

Bending of an Aspirated Pin During Rigid Bronchoscopy Safeguards and Pitfalls

Abdelrahman A.A. Elsayed, MD,* Albaraa A. Mansour, MD,†
Ahmed A.A. Amin, MD,* and Mohsen S.M. Ahmed, MD*

Background: Pin aspiration is a common problem in Muslim countries, where many women wear veils (hijab). This condition is usually treated using either a rigid or a flexible bronchoscope, and yet occasionally requires surgical approach. Pin bending may be necessary to extract impacted pins during the therapeutic rigid bronchoscopy.

Materials and Methods: Medical records of patients who had pins extracted with a bending technique during the period from January 2012 to December 2016 in 1 institution were analyzed. Information on intraoperative and postoperative complications was collected.

Results: Between 2012 and 2016, 315 rigid bronchoscopies were performed for pin extraction; in 38 cases, bending of the pin was required for the extraction because they were in a position that did not allow simple extraction. The procedure was successful in cases and there were no major complications.

Conclusion: The extraction of visible, distally located or impacted pins can be safely performed by experienced bronchoscopists using the bending technique. Some safeguards and pitfalls must be noted to ensure maximum safety.

Key Words: bronchoscopy, bronchus, foreign body, trachea, bronchial disease, chest

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Pin aspiration is a common problem faced by pulmonologists and thoracic surgeons in Muslim countries.^{1–3} It is usually treated using either a rigid bronchoscope or a flexible bronchoscope, and yet, occasionally, a surgical approach is required. In some Muslim countries, a large proportion of the female population

wears a veil or a headscarf (hijab) to cover their heads.⁴ It is a common practice to hold the pins, which are used to tighten the hijab around the head, in between the lips while fixing the scarf in front of a mirror. During this process, it is not uncommon for the women to inhale the pin with a typical history of shocking and coughing.

Some previous studies have suggested the use of magnetic forceps to extract pins with satisfactory outcomes,⁵ whereas others have recommended the use of a flexible bronchoscope with or without using a rigid bronchoscope, especially for the extraction of the distally located pins.⁶

Sohag University Hospital is a large tertiary care hospital; it is the only center that offers rigid bronchoscopy services to a population of ~4.9 million living in the Egyptian province of Sohag and the surrounding cities.

MATERIALS AND METHODS

The medical records of patients in whom pins were extracted with the bending technique from January 2012 to December 2016 in 1 institution were analyzed. In addition, information on intraoperative and postoperative complications was collected.

Patients' demographics were collected. A chest and neck posteroanterior and lateral x-rays are usually sufficient for the diagnosis of aspiration and determination of the site of the pin location. Rigid bronchoscopy was usually arranged on the same day unless the patient presented late at night, in which case the procedure was scheduled for the next morning. In some cases, pins were very distally located on the chest x-ray. In such cases, patients were scheduled for bronchoscopy and thoracotomy in the same setting. Written informed consent was obtained from the parents or the patient.

Patients were positioned in a supine position, and anesthesia was administered by either intravenous propofol or inhaled isoflurane. Succinyl

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From the *Department of Cardiothoracic Surgery, Faculty of Medicine,
Sohag University; and †Sohag Heart Center, Sohag, Egypt.

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Reprints: Abdelrahman A.A. Elsayed, MD, Department of
Cardiothoracic Surgery, Faculty of Medicine and University
Hospital, Sohag University, Sohag 82524, Egypt (e-mail:
Abdelrahmanadel@med.sohag.edu.eg).

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choline was used as a muscle relaxant, a laryngoscope was used to push the tongue to the left side, and a rigid bronchoscope was inserted. The size of the latter was chosen according to the patient's body mass index. Classic DOESEL-HUZLY Storz sheaths were used. Sizes ranging from 3.5 to 6 with a length of 30 cm were typically used if pins were found in the trachea to the level of the carina, provided that the patient was younger than 15 years of age. For older patients or deeper pins, a 40 cm, size 5 sheath was used to ensure more distal access to the main and lobar bronchi.

