

# ENDOSCOPIC MANAGEMENT OF PIN STUCK INTO THE SEGMENTAL BRONCHUS

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## Abstract

This case is a challenging case review of a successful removal of sharp and deep located airway foreign body using ventilating bronchoscopy.

## Endoscopic management of pin stuck into the segmental bronchus

Running title: Endoscopic removal of sewing pin inhalation

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Key Clinical Message: This case review shows a successful removal of sharp and deep located airway foreign body using ventilating bronchoscopy. To remove foreign body without giving damage to airway mucosa, careful and delicate maneuvers should be performed.

Statement of author contribution: Professor Seong Keun Kwon performed surgery, and Young Chul Kim assisted the surgery and took care of the patient during the admission period. Young Chul Kim summarized the case and Seong Keun Kwon read and approved the final manuscript.

## Introduction

Foreign body aspiration is a potentially life-threatening emergency that can result in acute respiratory distress, pneumonia, atelectasis, sepsis or death [1]. Sharp and penetrating foreign bodies are of particular interest because of their potential to damage the airway and cause possible complications.

Recently, among young Muslim women, aspiration of sharp, pointed pin with beaded head is increasing due to the rise of veiling populations [2]. In most cases, bronchoscopic removal is needed. The pin usually falls with the beaded head pointing downward because it is heavier than the rest part of the pin [1], and the sharp end of the pin sometimes gets stuck in the airway mucosa, making it much more difficult to remove. In addition, due to its narrow shape and beaded end downward position, it can migrate to distal part and require thoracotomy if bronchoscopic removal fails.

This case is a retrospective review of a successful removal of sharp and deep located airway foreign body using ventilating bronchoscopy.

## Case report

A 10-year-old female accidentally swallowed a 3.3cm metallic sewing pin with pearl head while making hairpin to her dolls. She coughed a little, but she denied history of choking and dyspnea. She visited emergency room 4 hours after swallowing, and she didn't have any symptoms at the time of arrival. The posteroanterior chest radiography and chest CT revealed the pin bent about 30 degrees and located in the left lower lobe lateral basal segmental bronchus (Figure 1). Ventilating bronchoscopy was performed by using a size 3.5, 30cm KARL STORZ (Tuttlingen, Germany) bronchoscope and 2.9mm-30/36cm KARL STORZ telescopes. The pearl head of the pin was located at the bottom while the sharp tip of the pin, which was located at the top, was stuck in the mucosa. During the removal procedure, tip of the bronchoscope was located at the left main bronchus, and the optical forceps with telescopes were advanced to segmental bronchus. After grasping the midportion of pin, it was pushed down to distal direction for mobilization of the sharp tip. After the tip was exposed, it was grasped and pulled back into the bronchoscope with giving minimal damage to nearby mucosa. The pin was bent about 30 degrees and this made the pin stuck inside the bronchoscope, and the sharp tip of the foreign body was hooked into the fenestration of the bronchoscope. Eventually, the foreign body and the bronchoscope were removed together (Figure 2, 3). The intraoperative bleeding was minimal and there were no acute postoperative complications. Her vital signs were stable and she was discharged at postoperative day 1 without any acute complications.

## Discussion

Inhaled foreign body can result in acute respiratory distress, pneumonia, atelectasis, sepsis or even death. The aspirated object depends on various factors such as age, sex, geographical area, sociocultural factors, socioeconomic status, occupation and nutritional habits. The metallic sewing pin aspiration discussed in this case occurs predominantly in young Muslim females wearing hijab. While wearing headscarves with their two hands, they hold the pins between their lips or teeth, and actions such as laughing, talking, coughing, sneezing makes them accidentally swallow the pins. According to Kakunje et al., 3.7% of 270 sampled Muslim women experienced pin aspiration. These cases are commonly grouped together as "turban pin syndrome" or "hijab syndrome" in literatures [2].

Foreign body aspiration is commonly believed to occur preferentially in the right bronchial tree because the right main bronchus is steeper and wider than the left main bronchus [1]. However, prior researches showed that the metallic hairpins were more likely to be lodged in left bronchial tree with statistical significance. Rizk et al. explained this phenomenon with the Bernoulli effect. Maneuvers such as coughing, laughing or speaking generates larger negative pressure at the narrower left bronchus than right main bronchus, and this appears to outweigh the anatomic predominance of right bronchus in the case of metallic pin inhalation [1].

These pins have a long narrow body with a round colored plastic bead at one end. The beaded end usually points downward due to its heavy weight, and it makes the pin goes deeper into the tracheobronchial tree. Sometimes the pointed end gets stuck in the airway mucosa, and during the removal process the sharp end can scratch the airway and can cause complications such as tracheobronchial wall erosion, fistula, pneumothorax

and emphysema [4]. If the pin is distally located, removal becomes more challenging process because even minimal amount of bleeding can obscure the endoscopic view of narrow airway.

The location of the pins, the time from the onset to the intervention, the physician's experience and skills are important factors that determine the patient's morbidity. Laryngoscopy, fiberoptic bronchoscopy, rigid bronchoscopy, or thoracotomy can be used to remove the foreign body. According to prior articles, thoracotomy rates varied from 1.6 to 7.0 %, and as the deeper the foreign body was located, the higher rate of thoracotomy was performed [1], [3], [4].

In this case, two important steps were performed to reduce bronchial wall damage during removal process – 1. the pin was pushed down to distal part for mobilization, 2. the bent pin was stuck, hooked into the bronchoscope, and removed with the bronchoscope. The pointing end of metallic pin could not be grasped easily using tooth forceps as well as alligator forceps due to its slippery nature. Sahu et al. removed an aspirated board pin by hooking the sharp end of the foreign body inside the fenestration of cup forcep [5]. These intervention techniques eventuated successful removal of deep located sharp and pointed pin without complication, and prevented more invasive procedures such as thoracotomy.

## Conclusion

We present a challenging but successful removal of sharp and deep located metallic sewing pin stuck into the segmental bronchus with ventilating bronchoscopy.

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## Figure Legends

Figure 1: The chest radiograph demonstrating foreign body in the left lower lobe bronchus

Figure 2: (a) The foreign body was located in the left lower lobe lateral basal segmental bronchus and the sharp tip was stuck in the airway mucosa, (b) The foreign body was pushed down to distal part for mobilization, (c) The tip was exposed, (d) The bent pin was stuck, hooked into the bronchoscope, and removed with the bronchoscope

Figure 3: The removed foreign body



