Removal of Foreign Bodies
(Two Teeth) by Fiberoptic Bronchoscopy*

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In special situations the flexible fiberoptic bronchoscope, with its increased visual range and extended capabilities for extraction, may be utilized to augment rigid bronchoscopy. Recently developed tools for extraction (claw, basket, forceps, and balloon catheter) may be inserted through the channel of the fiberoptic bronchoscope to capture small, peripheral foreign objects. We present the case of a 76-year-old man in whom two aspirated teeth were removed from the right lower lobe (RB* and RB**) using the fiberoptic bronchoscope, a wire basket, and a Fogarty balloon catheter. Rigid tube bronchoscopy was contraindicated because the patient had just sustained a fractured skull and jaw in an automobile accident.

Traditionally, the open-tube rigid bronchoscope is used to remove aspirated foreign bodies from the tracheobronchial tree. With the aid of grasping forceps and special tools, approximately 90 to 95 percent of all foreign bodies can be extracted by this standard technique. Failure to promptly recover the foreign object commonly results in pneumonia, formation of an abscess, empyema, and even death. Until recently, if conventional methods were not successful, the only other option was early thoracotomy and transpleural bronchotomy.

Currently, the flexible fiberoptic bronchoscope, with its increased visual range and extended capabilities for extraction, may be utilized to augment rigid bronchoscopy in removal of foreign bodies. Recently developed tools for extraction (claw, basket, forceps, and balloon catheter) have been used experimentally to capture small foreign objects in the peripheral airways of dogs. In addition, the flexible fiberoptic bronchoscope can be used in special situations, eg, on patients being mechanically ventilated and on those with fractures of the jaw, cervical spine, or skull. The following case is presented to illustrate a unique application of the fiberoptic bronchoscope in removing two foreign bodies (teeth) from a traumatized elderly man in whom use of the rigid bronchoscope was contraindicated.

Case Report

A 76-year-old man was admitted to the Iowa City Veterans Administration Hospital in May 1976, following an automobile accident. On examination, he was obtunded and had mild tachycardia (pulse rate, 112 beats per minute), tachypnea (respiration rate, 25/min), and multiple facial lacerations. Three of his front teeth had undergone traumatic avulsion, and many of the remaining teeth were loose. Decreased breath sounds and coarse rales were audible over the upper anterior portion of the left side of the chest. A right hemiparesis and a right Babinski’s response were present.

Chest x-ray films showed an infiltrate of the left upper lobe. Roentgenograms of the skull and jaws showed a linear fracture of the temporal-parietal area and a fracture of the left mandible. Oral intubation was performed, and the patient was given oxygen therapy with warm humidification. With a fractional concentration of oxygen in the inspired gas, of 40 percent, the arterial oxygen pressure was 149 mm Hg.

![Figure 1. Chest x-ray film of 76-year-old man, showing two aspirated teeth (arrow) in right lower lobe.](image-url)
the arterial carbon dioxide pressure was 30 mm Hg, and the arterial pH was 7.42. The anesthesiologist noted that intubation was difficult, requiring several attempts to pass the endotracheal tube. A routine chest x-ray film taken for placement of the tracheal tube revealed two aspirated teeth in the right lower lobe (Fig 1).

Because rigid bronchoscopy was contraindicated in this patient with severe trauma to the head and jaw, removal of the foreign bodies was attempted with the flexible fiberoptic bronchoscope (Olympus BF-5B/2). The procedure was done through a previously inserted 9 mm oral endotracheal tube, with the patient receiving 40 percent oxygen via a swivel tracheal tube adapter. The only preprocedural drug used was atropine (1.0 mg), given intramuscularly 30 minutes earlier.

Both of the teeth were located in the anterolateral segment of the right lower lobe (RB). The enamel crown on one tooth was easily seen in the subsegment RB*. The other tooth was more peripheral, but the white tip was partially visualized upon entering subsegment RB**.

