Review Article

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Emergency Management of the Pediatric Airway

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Abstract

Establishing a patent airway is one of the basic and most important components of basic and advanced life support. However, despite the availability of excellent guidelines/simulation training hypoxic arrests continue to occur in the emergency. This is because, most of the times the child may not be assessed properly in cases of mild to moderate distress at presentation and red flag signs are often missed. Simple measures like pacing a towel or ensuring sniffing position or position of comfort in case of breathing difficulty are not instituted in time eventually leading to a respiratory compromise. Use of appropriate sedatives, analgesics before using muscle relaxants is not ensured, resulting in pain and anxiety in the patient as well as in the care giver as ideal intubating conditions is not achieved in such cases. Use of bag and mask ventilation as a bridging measure in cases of failure of intubation may be life-saving and all health care providers involved in the care of critically ill children, should be skilled in this important procedure if they were to save the life of these patients. In this review, we have once again tried to reemphasize these important principles of airway management in a simple and comprehensive manner. Our emphasis is on simple measures to open the airway, use of airway adjuncts, technique of rapid sequence intubation with a simplified table on drugs commonly used during this important procedure and trouble shooting in an intubated patient. This review is targeted at all fellows in emergency medicine and intensive care and practising paediatricians involved in the care of critically ill/ injured child.

Keywords: Airway; Intubation; Rapid sequence intubation; Bag mask ventilation; RSI; Sedatives; Muscle relaxants; Analgesics.

Case study

A 4 year old child is admitted to the pediatric emergency with complaints of difficulty in breathing and fever of 4 days duration. You are the emergency resident on duty and are called in to evaluate the child. The vitals at admission are heart rate-156/min, peripheral pulses palpable, RR-67/minute, intercostal and subcostal retractions present, SpO_2 92% on rom air and capillary refill time of 2 seconds. Respiratory system examination reveals use of accessory muscles and bilateral crepitation in all areas of the lungs. Cardiovascular system examination is essentially normal. The child is drowsy but responding to commands.

What would be your next step? How will you manage this case? If during the course of management you find that the child has lost consciousness how can you maintain a patent airway without intubating the child if the child is breathing?

Or suppose, you find the child not responding to your treatment and not maintaining saturation what would be your next step? What is rapid sequence intubation? Can you use RSI in this child? If so what are the pre-requisites? What are the alternatives to endotracheal intubation?

In this review we shall try to answer the above pertinent questions related to airway management in such cases.

Introduction

Establishing a patent airway is one of the

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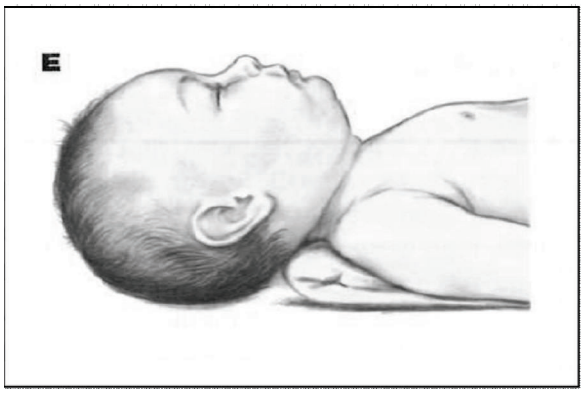
Figure 1: A folded towel is placed beneath the shoulder to open the airway in an infant



basic and most important components of basic and advanced life support. Airway management depends on a brisk assessment of the patient's breathing and knowledge of the likely progression of the airway problem, that is, deterioration versus improving function. In virtually any setting where respiratory difficulty is suspected, oxygen should be administered until the specific abnormality can be identified and adequately treated.[1,2]

If the patient is breathing spontaneously, attention is directed first to signs of upper airway obstruction, including absence of audible or palpable air flow, stridor, or rocking chest and abdominal motion rather than the normal, smooth rise and fall that should occur with inspiration and expiration.[1,2]

Assessment of airway

It is essential to determine whether airway

Figure 2. The towel is placed beneath the occiput in an older child to open the airway

