

An Unusual Complication of Endotracheal Intubation

Amy Durall MD, R John Bertha RRT, and Tina Slusher MD

Case Summary

A 21-month-old girl was admitted to the pediatric intensive care unit (PICU) following a near drowning. Emergency medical services personnel intubated the child in the field, using a 3.0 mm inner-diameter endotracheal tube (ETT). There was an undocumented report of a second intubation attempt by emergency personnel in the field. After arrival in the outlying emergency room the child vomited, dislodging the ETT. She was then reintubated with a 4.0 mm ETT. No chest radiograph was done to confirm placement. The child was transported to our facility for further management. Because of a substantial air leak around the ETT the child was reintubated nasally with a 4.5 mm ETT, under direct vision, with no difficulty, by a resident physician under the direct supervision of an attending pediatric intensivist. After the ETT change the child had good breath sounds bilaterally and an appropriate colorimetric change on the carbon dioxide detector, consistent with tracheal intubation. A chest radiograph (Fig. 1) was obtained after this tube change. On repeated examinations during her early PICU stay, the patient's breath sounds over the left chest were intermittently decreased. On further discussion with the resident physician the epiglottis, vocal cords, and a second tube, thought to be the nasogastric tube, were seen during laryngoscopy at the time the ETT was changed. A procedure was performed and ventilation improved.

Questions

1. What is the general appearance of the chest in Figure 1?
2. What is the location of each of the tubes?

Amy Durall MD, R John Bertha RRT, and Tina Slusher MD are affiliated with the Department of Pediatrics, West Virginia University, Morgantown, West Virginia.

Correspondence: Tina Slusher MD, Department of Pediatrics, West Virginia University, Robert C Byrd Health Sciences Center, PO Box 9214, Morgantown WV 26506. E-mail: tslusher@hsc.wvu.edu.

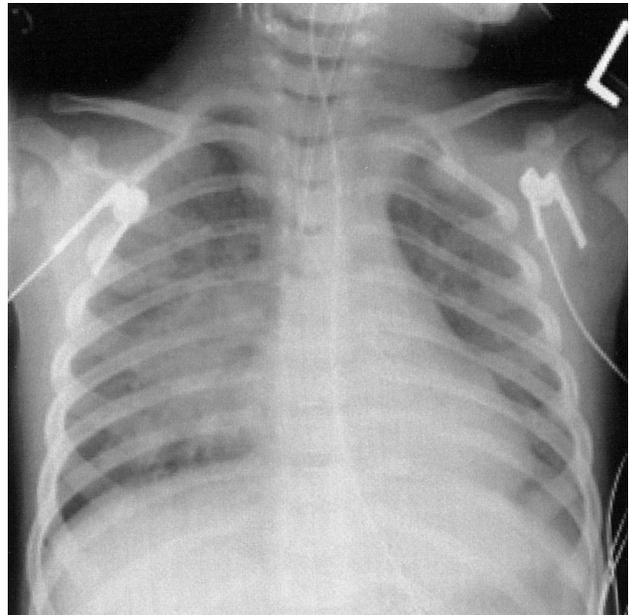


Fig. 1. Radiograph after first endotracheal tube change.

Answers

1. The chest radiograph in Figure 1 was later interpreted by radiology as showing an area of focal consolidation in the right middle and right lower lobes, with hazy opacity in the left lung base.
2. The ETT tip was projecting over the superior endplate of the T4 vertebral body. It was approximately 0.7 cm above the carina. An additional catheter tubing was seen projecting over the cardiac silhouette and thought to be external to the patient, as interpreted by the radiologist. The PICU physicians noted the abnormal appearance of the ETT location, the appearance of multiple tubes, and haziness of the left lower lobe, resulting in further evaluation, as discussed below.

Discussion

The PICU physicians reviewed the chest radiograph obtained after the initial ETT change here and found the position of the ETT difficult to ascertain. Because of the confusion concerning the location of the tip of the most

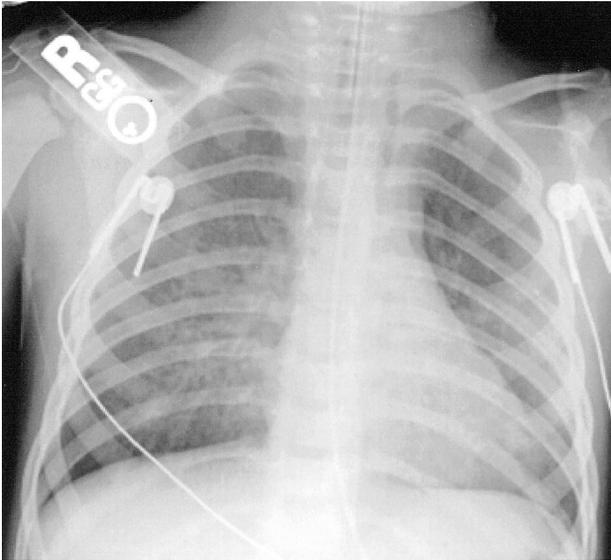


Fig. 2. Radiograph after second endotracheal tube change.

recently placed ETT, as well as intermittently decreased breath sounds in the left chest, the child's airway was reevaluated by direct laryngoscopy. The ETT and a nasal gastric tube were removed. The child was ventilated with a bag-valve-mask, and the airway was visualized again in preparation for reintubation. On direct laryngoscopy, a tube was seen protruding through the cords, which was easily extracted with a Magill forceps. The child was again intubated, without difficulty. The extracted tube was found to be a 3.0 mm ETT without the adapter. The child's respiratory status improved. A follow-up chest radiograph (Fig. 2) showed interval removal of the ETT that had been in the left main bronchus and was mistakenly believed to be outside of the patient. The child improved and was extubated uneventfully on hospital day 3. She was discharged on hospital day 8 and was believed to be back to baseline both neurologically and clinically.

Although aspiration of foreign bodies during intubation has been previously reported, most foreign bodies are swallowed and found in the gastrointestinal tract.^{1,2} Our case

presents the unusual complication of tracheal foreign body aspiration during intubation. This case points out the importance of considering a foreign body after a previous intubation, the potential for complications from pre-hospital endotracheal intubations,³ and the need to keep track of all parts of the ETT during reintubations. Common clinical findings with aspirated foreign bodies include unequal or decreased breath sounds, prolonged expiration, impaired respirations, wheezing, and tachypnea.⁴⁻⁶ Acute complications of a foreign body in the bronchus include hypoxemia, hypercarbia, total acute airway obstruction, and pneumothorax.⁴⁻⁶ Complications of longstanding intubation include atelectasis, lung collapse, recurrent pneumonia, hemoptysis, lung abscess, and bronchiectasis.^{4,5} In addition, a chest radiograph needs to be obtained after intubation to confirm ETT tip position. Since the conventional radiograph contains only 2-dimensional information, it is also important to positively identify all devices and foreign bodies seen on the post-intubation chest radiograph.⁷ Finally, one needs to pursue the clinical intuition that something is "wrong with this picture" until satisfied that the ETT is correctly located and any other tubes that have been placed are identified.

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