Neither tooth could be grasped with the “alligator tooth” forceps (ACM1). The wire basket then was passed through the channel of the fiberoptic bronchoscope, and the more accessible tooth in RB** was removed easily by the operator (D.C.Z.). The extraction was performed by advancing the tip of the Teflon tube (with the basket retracted inside) just beyond the foreign body. At this point the basket was opened and pulled back so that the tooth became enveloped by the separated wire and then entrapped when the basket was closed (Fig 2).

Because the second tooth was firmly wedged into a distal subsegment, a No. 5 French Fogarty balloon catheter was inserted through the fiberoptic bronchoscope and positioned beyond the tooth. At this point the balloon was inflated, the catheter was pulled back, and the dislodged tooth was captured without difficulty by the wire basket. The patient’s condition gradually improved following removal of the two organic foreign bodies.

DISCUSSION

Rigid bronchoscopy still remains the procedure of choice for removal of foreign bodies. In the pediatric patient the only other alternative for removal of foreign bodies is surgery. The flexible fiberoptic instrument cannot be used in infants and young children because of the small diameter of the trachea and glottis. In adult patients the open-tube bronchoscope is particularly useful in removing large foreign bodies located in proximal airways. But there is a subgroup of adult patients in whom rigid bronchoscopy is either impractical or contraindicated. This special group includes patients with small foreign objects in peripheral airways, patients being mechanically ventilated, and patients with mechanical problems secondary to trauma or disease involving the head, jaw, or neck. In these circumstances the fiberoptic bronchoscope may be utilized with success, hence avoiding the morbidity and mortality of an operation.

Most chest physicians have been slow to accept the use of the fiberoptic bronchoscope for removal of foreign bodies. One major problem of the fiberoptic instrument was the narrow channel for biopsy, which limited the size of any tool for extraction; however, with new designs of fiberoptic bronchoscopes, better bronchoscopic techniques, and the development of new instruments for extraction, the full potential of the fiberoptic bronchoscope for extraction of foreign bodies is being realized. Zavala and Rhodes* demonstrated the effectiveness of the flexible bronchoscope in the experimental removal of foreign bodies from the bronchial tree of dogs. Since this original study in animals, six cases have been reported, describing successful removal of foreign bodies with the fiberoptic bronchoscope (Table 1). The advantages of the fiberoptic instrument are related to its greater visual range, mobility, and comfort to the patient.

Removal of a foreign body via the fiberoptic bronchoscope is not without risk or hazard. As previously emphasized by Zavala and Rhodes, proper technique is essential to avoid the following complications: (1) displacement of the foreign body to a more distal position, where removal would require a transpleural bronchotomy; (2) trauma to the bronchus, resulting in significant bleeding or perforation, or both; (3) loss of the foreign body in the subglottic area, a potential danger of airway obstruction; (4) fracture of an organic object (eg, a peanut) into pieces by use of the wrong tool for extraction (forceps), so that complete recovery becomes impossible; and (5) hypoxemia and possible cardiac arrest.

Table 1—Removal of Foreign Bodies by Flexible Fiberoptic Bronchoscopy

<table>
<thead>
<tr>
<th>Year</th>
<th>Reference</th>
<th>Foreign Body</th>
<th>Method of Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>Wanner et al</td>
<td>Fragments of banana</td>
<td>Aspiration</td>
</tr>
<tr>
<td>1974</td>
<td>Ikeda</td>
<td>Fish bone and dental drill</td>
<td>Forceps</td>
</tr>
<tr>
<td>1974</td>
<td>Barrett et al</td>
<td>Gastric contents?</td>
<td>Forceps</td>
</tr>
<tr>
<td>1975</td>
<td>Zavala and Rhodes</td>
<td>Suture with granulation tissue</td>
<td>Forceps</td>
</tr>
<tr>
<td>1975</td>
<td>Klayton et al</td>
<td>Rubber ear plug</td>
<td>Forceps</td>
</tr>
<tr>
<td>1976</td>
<td>Lillington et al</td>
<td>Ham bone</td>
<td>Forceps</td>
</tr>
<tr>
<td>1976</td>
<td>Fieselmann et al</td>
<td>Two teeth</td>
<td>Wire basket</td>
</tr>
</tbody>
</table>
because of failure to utilize therapy with supplemental oxygen.