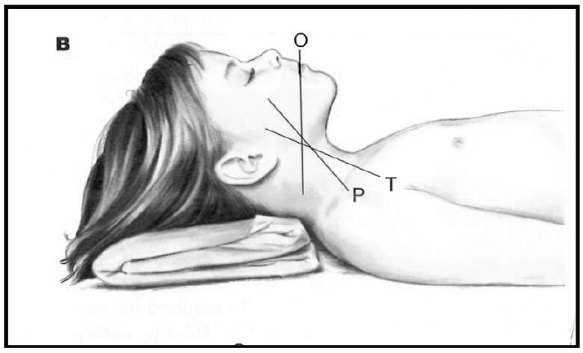
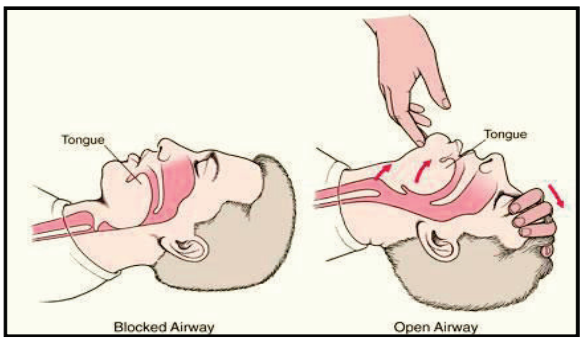


Figure 3: Head-tilt-chin-lift maneuver to open the airway



is patent or not. This can be done by observing the movement of chest or abdomen, by listening for breath sounds and by feeling for movement of air at the nose and mouth. We must also establish if upper airway is clear, whether it is maintainable or not or maintainable by simple measures such as placing a towel (Figure 1 & 2) or head-tilt-chin-lift maneuver.[1]

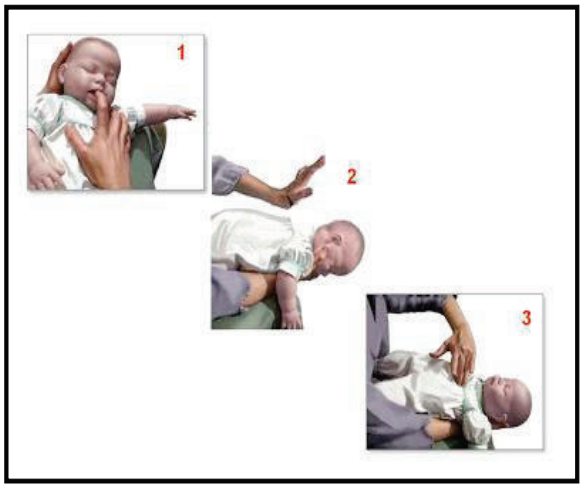
Measures to restore upper airway patency

A) Basic measures

1. Allow child to assume a position of comfort.
2. Use head tilt-chin lift (*Figure 3*) to open the airway unless cervical spine injury is suspected. The tongue is the most common cause of airway obstruction in unconscious pediatric victim. Hence manoeuvres like head tilt – chin lift or jaw thrust are used to open the airway
3. If cervical injury is suspected, open the

Figure 4: Jaw thrust maneuver in case of cervical spine injury

Figure 5: Back slaps and chest thrusts in an infant with foreign body airway obstruction



airway using a jaw thrust without neck extension. When a head or neck injury is suspected, use the Jaw – thrust manoeuvre, with spinal immobilization instead of head tilt – chin lift. *Procedure*: Place 2 or 3 fingers under each side of the lower jaw at its angle and lift the jaw upward and outward. This moves the jaw and tongue forward and opens the airway without bending the neck.

4. In a patient with cervical spine injury if jaw thrust does not open the airway then use *head tilt chin lift* or *jaw thrust with neck extension* as opening airway is a priority !
5. Suction the nose and oropharynx.
6. *Technique of suctioning:* connect suction apparatus to wall suction or pump suction and maintain a continuous pressure of less than 120 mmHg. Give 100% oxygen before suctioning. Open the mouth and sweep the suction tip across the oral cavity. Limit the suction time to less than 10 seconds per attempt. Reoxygenate the child in between the attempts. While suctioning the trachea reduce the pressure to less than 100 mmHg.

