curved laryngoscope blades are used by hooking the tip of the blade in the vallecula and indirectly lifting the epiglottis. Many newer versions including video laryngoscopes have been introduced to facilitate endotracheal intubation. Choice of the specific device depends on availability and personal preferences.

Video laryngoscopes are considered the equipment of choice in an anticipated difficult airway when mouth opening is adequate for its insertion. The improved glottic vision increases chances of successful intubation. As the magnified glottic view is visible to the intubator and assistant, further improvement in visualizing the laryngeal inlet can be assessed when optimum external laryngeal pressure is applied. Minimal cervical spine manipulation is required and the device can be simultaneously used along with a fibreoptic bronchoscope (FOB) to improve the chances of successful intubation.

FOB is the technique of choice of anticipated DA in expert hands. Novice users need to practice in simulated conditions and routine intubations. This is the gold standard for confirming adequate positioning of ETT in the trachea.

Uncuffed vs cuffed ETT

An increasing number of paediatric anaesthesiologists prefer cuffed ETTs over the uncuffed ones. A cuffed ETT has the advantage of high first pass success rate, less air leak and gastric insufflation, minimal escape of anaesthetic gases responsible for operation theatre pollution and reduced incidence of post-extubation stridor.[13.14] The cuff pressure should not exceed 20 cmH_20 to avoid tracheal mucosal damage and monitoring of cuff pressure is considered mandatory. Microcuff® tubes are especially designed cuffed tubes for children providing an effective sealing at low cuff pressures. The cylindrical shaped polyurethane cuff is placed more distally to avoid endobronchial intubation and damage to the narrower cricoid region and vulnerable mucosal tissues. The ideal depth of insertion for ETT is between the carina and vocal cords. This distance is short in neonates, so the cuff should be passed just below the vocal cords under direct laryngoscopic vision. Presence of bilateral breath sounds should be ensured and confirmed with capnography. Breath sounds should always be rechecked after any change in position of the child to detect any inadvertent migration into the mainstem bronchus or pharynx.

Rapid sequence induction (RSI)

Classical RSI requires application of cricoid pressure and rapid ETT insertion without mask ventilation, using bolus dose of IV induction agent and succinylcholine (1-2 mg/kg). This technique can pose a challenge in the paediatric population. Preoxygenation is difficult as children are not cooperative, and yet prone to rapid fall in oxygen saturation. Application of cricoid pressure is difficult as the cricoid cartilage is small. Inadequate efforts of cricoid pressure application can lead to lateral displacement of the oesophagus thereby increasing chances of pulmonary aspiration.

Succinylcholine is contraindicated in patients prone to malignant hyperthermia, hyperkalaemia and allergy to succinylcholine.[10] Rocuronium is an alternative muscle relaxant for rapid intubation in a dose of 0.9-1.2 mg/kg. Sugammadex is the drug of choice for prompt reversal of its neuromuscular

blockade and is available in India. It has an off-label use in paediatrics as it has not been approved by the FDA.[15]

Controlled RSI (cRSI) is the preferred technique in children. The following technique is recommended:[16,17]

- The child to be kept in 20º head-up position during preoxygenation
- Provide intermittent suctioning of the Ryle's tube in situ, or insert one immediately after intubation.
- Provide adequate hypnosis using propofol or thiopentone followed by adequate muscle relaxation with either a depolarising or non-depolarising muscle relaxant.
- Gentle bag mask ventilation with insufflation pressures <12 cmH_20.
- Tracheal intubation in a deep plane of anaesthesia with complete muscle paralysis. Neuromuscular monitoring should be used.

Extubation and postoperative care

Extubation is a critical moment during paediatric anaesthesia as children are prone to perioperative respiratory adverse events. Adequate suctioning should be done before planning to extubate. Subglottic suctioning should also be done if the ETT has a subglottic suction port. Small children may not be able to understand voice commands, so observing the breathing patterns and the saturation remains the only alternative. The method of extubation may be chosen according to the patient's clinical profile and the practice of the anaesthesiologist.

In a DA situation, a child should preferable be extubated when awake. 'Awake' extubation is practised when the child has achieved age-appropriate tidal volume and respiratory rate, conjugate gaze, eye opening and adequate muscle power.[18] As the cough reflexes return, the chances of aspiration are reduced. However, the child might be agitated and this can cause surgical site disruption, postoperative bleeding and even desaturation. Hence, extubation of a child can also be done under deep sedation. The pre-requisites for the child to be extubated in the deeply anaesthetised state are that tidal volume should be > 5 mL/kg with an age-appropriate respiratory rate. Extubation of a properly evaluated child under deep anaesthesia has the advantage of reduced cough and less oxygen desaturations, but there is increased possibility of airway obstruction. Extubation can be done either in supine or lateral position. At the time of extubation, the intubation trolley should be kept ready with all the equipment required for reintubation if needed. Removal of SGA in a child is safest in the lateral position as compared to supine. The risk of airway complications was found to be least when SGA was removed at a deep plane of anaesthesia in the lateral position[19,20]. Post operatively, oxygenation may be required, necessitating the availability of nasal prongs, face masks, high flow nasal canulae.

The post anaesthesia care unit should have facility for oxygen supplementation, continuous monitoring vital parameters and pain management. The area should also be equipped to manage any untoward events.

