

Endobronchial Intubation: A Method For Confirmation Of Endotracheal Intubation In Infants

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Abstract

Tracheal intubation to secure a patients airway is a fundamental skill in anaesthesia practice. Confirmation of endotracheal intubation in neonates is a very difficult task and it is also one of the most important parts of anesthesia.

Accidentally placing the tracheal tube in the oesophagus happens to every experienced anaesthesiologist. Delay in diagnosis and corrective action can lead to hypoxic damage.

We present a case of jejunal atresia posted for emergency surgery, in which endotracheal placement of tube was confirmed by endobronchial intubation, in the absence of ETCO₂ (end tidal carbondioxide) monitoring

We conclude by saying that confirmation of endotracheal intubation by endobronchial intubation is a rapid and reliable method with no expertise needed, when no ETCO₂ monitoring is available.

INTRODUCTION

There are various methods of confirmation of endotracheal intubation of which one method is by endobronchial intubation at the start and then gradually withdrawing it and fixing it at the point where there is equal air entry. There are various other reliable methods like fiberscope but the cost factor, expertise needed, and their doubtful use in neonates, especially in our set up withholds their use.

We report a case in which we used the above technique for confirmation of endotracheal intubation.

CASE REPORT

A 3 day old female child diagnosed to have jejunal atresia was taken up for emergency procedure in paediatric surgery department. After stabilization with IV fluids preoperatively in view of dehydration patient was taken up in operation theatre. Preoperative investigations were all normal with hemoglobin of 16 gm%. Vital parameters were in the normal range. ECG monitor and pulse-oximeter were connected. Patient was induced with thiopentone 7mg/kg and sevoflurane. Once the eyelash reflex was lost, patient was intubated with a 3.5 no uncuffed portex endotracheal tube. The tube has been passed intentionally into the right mainstem bronchus till air entry was visible on the right side only. Once this was confirmed by auscultation, the tube was gradually withdrawn till equal air entry was present on both sides and fixed after withdrawing another 1cm. Post

intubation vital parameters were in the acceptable range. The surgery proceeded uneventfully.

DISCUSSION

Confirmation of endotracheal placement of the endotracheal tube is one of the most important jobs of an anesthesiologist. It can be done by a number of ways ,of which a few have been discussed below.

Direct visualization of the tube passing the cords is one of the best methods of confirmation but in neonates, the cords are not pearly white and also placed anteriorly. So even after visualization of the tube passing between the cords, the tube may slip out while the laryngoscope is being withdrawn, the stylet is being removed or during the fixation of the tube₂.

Chest wall motion is also used to confirm endotracheal placement but in neonate, the chest and abdomen are so small that abdomen moves along with the chest even though the tube is in trachea.

Auscultation of both lung fields is one of the most commonly used methods of confirmation of endotracheal placement in routine practice. The test is not reliable as there are reported cases where normal breath sounds were heard inspite of the tube being in the esophagus. Auscultation of the upper abdomen along with the chest was found to be more effective but again it is not foolproof in pediatric

patients as the anatomy is very small. Also in a case of congenital diaphragmatic hernia, the bowels are in the chest, which can result in false results.

ETCO₂ monitoring is a very reliable and rapid method of confirmation. It can be positive with esophageal intubation in early stages as air can be forced into the esophagus during mask ventilation^{3, 4, 5, 6}. CO₂ may not appear despite correct placement in cases with severe bronchospasm and conditions in which there is no pulmonary blood flow.

There are methods like palpation of suprasternal notch, measuring amount of air needed to inflate the cuff to create a seal, tube cuff palpation and humidity in distinguishing endotracheal from esophageal intubation⁷. But these methods are not useful in neonates as uncuffed tubes are used.

Fibrescope is the confirmatory method but it requires instrument, expertise, time and it cannot be used with small tubes^{1, 4}. Chest x-ray and ultrasound can be used to confirm the placement but this is not cost effective.

Intentional bronchial intubation is a method in which the tube is advanced into the mainstream bronchus. If the breath sounds can be heard on only side, bronchial intubation has been achieved. With esophageal intubation the breath sounds the breath sounds are either equal bilaterally or equally

diminished on both sides. Even though it is not totally foolproof, it is reliable, rapid and cost effective.

We conclude that ETCO₂ is the gold standard method in detecting the correct placement of endotracheal tube, but in its absence and during emergency surgeries where ETCO₂ monitor is not available, intentional endobronchial intubation is the reliable, rapid and cost effective technique.

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