Figure 6: Oropharyngeal airways

Figure 7: Nasopharyngeal airways of different sizes

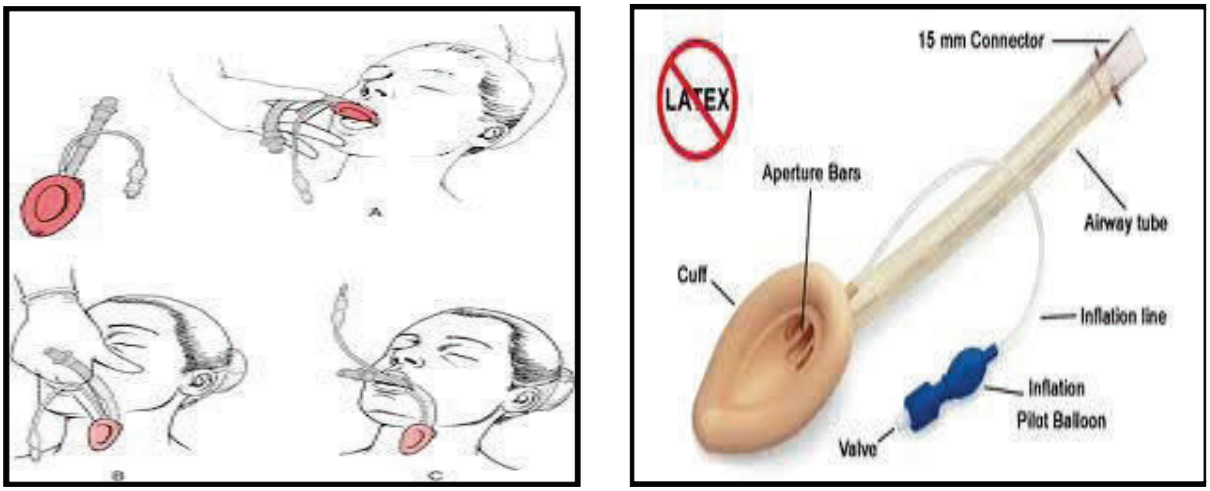
Precautions during suctioning

- Avoid deep Yaunker suction in awake patients to prevent gagging, vomiting or laryngospasm
- Avoid nasogastric tubes in facial / cranial trauma
- Exercise caution when placing orogastric tubes in suspected laryngeal, penetrating neck, or esophageal injury

7. Perform foreign body airway obstruction relief techniques if the child is responsive. This includes backslaps and chest thrusts for infants below 1 year of age and abdominal thrusts for older children (*Figure 5*). Once the child becomes unresponsive start cardiopulmonary resuscitation.

When use of simple measures does not help in maintaining the airway then one should consider the use of advanced measures such as oropharyngeal and nasopharyngeal

Figure 8. Technique of insertion of laryngeal mask airway



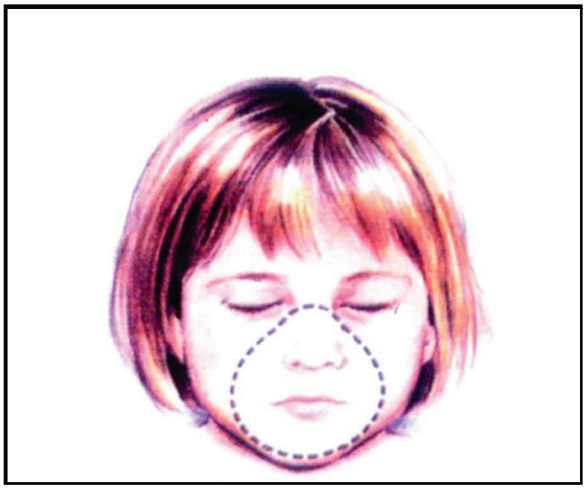
airways, laryngeal mask airway and finally intubation.[1-3]

B) Advanced measures

a) *Oropharyngeal airways* help maintain an open airway by displacing the tongue or soft palate from the pharyngeal air passages. Oropharyngeal airways (*Figure 6*) are used in unresponsive victims who do not have a gag reflex. Make sure to select the correct size. An oropharyngeal airway that is too small may push the base of the tongue farther into the airway while one that is too large may obstruct the airway.[1]

b) *Nasopharyngeal airways* can be used in semi-conscious children with an intact gag reflex. Pay careful attention to proper diameter and length. A nasopharyngeal airway (*Figure 7*) that is too short may not maintain an open airway, while one that is too long may obstruct it. A small-diameter nasopharyngeal airway may be obstructed easily by secretions. It may therefore require frequent suctioning.[1]

