

## **EDITORIAL**

# Tracheobronchial foreign bodies

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The history of bronchology began with foreign body retrieval [1], which still remains a gratifying procedure occurring fairly rarely in routine practice, but with higher frequency in paediatric medicine and in adults with impaired airway protective mechanisms. Tracheobronchial foreign bodies have taken on a new dimension in interventional bronchology, with the placement, adjustment and removal of an increasing variety of stents, presenting problems of a very special nature. Certain fundamental considerations apply, however, in all these cases and these will be discussed here as a background for the paper on nonasphyxiating tracheobronchial foreign bodies by LAN [2] in this issue.

### **Incidence**

Foreign bodies in routine adult bronchology practices are very rare. In our department, performing 1,200–1,300 bronchoscopies annually, we have averaged two foreign bodies a year. A similar observation - a rate of 1–2 out of 1,000 - was made by Macha of the Lungenklinik in Hemer, which has a much larger bronchoscopy load (personal communication). In contrast, the bronchology unit of a local university paediatric department has a 10% (20 out of 201 during the period November 1992–October 1993) rate of foreign body retrieval (personal communication, F. Riedel, St. Josefs Universitätsklinik, Bochum). Also, units providing bronchology services for institutions caring for the mentally-retarded and/or physically-handicapped see more foreign body aspirations [3].

Finally, stent extractions or adjustments have been necessary sequelae to the rapid growth in stent implantation, adding a large amount of foreign body work nonexistent earlier.

### **Diagnosis**

Diagnosis is not a problem in the acute aspiration of a larger object which may occlude a major bronchus. It becomes more difficult if the object is tiny and/or the patient is unable to express himself, as in neonates, infants or the mentally-retarded. If a child complains of having "swallowed a peanut", one of the most common mistakes is for the parent to disbelieve the child or - even worse - for the doctor to disbelieve the parent.

Establishing suspicion of aspiration may be the most important step to diagnosis and a history pointing to such an event must never be neglected [4]. Smaller foreign bodies may be retained for months or even years, sometimes causing no symptoms, but occasionally causing chronic cough. In the latter case, if other indices of suspicion are present, *e.g.* impaired airway protective mechanisms [5] in an alcoholic, further diagnostic steps are indicated. Localized wheeze or non-resolving lobar pneumonia may also stem from foreign bodies.

Once suspected, simple but diagnostically important radiographic studies can be helpful. Although the plain radiograph should always be performed first, the lateral projection may reveal a retrocardial lesion, otherwise obscured by heart and great vessel shadows. An anterior-posterior film in expiration may show hyperinflation of a lung or lobe, the ostium of which is occluded by a nonradio-opaque object.

Once suspicion is thus established, it can be confirmed and therapy carried out by bronchoscopy.

### **Bronchoscopy**

Even those bronchoscopists most accustomed to the use of a flexible instrument will admit, if pressed, that the ultimate weapon for foreign body retrieval is the open tube bronchoscope. The reason for this is that a small percentage of foreign bodies are so imbedded in scar and granulation tissue that they can only be eased out with rigid forceps firmly grasping the object. Whereas flexible foreign body forceps can be used only to pull, the rigid instrument enables pulling as well as rotation and, if necessary, pushing. These latter features are of particular importance in stent adjustment or extraction. In addition, sharp objects may have to be manipulated in such a way as to minimize mucosal trauma on retrieval, a manoeuvre more easily accomplished by rigid instruments. Some of these points were emphasized by LIMPER and PRAKASH [5], who, in a retrospective study, noted 14 out of 23 successful retrievals with the flexible and 43 out of 44 with the rigid bronchoscope. Finally, with rare exceptions [6], authorities agree that in small children the open tube offers optimal ventilation and instrumentation, whilst general anaesthesia eases psychological stress for the child and provides controlled and calm working conditions for the endoscopist [7].

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Apart from the special situations discussed above, the choice of flexible or rigid instrument will depend on the endoscopist's preference, training and expertise. In general, for foreign body retrieval in adults, no inherent, absolute advantage can be ascribed to one or the other system. Local determining factors such as the ready availability of anaesthesiology services, may also influence the decision in one or the other direction. It is of interest that CUNANAN [3] found a much higher morbidity and mortality rate (12%) using a rigid system, compared to only 1% using flexible bronchoscopy in the retrieval of foreign bodies in 300 physically-handicapped and mentally-retarded patients. Although we cannot confirm this striking difference, the personnel and equipment costs of general anaesthesia argue against using open tube procedures unless definitely indicated.

Some basic considerations apply also to patient preparation. As little time as possible should be lost between foreign body aspiration and treatment, and complication rates increase the longer an object is retained [8, 9]. Inflammatory changes can be significantly reduced by prior application of steroids [10]. We therefore routinely administer 100 mg prednisolone on the previous day, one hour preoperatively, and, depending on the endoscopic findings, also following retrieval. We are unable to confirm the observation by SHURE [4] that an endotracheal tube may impede spontaneous expectoration of a dislodged foreign body; on the contrary, the endotracheal tube eliminates the possibility of unexpected cough or vocal cord closure disengaging the foreign body from the forceps, and we use it routinely.

Recognition of a foreign body and estimation of size is usually quite easy but may be complicated if the object is occluded by granulation tissue. In an earlier paper, LAN *et al.* [11] reported that granulations can be removed without much bleeding, facilitating retrieval in a repeat flexible bronchoscopy a week later (open tube adherents may well counter that they would do the whole procedure in one sitting).

A wide range of instruments is now available for retrieval of foreign bodies, from the useful alligator forceps for routine use, balloon catheters to dislodge an object, special rat-toothed foreign body forceps for grasping coins, baskets for trapping vegetable matter (*e.g.* a pea), to magnetic probes for small metal objects.

One particular situation requires special mention because of the potential catastrophic results if unheeded: pus, accumulating distal to a foreign body occluding a lobar bronchus, may suddenly spill over and compromise ventilation and/or cause massive contralateral pneumonia on removal of the occluding object [12]. Roentgenograms prior to endoscopy indicating bronchial occlusion with distal increase in volume and/or atelectasis should alert the clinician to this possibility. Careful suctioning through a thin catheter advanced

distal to the foreign body and optimal suction on loosening the object, will avert the problem.

The rarity of bronchial foreign bodies in adults makes training on a wide scale difficult. SHURE [4] suggests a combination of instructional videos and hands-on training with such teaching models as the "Broncho Bob" model developed by the author. This model, known on the European continent as the Scopin Trainer, has recently been modified for intubation with flexible and rigid systems (Scopin II Universal Trainer).

### Conclusion

Foreign body extraction is an important procedure, rare in adult bronchoscopy but more often required in paediatrics. Although, in certain situations, the rigid bronchoscope and general anaesthesia is definitely indicated, for most interventions in adults the training and expertise of the endoscopist and local factors will be decisive. LAN [2] shows that many retrieval problems in adults can be satisfactorily solved using the flexible fiberoptic bronchoscope.

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