Once identified, the pin was carefully inspected to determine its position. It was always in an upside-down position, with the sharp metal tip proximal and the plastic rounded head distal, a position that could be explained by the event of aspiration. If the tip of the pin was impacted in the bronchial wall (usually medially impacted), a trial of disimpaction was performed, and if this failed, the bending technique was attempted.

Bending Method

The sheath was advanced and rotated to ensure that its most distal end touched the pin. This could be easily felt by a metal to metal click sensation. Using a heavy-toothed forceps, the nearest part to the tip of the pin (the most medial part in the case of medially impacted pins) was grasped. We usually double-check to ensure that only the pin was grasped.

The sheath was firmly fixed and slightly pushed distally by the left hand to ensure that it would not be proximally displaced. Sustained forcible traction was applied to the forceps while it was firmly closed. The pin usually offered resistance for 2 to 3 seconds, followed by a sudden release, indicating that the pin was bent and free from the bronchial mucosa. The pin was then withdrawn inside the sheath.

The pin was removed through the sheath while it remained in position in the endobronchial tree. The tracheobronchial tree was then thoroughly examined for any signs of injury or bleeding. The extracted pin was examined to detect any missing parts. Once it was confirmed that the pin was completely removed and the airways were clear and free of bleeding, the sheath was removed to complete the procedure.

Patients were kept in the recovery room for 1 hour. A chest x-ray was routinely obtained at 2 hours after the procedure to rule out any postoperative complications.

RESULTS

Between January 2012 and December 2016, a total of 315 rigid bronchoscopies were performed to extract aspirated headscarf pins at Sohag University Hospital. The bronchoscopic procedures were successful in 96.2% of patients (303 patients), whereas a thoracotomy was required in 12 patients. In 38 patients, pins were extracted using the bending technique because they were positioned such that the tip of the pin was difficult to grasp and withdraw into the sheath (Fig. 1).


Patients were typically young females with a mean age of 11.4 years, ranging from 5 to 35 years old. Most of the time, the typical history of pin inhalation was associated with sudden coughing. Some patients reported a feeling of persistent stitching chest pain.

Pins were located in the trachea in 4 patients, partially at the level of the carina in 16 patients and more distally in 18 patients. Of the 34 patients where the pin was distal to the trachea,



FIGURE 1. A bent pin after extraction. 



FIGURE 2. A broken pin during extraction using the bending technique. 

20 patients had pins in the left side and 14 pins on the right side. Patients visited the hospital on the same day in 28 cases and on a subsequent day in the remaining 10 cases.

In 2 of 38 patients, minor bleeding was encountered and was conservatively controlled; both were discharged well on the same day. In 2 patients, the pin was broken inside the sheath and was extracted in pieces during the same session (Fig. 2). No pneumothorax or pneumomediastinum was encountered.

In 3 patients, pins were successfully extracted during the second trial. In these 3 cases, the first trials were performed by junior surgeons who were not familiar with the bending technique.

DISCUSSION

In Muslim countries, a large number of females wear a veil (hijab). They typically use headscarf pins to tighten the hijab around their heads. Thus, aspiration of these pins into the endobronchial tree is not uncommon, and their location and sharp metal end occasionally make their extraction challenging.

SAFEGUARDS AND PITFALLS

Bending the impacted pins inside the sheath of a bronchoscope is safe as long as the following rules are observed:

- (1) Ensure that the sheath is touching the pin at all times and maintain a slight distal pressure on the sheath, especially during sustained traction, to avoid bronchial tearing or bleeding.
- (2) Use heavy-toothed forceps to ensure that the force needed to bend the pin can be applied.
- (3) Do not pull the sheath with the pin. Once the pin has been bent inside the sheath, remove it and keep the sheath inside the trachea to detect any bleeding. Otherwise, it may be difficult to maintain safe airway access in cases of massive bleeding.
- (4) Examine the pin to ensure that it is complete and no parts are missing.
- (5) A routine chest x-ray should be obtained 1 to 2 hours after the procedure to detect any signs of complications.
- (6) Only experienced bronchoscopists should perform this maneuver.

CONCLUSION

Bending of inhaled pins during extraction from the airways is a safe technique in the hands of experienced bronchoscopists.

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