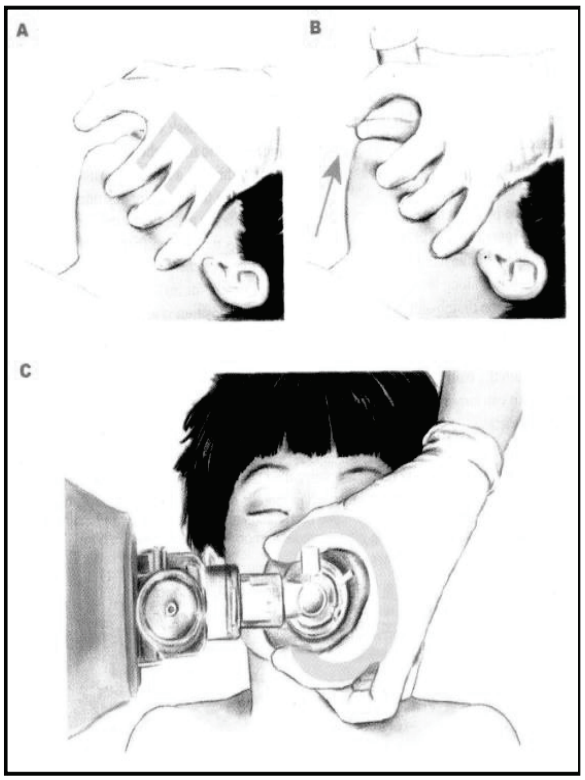
Figure 9: Method of applying the mask



c) *Laryngeal mask airway (LMA):* When bag-mask ventilation is unsuccessful and when endotracheal intubation is not possible, the LMA is acceptable when used by experienced providers to provide a patent airway and support ventilation. LMA insertion is associated with a higher incidence of complications in young children compared with older children and adults.[4]

d) *Endotracheal intubation:* The pediatric intensivist is frequently called on to intubate critically ill patients when brief ventilation with bag and mask is inadequate to reverse the underlying disorder. This requires special training and skills and should be performed only by a person trained in advanced airway management or a person with the necessary skills. One should be skilled in the procedure of bag and mask ventilation before intubation as in cases of failure of intubation it is a life-saving procedure. Here we would briefly recapitulate the technique/steps of bag and mask ventilation.[1-3]

Figure 10: E-C Clamp technique for bag and mask ventilation



Bag and mask ventilation (BMV)

It serves as the initial method to maintain ventilation and the method of choice if endotracheal intubation is unsuccessful. BMV should be started for all patients who have apnea / bradypnea or inadequate respiratory effort.

Equipment

A) Ventilation mask: A ventilation mask consists of a rubber (or) plastic body, a standardized 15 mm / 22 mm connecting port and a rim or face seal. The mask should be transparent to observe the color of child's lip and condensation to detect exhalation. They are available in various sizes. The mask should extend from the bridge of the nose to the cleft of the chin, enveloping the nose and mouth and avoiding compression of the eyes (*Figure 9*). It should provide an air tight seal around the area covered.

B) Manual resuscitator: (self- inflating or flow inflating) It is designed to re-inflate automatically after being compressed and released during BMV. (It is available in size 1 liter suitable for entire pediatric age range).

Technique

Performing BMV in an infant or child begins with positioning the child (as described above) opening and clearing the airway. Select the appropriate mask that completely covers the nose and mouth. Select a 1 liter bag. Connect the bag to source of oxygen. Apply the mask to the face with the non-dominant hand while positioning the head and neck optimally to maintain airway. With the help of the index finger and thumb gently compress the mask on the face (C-grip), and place the long, ring and small fingers on the angle of the jaw, forming an "E" (*Figure 10*). The entire hand placement for BMV is called "E-C Clamp". The fingers on the jaw should pull the patients chin into the mask, creating a good mask seal. Once the mask is properly applied to the face we need to compress the resuscitation bag with the dominant hand at an age – appropriate rate. Squeeze the bag just until chest rise is adequate. When 2 persons are available for BMV one person uses both hands to apply the mask using the "E-C Clamp" technique and the other compresses the bag (*Figure 10).* Place a nasogastric tube to relieve the inflation of stomach caused during BMV. Carefully monitor the patient at all times while performing BMV. Monitor heart rate, chest rise, SPO_2 on pulse oximetry to ensure that the procedure is being properly performed. Bradycardia, hypoxia and hypercapnia are all possible indications of poor technique. If O_2 is not available BMV can be done with room air.

Complications: Aspiration of gastric contents or pneumothorax due to barotrauma and/or eye injury due to compression with mask may occur.

As mentioned earlier bag and mask is only used in the intervening period before intubation and one cannot replace intubation with this technique. Therefore arrangements

