Video Article

Guidelines for Elective Pediatric Fiberoptic Intubation

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Abstract

Fiberoptic intubation in pediatric patients is often required especially in difficult airways of syndromic patients i.e. Pierre Robin Syndrome. Small babies will desaturate very quickly if ventilation is interrupted mainly to high metabolic rate. We describe guidelines to perform a safe fiberoptic intubation while maintaining spontaneous breathing throughout the procedure. Steps requiring the use of propofol pump, fentanyl, glycopyrrolate, red rubber catheter, metal insuflation hook, afrin, lubricant and lidocaine spray are shown.

Video Link

The video component of this article can be found at https://www.jove.com/video/2364/

Protocol

1. Equipment Preparation

1. Med fusion pump for propofol infusion
2. Place nasotracheal tubes under heating mattress
3. Connect camera to scope and check orientation
4. Three movements affect the view through the scope:
    1. In and out.
    2. Rotation using a two-handed maneuver.
    3. Flexion and extension of the tip of the scope.

2. Additional Equipment

1. Fentanyl 0.5-1.0 mcg/kg
2. 12F red rubber suction catheter
3. Glycopyrrolate 0.1-0.2 mg
4. Metal insufflation hook
5. Afrin nasal spray
6. Lubricant
7. Lidocaine 2% or 4% for spraying nares

3. Patient Preparation

1. Perform mask induction maintaining spontaneous ventilation.
2. Start IV and give fentanyl and glycopyrrolate IV.
3. Give propofol bolus 1 mg/kg and begin propofol infusion 200 mcg/kg/min.
4. Tape eyes before spraying Afrin to avoid dilation of pupils.
5. Spray Afrin and lidocaine in both nares.
6. Mask ventilate the patient to distribute Afrin and lidocaine distally.
7. Pass red rubber catheter into both nares to check patency.
8. Choose the more patent nostril for the fiberoptic scope.
9. Keep the red rubber in the other nostril with tip in the hypopharynx for O_2.

10. Use insufflation hook to connect red rubber to the circuit and administer 2 L/min of O_2 (don't insufflate high flows into the hypopharynx).

4. Actual Fiberoptic Intubation

1. Take connector off the nasotracheal tube.
2. Advance tube all the way up the lubricated fiberoptic scope.
3. Clean fiberoptic tip with alcohol
4. Put a slight curve on the end of the scope to follow the floor of the nose.
5. Thread the fiberoptic to the larynx blindly.
6. Look for any recognizable anatomic structures. FREEZE!
7. Bring anatomic structures into the center of the field and keep them there.
8. When approaching the vocal cords, give a bolus of propofol 1 mg/kg IV.
9. Once through the cords, make a downward turn into the trachea.
10. Follow tracheal rings to the level of the carina.
11. You may require an additional propofol bolus of 1 mg/kg IV.
12. Make sure the fiberoptic scope tip is in a neutral position.
13. Thread the ETT. If the ETT gets hung up at the larynx, give a 360° turn of the tube to spin it into the trachea.

5. Representative Results

This video shows an efficient technique for elective fiberoptic intubation in pediatric patients that is easily teachable to residents and fellows and reproducible. The main key is to maintain spontaneous ventilation at all times. Good equipment preparation before hand is also important.

Discussion

Fiberoptic intubation in pediatric patients with difficult airway could be a challenging task[1,2] and the presence of craniofacial dysmorphisms presents additional challenges to tracheal intubation[3]. It is more difficult to perform this procedure in pediatric patients than in adults mainly because of smaller airways in pediatric patients which make the manipulation of the fiberoptic more difficult since any small movement of the tip of the firberoptic scope runs the risk of touching the mucosa of the nasopharynx/trachea. This will prevent good visualization of the airways and lead to perform back and forth maneuvers of the fiberoptic scope to get better image. While trying to work around this problem, children have higher rates of oxygen consumption, significantly shortening the period of apnea that can be safely tolerated. The anesthesiologist will have to interrupt the procedure to start ventilation and avoid severe desatruation of the patient. Awake fiberoptic intubation is recommended for intubation of patients with difficult airways[4]. Although this is feasible in adult patients, it is more difficult to perform on pediatric patients while awake because of lack of cooperation[5]. Some practitioners perform fiberoptic intubation on anesthetized and paralyzed patients[2,6]. Although acquiring fiberoptic intubation skills in anesthetized patients rather than awake patients is well supported in the literature[7-9], it is still a learning curve and in the hands of an inexperience practioner, runs the risk of patient desaturation which could have severe consequences if the patient has difficult airways and is difficult to ventilate or intubate[10]. We developed guidelines to perform a safe fiberoptic intubation while the patient keeps breathing spontaneously during the procedure and thus avoids the risk of desaturation.

Disclosures

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