Case Report

Foreign body in the lung following dental procedure

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ABSTRACT

This is an interesting case report of a foreign body (FB) aspiration in an adult patient. The FB in question was a dental drill, which accidentally went into the airways during a dental procedure. The extraction was technically difficult due to the peripheral location and thin and sharp tip of the FB. The extraction of this FB required a unique innovation through the rigid bronchoscope.

KEY WORDS: Bronchoscopy, dental drill, foreign body

INTRODUCTION

Foreign bodies (FBs) in the trachea-bronchial tree due to aspiration are quite common in the pediatric age group and occasionally in adults.[1] FBs are normally easily extracted by bronchoscopy, but this procedure can be quite challenging at times. We present a case of such an FB, which was aspirated following a dental procedure and was extracted with considerable difficulty by utilizing an innovative methodology.

CASE REPORT

A 68-year-old man presented to us with complaints of a recurring cough and occasional blood-streaked sputum. The problem started after a dental procedure during which he had a choking episode and aspirated a dental drill, which was being used for a root canal treatment. He denied any fever, chest pain, or shortness of breath. He had no other medical problems of note beside the above. Clinical examination was essentially normal. The patient had brought with him an X-ray of the chest, which was normal, and CECT of the thorax with reconstructions in which the slender metallic FB was seen lodged in one of the basal sub-segments of the left lower lobe [Figures 1-3]. A decision for bronchoscopic extraction was taken. After obtaining informed consent the patient was taken up for fiberoptic bronchoscopy under conscious sedation.

Procedures

A bronchoscopy for evaluation was done with a videobronchoscope, outer diameter 5.8 mm, under conscious sedation with intravenous midazolam. The trachea-bronchial tree was largely normal except for the left lower lobe lateral basal segment, where the tip of the FB, a dental drill, was seen pointing straight up. The plastic blunt end of the drill was lying distally embedded in the subsegmental bronchus. An attempt was made to hold this metallic sharp end with a rat tooth forceps but failed. Then, a snare was coiled around the tip, but it slipped through on account of it being too thin. A magnetic tip probe for extraction of metallic FBs also failed to pull out the FB. Finally, a thin Fogarty catheter was pushed from the side of the FB with the intention of inserting it distal to the FB, inflating the balloon and then pulling it up to dislodge the FB. However, this attempt resulted in the FB getting pushed in with the catheter and then slipping out of sight into the distal subsegment.

The video bronchoscope was pulled out and in its place a thin pediatric fiberoptic bronchoscope, outer diameter...
3.2 mm, was inserted. The FB was again located further down in the bronchial tree in a fourth order basal subsegment [Figure 4]. A thin dormia basket was inserted through the working channel of this bronchoscope to snare the FB. This attempt also failed because the distal end of the FB was impacted in the bronchus and, therefore, did not allow the dormia basket to open alongside. Taking into account the failure of the various instruments to extract the FB it was decided to attempt extraction with the rigid bronchoscope. The patient and the family were informed and counseled about the failure of the procedure so far, the need for rigid bronchoscopy under general anesthesia, and the possibility of needing surgery in case the rigid bronchoscopy also failed.

The next day the procedure was undertaken in the operation theater under general anesthesia. Initially, a 7.5 mm outer diameter, 43 cm barrel, rigid bronchoscope was inserted up to the left main bronchus. A zero degree Hopkins telescope was passed through it for visualizing the FB. However, to our dismay, we found that the tip of the Hopkins telescope was too thick to enter the subsegment, and the FB could not be seen. Furthermore, the outer barrel of the rigid bronchoscope after entering the left main bronchus was at such an angle that maneuvering the Hopkins telescope towards the segment of interest was very difficult. The situation demanded that a short bronchoscope barrel be inserted only up to the proximal part of the left main bronchus so as not to restrict the maneuverability of the extraction instruments. Then a long thin telescope had to be passed through it to reach the FB and extract it with an optical forceps under vision.

For this purpose, a 5.5 mm outer diameter, 30 cm barrel, pediatric rigid bronchoscope was inserted just inside the left main bronchus. Since the adult Hopkins telescope was too thick and the pediatric telescope too short to reach the left lower lobe, a ureteroscope 6F, 3 mm outer diameter, length 45 cm, was selected to extract the FB. To our delight, this telescope indeed could be passed and maneuvered into the left lower lobe subsegment, and the FB glimpsed. However, another challenge confronted us.

![Figure 1: Computed tomography scan thorax with metallic foreign body in left lower lobe](image1)

![Figure 2: Computed tomography thorax sagittal reconstruction showing foreign body in left lower lobe](image2)

![Figure 3: Computed tomography three-dimensional reconstruction showing foreign body in fourth generation bronchus left lower lobe](image3)

![Figure 4: Foreign body seen in the left lower lobe by pediatric fiberoptic bronchoscope](image4)
The flimsy bronchial walls of these narrow sub-segments, collapsed around the telescope making insertion and visualization difficult. Fortunately, this was averted with the jet venturi system connected to the rigid bronchoscope by which frequent, high velocity bursts of oxygen enriched air helped to keep the distal airway open and keep the tip of the FB in view. Finally, the FB could be extracted under vision with a tri-pronged 3F forceps passed through the ureteroscope. This prong is normally used for extracting stones from urinary passage, but here it served admirably to extract this sharp metallic FB from an almost inaccessible location [Figure 5].

A postprocedure check fiberoptic bronchoscopy revealed a normal bronchial tree. The patient remained well on follow-up with complete recovery of the symptoms.

DISCUSSION

FB aspiration into the trachea-bronchial tree in adults is uncommon and most large series report it in 5–8% of the total number.[1] Aspiration during dental procedures has been reported frequently both into the esophagus and into the airways.[2,3] Most large series and a systematic review of FB extraction in adults has shown that the instrument of choice for the procedure in this age group is the flexible bronchoscope.[4] However in certain situations, the rigid bronchoscope has to be used for safe and effective extraction. This would be true for large asphyxiating FBs and also for sharp and pointed FBs, which could injure the tracheo-bronchial mucosa and the glottic structures during extraction with the flexible bronchoscope. The rigid bronchoscope has the advantage that after securing the FB with the forceps it can be pulled into the bronchoscope barrel thus protecting the airways during extraction. On hindsight in this case, it may have been better to plan for rigid bronchoscopy right from the beginning.

The other important issue highlighted by this case is the need for appropriate instruments for interventional procedures. A thin and adequately long Hopkins telescope would have served the same purpose as the ureteroscope, but we did not have one. The case above demonstrates a situation where rigid bronchoscopy, and the innovative use of a ureteroscope helped to solve a tricky problem.

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Conflicts of interest
There are no conflicts of interest.

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