Table 1: Characteristics of drugs commonly used during rapid sequence intubation

Drugs	Dosage	Properties	Onset time	Offset time	Remarks
Sedatives					
Midazolam/ Lorazepam	0.1–0.3 mg/kg IV	Amnestic, sedative	30-60 seconds	30-45 minutes	• Often combined with Fentanyl • May cause hypotension
Thiopental	1-6 mg/kg (depends on build of patient)	Amnestic, Sedative	60-90 seconds	5-10 minutes	• Good for ICP but bad for hemodynamics • May cause respiratory depression
Etomidate	0.3 mg/kg IV	Amnestic, sedative	30-60 seconds	3-5 minutes	• Clonic activity, clinically significant adrenal suppression • Good for hemodynamics but not recommended for children with septic shock
Propofol	1–3.5 mg/kg IV	Amnestic, sedative	60 seconds	5-10 minutes	• Good for ICP but *bad* for hemodynamics • Patients wake up clear headed as compared to thiopental
Sedatives /Analgesics					
Fentanyl	2–4 mcg/kg IV	Amnestic, analgesic, sedative	30-60 seconds	30-60 minutes	• Good for hemodynamics • May cause occasional chest wall rigidity
Morphine	0.1–0.3 mg/kg IV	Amnestic, analgesic	15-30 minutes	2-4 hour	• Bad for hemodynamics • Occasional respiratory depression
Ketamine	1-2 mg/kg IV	Amnestic, sedative, analgesic	60-90 seconds	60-90 seconds	• Ideal for short procedures • Good for hemodynamics, asthma but bad for ICP • May cause hallucinations, therefore it is better to use it in combination with midazolam/lorazepam (prior to drug administration)
Neuromuscular blocking agents					
Succinylcholine	1-4 mg/kg IV	Depolarizing Muscle relaxant	60 seconds	10 minutes	• Good for laryngospasm, urgent paralysis • Contraindicated in hyperkalemic patients, patients with muscle disease, burns, spinal cord trauma or otherwise
Rocuronium	0.6-1.2 mg/kg IV	Non-depolarizing muscle relaxant	60 seconds	15-45 minutes	• Suitable for use in patients with renal failure due to hepatic excretion
Vecuronium	0.1-0.3 mg/kg IV	Non-depolarizing NMB	3-5 minutes	30-75 minutes	• Use with caution in patients with hepatic failure • Minimal hemodynamic effects
Cis-atracurium	0.1 mg/kg	-do-	3-5 minutes	20-35 minutes	• Elimination is by Hoffman degradation and therefore ideal for patients in renal/hepatic failure • May cause histamine release and therefore use with caution in patients with asthma

should be made to intubate the patient with unmaintainable airway after providing bag mask ventilation as a temporary measure.[1-3]

The common indications for intubation may include one or more of the following[1-4]:

1. PaO2 <60mm with FiO2>0.6 (in the absence of cyanotic congenital heart disease)
2. PaCO2> 50 mm Hg (acute and unresponsive to other interventions)
3. Upper airway obstruction, actual or impending
4. Neuromuscular weakness
5. Maximum negative inspiratory pressure >-20 cm H2O
6. Vital capacity <12-15 ml/kg
7. Hemodynamic instability (cardiopulmonary resuscitation, shock)
8. Controlled therapeutic (hyper) ventilation
9. Intracranial hypertension and
10. Pulmonary hypertension

Technique of endotracheal intubation

- Prepare the equipment and select appropriate size endotracheal tube (appendix 1). Also keep one size less and more ready.
- Position the child's head such that the axes of mouth, pharynx and trachea are aligned i.e. in sniffing position.
- Hold the laryngoscope blade in left hand and insert the blade so as to displace the tongue and epiglottis and visualize the glottis opening.
- Insert the tube from the right corner of the mouth and not through the barrel so that you can see the tube passing through the glottis. Help can be taken from an assistant to visualize the glottis by applying cricoid pressure (in unconscious patient) or applying gentle rightward traction on the right corner of the patient mouth.
- Next position ET tube in the mid trachea as per the length calculated (*Appendix 1*).
- Confirm the position of the tube by various methods described subsequently.

Rapid Sequence Intubation (RSI)

To facilitate emergency intubation and reduce the incidence of complications, skilled, experienced providers may use sedatives, neuromuscular blocking agents, (*Table 1*) and other medications to rapidly sedate and neuromuscularly block the pediatric patient. Use RSI only if you are trained, and have experience using these medications and are proficient in the evaluation and management of the pediatric airway. If you use RSI you must have a secondary plan to manage the airway in the event that you cannot achieve intubation.[1-4] The steps involved in RSI include:

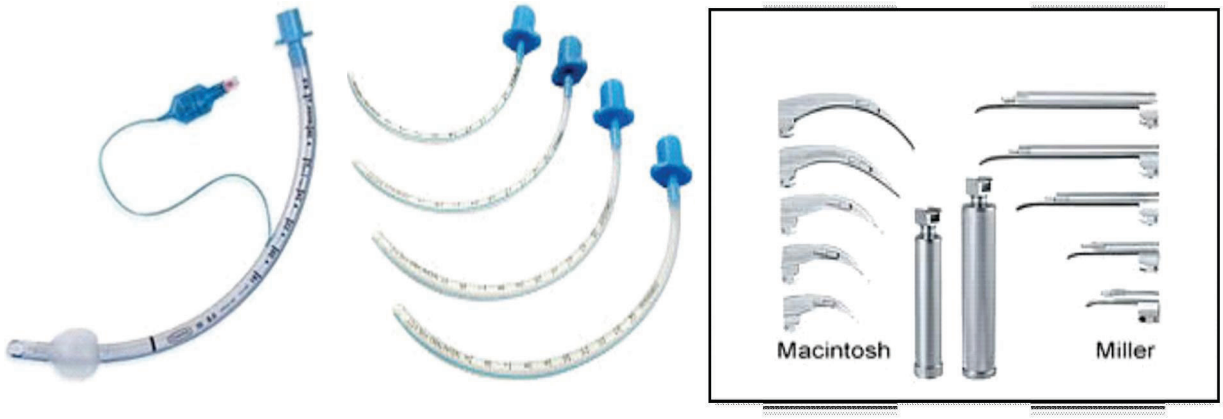
1. Preoxygenation
2. Premedication
3. Sedation
4. Neuromuscular blockade
5. Cricoid pressure (+/-)
6. Intubation