In this illustrative case, two teeth were aspirated into the peripheral airways of the right lower lobe following trauma and a difficult intubation. With the use of a fiberoptic bronchoscope, a Fogarty balloon catheter, and a wire basket, these aspirated foreign bodies were easily removed, eliminating the need for therapeutic thoracotomy in a high-risk situation. We believe that this is the first case report of a foreign body removed from the tracheobronchial tree using a wire basket inserted through the channel of the flexible fiberoptic bronchoscope.

At the present time the rigid bronchoscope is recommended for removal of most aspirated foreign objects; however, with proper training in utilizing the newly developed tools for extraction and with full knowledge of how to avoid potential complications, it is conceivable that the flexible fiberoptic bronchoscope may become a front-line instrument for removal of foreign bodies in adults. Nevertheless, until we have gained much more experience, it is indeed wise to have a rigid bronchoscope readily available.

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REFERENCES


Staphylococcal Aortic Pseudo-Aneurysm*

Treatment Employing Ascending Aorta-Abdominal Aorta Bypass Graft

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An adult patient developed infection of the anastomosis after resection of an isthmic coarctation, with subsequent formation of a pseudoaneurysm. He was treated successfully by an ascending aorta-abdominal aorta bypass graft. The graft was placed retrosternally and passed through the diaphragm into the retroperitoneal space. After surgery the patient developed systolic hypertension. A faint murmur was heard over the chest and abdomen, caused by the turbulent flow through the graft.

Infection of the anastomosis of a resected aortic coarctation is a serious postoperative complication. The sudden formation of a pseudoaneurysm may aggravate further the patient's condition.

A patient was treated by employing an ascending aorta-abdominal aorta bypass graft. Interruption of the descending aorta with resection of the infected pseudoaneurysm was performed 15 days later.

CASE REPORT

A 28-year-old man was admitted in the Italian Hospital, Buenos Aires, with a history of throbbing occipital and frontal headaches. Approximately 18 months before admission, he began to have shortness of breath with moderate exertion and angina pectoris.

On physical examination the patient appeared to be in nonacute distress. The pulse rate was regular at 90 beats per minute, and the blood pressure was 150/90 mm Hg. The femoral pulses were absent. The cardiac impulse was dynamic and indicated moderate enlargement. A grade 3/6 systolic ejection murmur was heard in the upper left sternal border and in the left interscapular area.

The electrocardiogram revealed left axis deviation and left ventricular hypertrophy. The chest x-ray film disclosed mild cardiomegaly with specific left ventricular enlargement. Rib notings were seen in both sides of the chest.

At cardiac catheterization, the aortic pressure was 150/80 mm Hg; the rest were within normal limits. Angiocardiographic studies demonstrated normal function of the mitral and aortic valves and revealed a typical ischemic aortic coarctation.

Surgical correction was performed on July 18, 1975; the coarctation was resected, and an end-to-end anastomosis was performed. After the operation, femoral pulses were present.

After the sixth day the patient's postoperative course was complicated with high fever. From the chest wound, *Staphylococcus aureus* was isolated, and the incision was partially drained. The patient was treated with cephalothin (12 gm/day in four intravenous doses) and gentamicin (240 mg/day in three intramuscular doses). On Aug 10, 1975, 22 days after the operation, the patient was discharged, apparently in good condition; however, his clinical course was complicated with intermittent high fever and persistent cough.

On Dec 17, 1975, the patient was readmitted with a fever of 39°C (102.2°F) to 40°C (104°F), repeated hemoptysis, and sudden aphonia. A chest x-ray film disclosed a shadow in the left upper lobe (Fig 1). Cultures of blood demonstrated *S aureus*. The incision from the left thoracotomy was completely healed. The patient was treated with cephalothin and gentamicin. Since the patient exhibited an allergic reaction with leukopenia, cephalothin was discontinued and instead