TRACHEAL RUPTURE: A RARE COMPLICATION RELATED TO FOREIGN BODY ASPIRATION*

*Bilge Çelebioğlu MD**, F. Cahit Tanyel MD***, Hanife Altunkaya MD*****

SUMMARY: Çelebioğlu B, Tanyel FC, Altunkaya H. (Departments of Anesthesiology and Pediatric Surgery, Hacettepe University Faculty of Medicine, Ankara, Turkey). Tracheal rupture: a rare complication related to foreign body aspiration. Turk J Pediatr 1999; 41: 273-276.

A one-year-old patient admitted following foreign body aspiration and referred following cardiopulmonary resuscitation in a local hospital was diagnosed to have tracheobronchial rupture. We first assumed puncture of the mucous membrane of the left main bronchus by the tip of the tube. Later, we thought that the rupture might have been caused by rigid bronchoscopy. Etiology and treatment are discussed and recent literature reviewed. *Key words: trachea, rupture, aspiration, foreign bodies, rigid bronchoscopy, intubation complications.*

Perforation of the trachea and main stem bronchi are rarely encountered during surgical practice. Such injuries usually result from major trauma or iatrogenically. Intubation, suction and foreign body aspiration are other causes of tracheobronchial perforations[1].

Since tracheobronchial injuries may follow a rapidly lethal course, immediate diagnosis and surgical intervention are essential for a successful outcome[2].

A case of tracheobronchial rupture related to foreign body aspiration is reported to stress the importance of tracheobronchial evaluation following foreign body removal.

Case Report

A one-year-old girl was referred following foreign body aspiration. During dinner at 20:00 she had acute onset respiratory distress and cyanosis. She was admitted to a local hospital at 20:15 where she had cardiopulmonary arrest. Following intubation and resuscitation which included external cardiac massage but no intracardiac drugs, she was referred to our hospital at 21:00. She had spontaneous respiration through an endotracheal tube which was a 2.5 mm ID, rubber tube without cuff. Physical examination at admission revealed pulse rate of 145/min and a rate of respiration of 35-40/min. She weighed 10.4 kg. Plain chest radiograph at admission revealed consolidation in the right hemithorax. She was immediately taken to surgery, at 21:10.

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* From the Departments of Anesthesiology and Pediatric Surgery, Hacettepe University Faculty of Medicine, Ankara.

** Associate Professor of Anesthesiology, Hacettepe University Faculty of Medicine.

*** Professor of Pediatric Surgery, Hacettepe University Faculty of Medicine.

**** Research Assistant in Anesthesiology, Hacettepe University Faculty of Medicine.

Anesthesia was induced with propofol 2 mg/kg intravenously (i.v.) and muscle relaxation was obtained with succinylcholine 1 mg/kg (i.v.) Additional incremental doses of succinylcholine were administered during the bronchoscopy.

Anesthesia was continued with an infusion of propofol and 100 percent oxygen. While the lungs were ventilated, airway pressures were normal throughout the procedure and oxygen saturation remained at approximately 96 percent.

A haricot bean was removed through rigid bronchoscope from right main bronchus. After foreign body removal the control bronchoscopy revealed a complete longitudinal tear of 2 cm in the posterior part from the distal trachea to the left main bronchus, which went unnoticed before the removal. Chest x-ray showed no pneumothorax. A surgical closure was decided and the patient underwent left thoracotomy. After diagnosis the selective right bronchus was intubated carefully and anesthesia was continued with isoflurane, N_2O, O_2 and vecuronium. The tear was exposed and sutured using 4-0 vicryl sutures.

Electrocardiogram (ECG), oxygen saturation and noninvasive arterial pressure which were monitored continuously throughout the procedure remained within normal limits.

The postoperative recovery was uneventful and the patient was discharged after a week. The patient was free of signs and symptoms after six months of follow-up.

Discussion

Foreign body aspiration into the tracheobronchial tree is preventable. It has been a leading cause of in-home accidental deaths in children under four years of age[3, 4].

Early diagnosis is imperative to ensure prompt and successful treatment. However, bronchoscopy in children is still hazardous and demands special skills[5].

Rupture of the trachea rarely complicates tracheal intubation. Only a few case histories dealing with this complication are found in the English language literature. In almost all cases reported to date, the cause has been obvious. Endotracheal tube-related ruptures may result from either over distended and/ or asymmetric cuff or from direct trauma caused by the tip of the tube[6].

In this case, the patient was intubated with a small red rubber tube without a cuff. But the tube was of small size for the patient and thus bronchial intubation might have occurred.

We first assumed that puncture of the mucous membrane of the left main bronchus by the tip of the tube was the primary cause and that the lesion was enlarged due to coughing. Tracheal rupture occurred in the left main bronchus but the foreign body was found in the right side. We believed, therefore, that the tube might have been pushed through the left main bronchus during resuscitation.

Our next thought was that the rupture may have resulted from the rigid bronchoscopy. Rigid bronchoscopy may induce bronchospasm and interfere with ventilation. Thus, the anesthetic technique should provide adequate analgesia and muscle relaxation to eliminate reflexes from stimulation of the respiratory tract[7]. In our case, we provided adequate analgesia with i.v. anesthetics. When the rupture was seen with bronchoscope, the patient had normal inspiration and there was no pneumothorax. Although the rupture was clearly iatrogenic in the reported case, the places of resuscitation, bronchoscopy and foreign body removal remains obscure.

Bronchoscopy is the diagnostic technique of choice for patients with tracheo-bronchial injuries but it sometimes fails and complications can occur. Rupture often occurs within 2.5 cm of the carina[8-10].

Optimal treatment for tracheal ruptures includes: endotracheal intubation past the injured area, immediate drainage of pneumothorax if this complication occurs, acceleration of the rate of absorption of the pneumomediastinum by administration of a high inspired oxygen concentration, and correction of metabolic acidosis[11]. Early diagnosis and prompt operative management can minimize the morbidity and mortality of tracheobronchial injures[12].

Especially in cases with increased risk, such as having undergone resuscitation, the tracheobronchial tear should be evaluated for injury following foreign body removal. Close cooperation between the anesthetist and surgeon regarding airway issues is mandatory. Our experience with this case indicates that both the anesthetist and surgeon must be cautious of this possibility.

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