*Pre-oxygenation:*Aim is to fill the functional residual capacity with 100% oxygen. Pre-oxygenation may not always work in patients with lung disease and the intervention would have to be quicker in such patients to prevent saturations from falling to dangerously low levels and thereby leading to arrest.

Medications for RSI: Several types of medications are used during RSI (Table 1). These are used in order to achieve ideal intubating conditions for the patients as well as the practitioner and comprise of agents that can cause *amnesia, analgesia, sedation and muscle paralysis*. There is no perfect combination of drugs that exists for all patients; providers should select drugs based on the patient's condition and the provider's expertise. Most children require some degree of sedation to facilitate intubation and to reduce their awareness of paralysis and intubation.

Pre-medications: These are drugs that are

Figure 11: Cuffed, uncuffed endotracheal tubes and blades



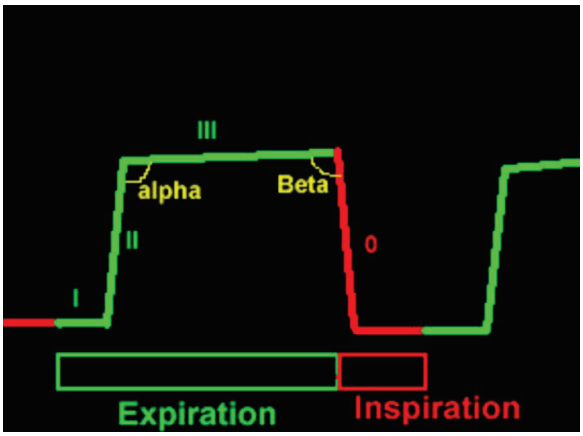
commonly used to counter the bradycardia that can develop during RSI as a result of airway manipulation and/or to counter the side effects of some of the drugs used during RSI. Bradycardia can develop during RSI as the result of airway manipulation and as a side effect of some of the RSI drugs. It can significantly reduce oxygen delivery, especially in patients with limited cardiac output. The drugs commonly used to counter the bradycardia that may occur as a result of airway manipulation during RSI are atropine and glycopyrrolate. The American Heart Association Pediatric Advanced Life Support guidelines recommend the use of atropine for infants who undergo RSI, for children 1 to 5 years of age receiving succinylcholine, and for adolescents receiving a second dose of succinylcholine. Although, atropine may prevent bradycardia and reduce oral secretions (facilitating airway visualization), the time to the onset of this effect is longer (15 to 30 mins) than most providers are prepared to wait before airway instrumentation.

Sedatives and analgesics: The sedatives and analgesic agents used during RSI mostly belong to the benzodiazepines (BZD), barbiturates and opioid group of drugs. Some of the commonly used agents of these groups of drugs and their physiologic effects are summarized in Table 1. Although the list of drugs is long one must choose what works best for them in their set up.

The "classic" combination of drugs used for rapid sequence induction/intubation is sodium thiopental (4-6 mg/kg) and succinylcholine (1-4 mg/kg) with a prior defasciculating dose of a non-depolarizing muscle relaxant such as vecuronium. In hemodynamically unstable patients, alternative drugs include ketamine, etomidate, or a benzodiazepine alone or in combination with a short-acting narcotic. Succinylcholine has multiple undesirable side effects (Table 1) that may include increased intragastric pressure. Most of the non-depolarizing relaxants, given in amounts two to three times the usual intubating dose, produce good conditions for intubation nearly as quickly as succinylcholine (60-90 seconds), without adverse side effects but lasting longer. Rocuronium is the current best alternative, with its rapid onset and short duration of action.

