

Late diagnosis and surgical treatment of bronchial bean aspiration - case report

Abstract

Asphyxiation by an inhaled foreign body is a leading cause of accidental death among children younger than 4 years. Delay in diagnosis, as well as the type of foreign body is a risk factor related to mortality and invasive procedures like tracheostomy and thoracotomy.

Here, we report a case of two year old girl admitted to our hospital 48 hours after bean aspiration. She underwent rigid bronchoscopy under general anesthesia with ventilatory support, tracheotomy followed by thoracotomy and bronchotomy as final way of foreign body extraction. During the procedure she had hypoxic cardiac arrest and was successfully reanimated. It took 10 days to wean her from mechanical ventilation and 10 more at the pulmonary department before she was discharged from hospital without neurological complications.

Keywords: tracheobronchial foreign body, rigid bronchoscopy, thoracotomy, bronchotomy

Volume 10 Issue 4 - 2018

Ivana Petrov,¹ Marija Rosic,¹ Dusica Simic,^{1,2}
Irena Simic,¹ Nevena Jovicic¹

¹University Children's Hospital, Belgrade, Serbia

²Faculty of Medicine, University of Belgrade, Serbia

Correspondence: Ivana Petrov, University Children's Hospital, Belgrade, Serbia, Email kikapetrov@hotmail.com

Received: May 02, 2017 | **Published:** July 26, 2018

Introduction

Tracheobronchial foreign body aspiration is a common pediatric emergency, most commonly occurring in children between 1 and 3 years, with a peak incidence in the second year of life.¹ Airway management in those children can be quite challenging.

Case report

A 2 year old girl had a history of choking episode while playing with beans followed by coughing, dyspnea and wheezing. Nevertheless, she had trouble breathing for two days before her parents brought her to a regional health center from which she was referred to our hospital, 48 hours after aspiration. On admission, girl was cyanotic, orthopnoic, coughing and breathing stridorous. Vital signs included a respiratory rate of 50 breaths per minute, heart rate of 170 bpm and blood pressure of 152/70 mmHg. She had an oxygen saturation by pulse oximetry of 85% while breathing 3 l/min of 100% O₂ delivered by nonbreathing mask. Chest auscultation revealed diminished breath sounds on the right side. Chest radiography showed complete atelectasis of the right lung with trachea and heart shift to affected side.

Management

ENT surgeon decided to perform tracheotomy and bronchoscopy with rigid bronchoscope. General anesthesia was induced with intravenous agents (thiopental and fentanyl) and maintained with combination of intravenous thiopental and sevoflurane. Muscle relaxation (with rocuronium bromide) and controlled ventilation was our technique of choice. With inspired oxygen (FiO₂) of 100%, positive end expiratory pressure (PEEP) of 5 cm H₂O, P_{insp} of 30 mmHg and respiratory rate of 30 breaths per minute we achieved oxygen saturation of 90%.

The foreign body was lodged in the right main bronchus. After few attempts to take out the entire piece with a clamp, bean was fragmented by the forceps and only few small parts were taken out. Nevertheless, one part of the bean moved and partly closed the entrance to a left principal bronchus and a child had a hypoxic cardiac arrest. Luckily, she was successfully reanimated and chest surgeons decided to stop the bronchoscopy and to perform the right

posterolateral thoracotomy and bronchotomy. Before this was done, flexible bronchoscope was used to obtain foreign body's orientation and determine the exact place for bronchotomy. All parts of the foreign body were successfully removed.

The tracheotomy was closed at the end of the procedure and the child was taken to the intensive care unit. The child was treated with antibiotics, inhaled bronchodilators and anti-inflammatory steroid medication for 2 more weeks. She was extubated 10 days after the surgery.

During the recovery brain MRI was performed, which showed signs of moderate subcortical atrophy, without focal changes. Electroencephalography was normal as well as neurological examination. She underwent physiotherapy with great success and was discharged from the hospital after 20 days with no neurological deficit.

Discussion

Literature shows that presenting symptoms of foreign body aspiration range from severe respiratory distress to minimal or no symptoms and in the absence of a choking episode, the diagnosis may be delayed from weeks to months.¹

This case illustrates a great delay in diagnosing foreign body aspiration, which led to atelectasis, acute inflammatory process with edema and bronchial mucosal damage, resulting in more time-consuming bronchoscopy and longer duration of hospitalization. Tomaske et al had median procedure duration of 15 min and hospitalization of 2-12 h.⁵ In our case, the procedure took 6 hours and hospitalization of 20 days.

Rigid bronchoscopy is the standard method for confirming the presence of a tracheobronchial foreign body in children and removing it.² In our case, the child was in the respiratory distress and rigid bronchoscopy under general anesthesia was the treatment of choice.

Inhaled anesthesia and total intravenous anesthesia are widely used for rigid bronchoscopy in children.³ A muscle-relaxant technique allows the use of balanced anesthesia which decreases anesthetic effects on cardiac output. In addition, positive-pressure ventilation may decrease atelectasis, improve oxygenation and overcome the

increased airway resistance that occurs when a telescope is used.⁴ Low functional residual capacity, high closing volume, as well as relative increased oxygen consumption predispose children to rapid development of atelectasis and hypoxia.

Conclusion

Delay in diagnosis as well as the type of foreign body are main risk factors related to mortality and severe complications requiring procedures like tracheotomy and thoracotomy. Proper method of anesthesia is an important factor in reducing mortality or severe complications.

The literature shows that experienced endoscopic team and experienced pediatric anesthesiologist are crucial for safe removal of tracheobronchial foreign bodies, however in complicated cases, as this one, the thoracic surgeon may be required as well.

Educational measures for parents of preschool children must include advices how to prevent foreign body aspiration.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

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