Table 5: **Key recommendations for paediatric airway management**	
1.	Anatomical and physiological differences in the paediatric airway make it challenging. *Anaesthesiologists should anticipate and be prepared for a difficult airway. Airway management and simulation workshops facilitate learning in a safe environment.*
2.	Perioperative complications in children are mainly respiratory, followed by cardiac causes. *The paediatric anaesthesiologist should be well trained and equipped to handle perioperative complications which are mainly respiratory in origin.*
3.	Perioperative anaesthetic complications in children are more frequent with the occasional paediatric anaesthetist when compared to an experienced paediatric anaesthesiologist *Trained paediatric anaesthesiologists should conduct anaesthesia for paediatric surgeries to minimise perioperative complications.*
4.	Preanaesthetic examination should be done thoroughly to rule out congenital anomalies and any systemic involvements. *Thorough preoperative airway assessment is difficult in small children. A difficult airway cart should be readily available to reduce airway morbidity and mortality.*
5.	Low respiratory reserves and a highly compliant chest wall in small children make them prone to rapid desaturation. *Appropriate measures for preoxygenation and nasal oxygen supplementation should be taken to minimize apnoea and desaturation in children. All types of airway devices should be available in the difficult airway cart including oral and nasal pharyngeal airways, supraglottic devices and endotracheal tubes.*
6.	Anaesthesiologists should be well versed with current difficult airway guidelines. Surgical tracheostomy remains the last resort to manage airway in CICV scenario. *Paediatric airway management algorithms should be easily accessible in Paediatric ORs. Difficult airway carts should also contain invasive airway management kits.*
7.	Specific precautions are required while administering anaesthesia to a child with a recent history of upper respiratory infection to avoid perioperative respiratory complications *The child should be taken up for elective surgery after assessing urgency and clinical condition. Extra vigilance is needed in a child requiring emergency surgery.*
8.	The goal of rapid sequence intubation (RSI) is to secure an airway emergently and safely *In infants and small children, modified RSI is the technique of choice i.e., administration of nasal O_2, gentle ventilation and use of a muscle relaxant with short half-life.*

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Appendix

The most common complications that occur are laryngospasm and bronchospasm which can occur perioperatively with the risk of postoperative apnoea, or desaturation, the recognition and management of which are in *Table 6*. SGAs should be preferred over ETT in older children with the likelihood of hyper-reactive airways to minimise airway stimulation.

Table 6: Common airway related problems

Laryngospasm	
Incidence	1.7- 25% [1], children > adults, higher perioperative morbidity.[2]
Precipitating factors	Airway anomalies, light plane of anaesthesia, secretions or blood in the airway recent history of URTI, airway instrumentation or surgery like tonsillectomy
Clinical presentation	Paradoxical respiratory movements Inspiratory stridor Chest retractions, totally absent chest movements in severe cases
Complications	Desaturation, bradycardia, aspiration, negative pressure pulmonary oedema cardiac arrest
Management	100 % O_2 by face mask, obtain a tight face mask seal. Give CPAP Open the airway by applying head tilt, chin lift and jaw thrust, insert OPA/NPA as required, use 'Larson manoeuvre' with pressure on laryngospasm. Deepen plane of anaesthesia by administering propofol or sevoflurane, if not relieved and patient desaturates further, IV succinylcholine 0.25- 0.5 mg/kg. If bradycardia, IV atropine 20 µg/kg Maintain ventilation with facemask/SGA/ETT, till recovery of neuromuscular blocking agent.
Bronchospasm	
Incidence	Incidence: 0.3- 3.2 %. May occur after intubation, intraoperatively or at emergence.
Clinical presentation	Ronchi on chest auscultation Changes in $EtCO_2$: upsloping of capnograph, decreased value Increased peak inspiratory pressures, decreased expired tidal volume decreasing value of SpO_2

Management	100% O_2, allow more time to exhalation: increase I:E ratio to 1:3, 1:4 Deepen the plane of anaesthesia with propofol or sevoflurane Give 8-10 puffs of salbutamol via metered dose inhaler Refractory bronchospasm: give magnesium sulphate, adrenaline, steroids, anticholinergics, neuromuscular blocking agents
Post-intubation croup	
Incidence	It usually is seen in the immediate postoperative period after extubation, due to local oedema and inflammation in laryngeal and subglottic structures due to tight fitting ETT or airway manipulation.
Precipitating factors	Age 1- 4 years Multiple attempts at intubation Prolonged intubation >1 hour Excessive movements of head and neck intraoperatively Oversized / overinflated ETT (No leak observed at cuff pressure > 25 cmH_2O) Coughing during extubation with ETT in situ
Clinical presentation	Loud cough, Inspiratory stridor Chest retractions Respiratory distress Cyanosis
Management	IV dexamethasone 0.6 mg/kg Nebulization with adrenaline
Child with upper respiratory tract infection (URTI)	
Elective surgery	Should be deferred to 2-4 weeks after the episode of active URTI if fever > 38°C, wet cough, child looks sick or has lung signs. [3]
Emergency surgery	If surgery is life-saving, proceed keeping possibility of perioperative respiratory adverse events (PRAEs) in mind. Be well equipped with relevant drugs and equipment. *The child presents with a running nose with no other sign of active URTI can be taken up for surgery under general anaesthesia without anticipated respiratory complications.
Premedication:	Nebulisation with a β-agonist like salbutamol Sedatives like midazolam should be given with caution as the child may desaturate in preoperative area Distraction techniques, or parenteral presence allowed during induction to reduce the distress.

Intraoperative management	Operations of short duration anesthesia can be maintained via a facemask Maintain an adequately deep plane of anaesthesia. Avoid gastric distension by inserting a NG tube to minimize respiratory compromise. Pre-set ventilator settings according to age and weight of the child prior to induction. Pressure or volume control ventilatory modes used to target ventilation end points Lung protective strategies: low tidal volumes, PEEP and high I:E ratio. Ventilatory settings: tidal volume 6 mL/kg, set age-appropriate respiratory rate. 250-500 mL reservoir bag to prevent excess delivery of tidal volume and barotrauma.

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