Cricoid pressure: There are no data to show that cricoid pressure prevents aspiration during rapid sequence or emergency tracheal

Figure 12: Exhaled CO_2 monitoring



intubation in infants or children. The 2010 PALS guidelines suggest the following recommendations for cricoid pressure.[5] In case of emergency intubations in infants and children, cricoid pressure should be discontinued if it impedes ventilation or interferes with the speed or ease of intubation.

Intubation: Both cuffed and uncuffed endotracheal tubes are acceptable for intubating infants and children. If cuffed endotracheal tubes are used, cuff inflating pressure should be monitored and limited usually to less than 20 to 25 cm H_2O. In certain circumstances (e.g., poor lung compliance, high airway resistance, or a large glottic air leak) a cuffed endotracheal tube may be preferable to an uncuffed tube, provided that attention is paid to endotracheal tube size, position, and cuff inflation pressure.

RSI in special situations

Raised ICP

- If there are no airway contraindications, administer anaesthetic and neuromuscular blocking agents.
- In case of raised ICP with cardiovascular compromise - etomidate (0.3 mg/kg IV), or midazolam (0.2-0.3 mg/kg IV), and fentanyl (5-10 mcg/kg IV), plus lidocaine (1.0-1.5 mg/kg IV), and rocuronium (0.6-1.2 mg/kg IV) or other relaxant
- If there is no associated cardiovascular compromise or hypovolemia associated with raised ICP- Thiopental (4-6 mg/kg IV), plus lidocaine (1.0 mg/kg IV), plus rocuronium (0.6-1.2 mg/kg IV) or other relaxant
- Ventilate patient until drug effect achieved (consider short-term hyperventilation in patients with signs of critically elevated intracranial pressure)
- Perform laryngoscopy and orotracheal intubation

Shock

- In case of cardiovascular compromise - etomidate and fentanyl (5-10 mcg/kg IV) (for sedation), plus succinylcholine/ rocuronium (0.6-1.2 mg/kg IV) or any other relaxant (paralysis).

Asthma

- Etomidate (0.3 mg/kg IV) and/or ketamine (1mg/kg IV) (for sedation), plus succinylcholine/ rocuronium (0.6-1.2 mg/kg IV). Avoid histamine releasing agents such as atracurium and cis-atracurium.

Verification of endotracheal tube placement[1]

1. Look for bilateral chest movement and listen for equal breath sounds over both lung fields, especially over the axillae.
2. Listen for gastric insufflation sounds over the stomach. They should *not* be present if the tube is in the trachea.
3. If there is a perfusing rhythm, check oxy-hemoglobin saturation with a pulse oximeter. Remember that following hyperoxygenation, the oxyhemoglobin saturation detected by pulse oximetry may not decline for as long as 3 minutes even without effective ventilation.
4. If you are still uncertain, perform direct laryngoscopy and visualize the endotracheal tube to confirm that it lies between the vocal cords.

Exhaled or End-Tidal CO_2 monitoring

When available, exhaled CO_2 detection (capnography or colorimetry) (Figure 12) is recommended as confirmation of tracheal tube position for neonates, infants, and children with a perfusing cardiac rhythm in all settings.[1]

Trouble shooting in an intubated patient

If an intubated patient's condition deteriorates at any point of time – first of all disconnect the patient from the ventilator if applicable and start bag tube ventilation. Then rule out **DOPE** systematically which stands for:

Appendix 1: Guidelines for Laryngoscope, Tracheal Tube, and Suction Catheter Sizes

Age of Patient	Laryngoscope	Internal Diameter of Tracheal Tube (mm)	Distance from Mid-trachea to Lips or Gums(cm)	Suction Catheter (F)
		Uncuffed tube= Age (years) / 4+ 4 Cuffed tube = Age (yrs)/4 + 3.5	<44 weeks gestational age *6 + Weight (Kg)* >44 weeks gestational age *3 x TT size*	2 x TT size
Preterm infant	Miller 0+	2.5, 3.0 uncuffed	7-8	5-6
Term infant	Miller 0-1+ Wis-Hipple 1 Robertshaw 0	3.0, 3.5 uncuffed	9-10	6-8
6 months		3.5, 4.0 uncuffed	10.5-12	8
1 year	Miler 1 Wis-Hipple 11/2 Robertshaw 1	4.0, 4.5 uncuffed	12.13.5	8
2 years	Miller 2 MacIntosh 2 Flagg 2	4.5 uncuffed 4.0 cuffed	13.5	8
4 years		5.0, 5.5 uncuffed 4.5 cuffed	15	10
6 years		5.5 uncuffed 5.0 cuffed	16.5	10
8 years	Miller 2 MacIntosh 2	6.0 cuffed	18	12
10 years	Macintosh 2	6.5 cuffed	19.5	12
12 years	Macintosh 3	7.0 cuffed	21	12
Adolescent	Macintosh 3 Miller 3	7.0, 8.0 cuffed	21	12

***D**isplacement of the tube*: Auscultate the chest bilaterally and over the stomach for breath sounds. If resistance is low while bagging or saturation does not improve suspect displacement- confirm by direct laryngoscopy.

***O**bstruction of the tube:* Start bag mask/tube ventilation and observe for secretions in the tube. Suction the tube. If after suctioning there is no improvement - feel for resistance while bagging with poor chest rise which could imply a partial or complete obstruction. One may make use of end tidal CO_2 monitoring if available which will show low exhaled CO_2 levels to confirm the same.

***P**neumothorax:* Look for asymmetrical chest rise. Percuss for hype resonant note bilaterally and identify areas of hyper resonance. Also auscultate for equality of breath sounds bilaterally. Confirm by needle aspiration on the midclavicular line at the second intercostal space with underwater seal.

***E**quipment failure:* After ruling out all of the above steps one by one inspect the ventilator,

its tubing's and connections for troubleshooting and correct any abnormalities detected. If the ventilator is also functioning optimally then the problem is with the patient and we may need to titrate the ventilator settings accordingly to suit his requirements.[1]

Key messages

1. Establishing a patent airway is one of the basic and most important components of basic and advanced life support.
2. While assessing airway patency we must establish if airway is clear, maintainable by simple measures such as head tilt-chin-lift or jaw thrust or not maintainable requiring advanced airway.
3. Avoid using airways in conscious patients with good gag reflex.
4. Bag and mask ventilation is often used as the initial method to maintain ventilation and is often used as a rescue measure before intubating a patient for failed intubation attempts.
5. RSI is a technique used by providers to rapidly sedate and neuromuscularly block the patient using a combination of sedatives, neuromuscular blocking agents and other medications.
6. If an intubated patient deteriorates at any point of time one must rule out **D**isplacement, **O**bstruction, **P**neumothorax and **E**quipment failure before changing any ventilatory settings.

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Case Report

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Spontaneous Bilateral Pneumothorax in the Newborn

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Abstract

Pneumothorax is a recognised cause of respiratory distress in the neonatal period. It may occur spontaneously (idiopathic) or secondary to various underlying lung diseases. In considerable cases of pneumothorax, intercostal drain is inserted to relieve respiratory distress. Pneumothorax results in longer hospital stays due to the requirement of these surgical interventions. But, here we would like to take the opportunity to share our clinical experience of the newborn with spontaneous pneumothorax with mild to moderate respiratory distress who recovered completely with conservative management with an oxygen-enriched atmosphere and no surgical intervention.

Keywords: Spontaneous pneumothorax; Newborn; Pneumothorax; Intercostal drain.

Introduction

Spontaneous pneumothorax can occur in the newborn infant and if not recognized may have fatal consequences. It should be suspected in any infant with respiratory distress. In children, incidence of spontaneous pneumothorax is highest during neonatal period, most probably due to high transpulmonary pressures generated with onset of breathing. Detection in newborn infants depends as much on a high degree of awareness of its possibility as on the knowledge of its predisposing factors and cincial features. The estimated incidence varies from 0.3% to 1.3% based on clinical symptoms or on radiological findings respectively.[1,2] We present here a case of bilateral pneumothorax in neonate which was managed conservatively with high oxygen flow without any surgical intervention.

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Case report

A 3350 gm female infant was born at term gestation (39 weeks) by caesarean section (indication-non progression of labour) to a primi gravida mother after an uneventful antenatal period. There was no history of any trauma during delivery or meconium stained liquor. Baby cried immediately after birth and did not require any resuscitation but shortly, developed tachypnea with grunting and cyanosis. She required supplemental oxygen via head box with resolution of cyanosis, but respiratory distress persisted Physical examination revealed a heart rate of 156 beats/min, capillary refill time of 2 seconds, good volume pulses and respiratory rate 68 breaths/min. Breath sounds were decreased bilaterally with no crepts or wheeze. Moderate chest retractions with RDS score (Downe's) of 4-5 was recorded. Rest of the systemic examination was normal. An arterial blood gas measurement in 40% ambient oxygen revealed a pH of 7.201, $PaCO_2$ of 62 mmHg and PaO_2 of 80 mmHg with base excess of - 8.0. The chest radiograph revealed bilateral pneumothoraces with normal pulmonary vasculature and normal cardiac silhouette (Fig 1). Septic profile and blood culture were negative. She was managed with high flow oxygen via oxygen hood. Respiratory distress decreased within 24 hours and she was off oxygen after 72 hours. She did not require