Overlooked inhaled foreign bodies: late sequelae and the likelihood of recovery

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The present paper describes eight patients (two teenagers and six adults) who had chronic symptoms (haemoptysis, cough, recurrent pneumonia) caused by foreign body (FB) inhalation which went undetected for 3 months to 25 yr. None of the patients had the usual predisposing conditions like mental retardation, seizures or brain tumour. The diagnosis of FB was made by radiography in one patient only. Computerized tomography visualized one FB (a beef bone), and bronchoscopy identified FB in another two patients. The remaining four cases were diagnosed at thoracotomy. Removal of FB was curative in three of five cases who required surgical resection for irreversible bronchiectatic changes. The severity of pulmonary changes correlated with duration of symptoms.

It is concluded that chronic, unexplained respiratory symptoms should warrant further investigation to exclude FB despite negative history and normal chest radiography. Finding of granulation tissue or cicatricial stenosis of the bronchus could be the only clue to the presence of a FB. Early diagnosis would avoid irreversible parenchymal changes which necessitate lung resection.

Introduction

Foreign bodies (FBs) are more common in certain groups of the population. These include children and adults with underlying medical conditions such as seizures, mental retardation, brain tumours and Parkinson's disease (1,2). The classical history is of sudden onset of cough followed by wheezing or dyspnoea, dependent on the nature and size of the FB. The patient is usually a child or person who suffers from memory loss, they present with less acute symptoms, and chest X-ray may be normal. In the Middle East, previous studies reported that watermelon seeds are the commonest FBs, followed by other plant substances (3,4). In contrast to other radio-opaque FBs, these are more difficult to diagnose. These organic substances are hygroscopic and tend to swell causing more local inflammation and delayed obstructive symptoms. The present paper reports the authors' experience with eight patients who had no underlying neurological conditions, and discusses the reasons for the delay in diagnosis.

Patients and Methods

The authors retrospectively reviewed those cases in which the diagnosis of FB was overlooked at King Khalid University Hospital, Riyadh between 1985 and 1995. There were eight patients, five females and three males, with an average age of 33.1 ± 16 years (range 11–55 years). On careful assessment, all patients denied a past history of FB inhalation, and none had a predisposing medical disease such as mental retardation or neurological disorder. Radiography and computerized tomographic (CT) scan of the chest, and bronchoscopic examination was performed in all patients.
<table>
<thead>
<tr>
<th>Case no.</th>
<th>Age/sex</th>
<th>Presenting symptoms</th>
<th>Duration of symptoms</th>
<th>Radiography and CT finding</th>
<th>Bronchoscopy finding</th>
<th>Operation</th>
<th>Nature of foreign body</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>10/M</td>
<td>Haemoptysis</td>
<td>7 yr</td>
<td>Bronchiectasis left lower lobe</td>
<td>Granulation tissue left lower lobe bronchus + cicatrical stenosis</td>
<td>Left lower lobectomy</td>
<td>Rusting nail</td>
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<tr>
<td>2*</td>
<td>45/F</td>
<td>Haemoptysis</td>
<td>12 yr</td>
<td>Bronchiectasis in the right lower lobe</td>
<td>Granulation tissue right lower lobe bronchus</td>
<td>Right lower lobectomy</td>
<td>Cardamom seed</td>
</tr>
<tr>
<td>3*</td>
<td>24/F</td>
<td>Haemoptysis</td>
<td>10 yr</td>
<td>Right lower lobe consolidation</td>
<td>Lesion in bronchus intermedius + cicatrical stenosis</td>
<td>Right lower + middle bi-lobectomy</td>
<td>Hardshell of peanut</td>
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<tr>
<td>4*</td>
<td>41/M</td>
<td>Haemoptysis</td>
<td>25 yr</td>
<td>Right lower lobe consolidation (see Plate 1)</td>
<td>Large brown polyp like mass the bronchus intermedius</td>
<td>Right lower + middle bi-lobectomy</td>
<td>Thorn (see Plate 2)</td>
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<td>5*</td>
<td>35/F</td>
<td>Recurrent pneumonias</td>
<td>1 yr</td>
<td>Right lower lobe + bronchiectasis</td>
<td>Bulging mass in bronchus intermediate + cicatrical stenosis</td>
<td>Right lower lobectomy</td>
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<tr>
<td>6</td>
<td>11/M</td>
<td>Recurrent pneumonias</td>
<td>6 months</td>
<td>Right lower consolidation</td>
<td>FB granulation tissue right main stem bronchus + cicatrical stenosis</td>
<td>Removal rigid bronchoscopy</td>
<td>Piece of plastic cover</td>
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<tr>
<td>7</td>
<td>55/F</td>
<td>Productive cough</td>
<td>3 months</td>
<td>Right lower lobe consolidation</td>
<td>FB granulation tissue in the bronchus intermedius</td>
<td>Removal rigid bronchoscopy</td>
<td>Chicken bone</td>
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<td>8†</td>
<td>44/F</td>
<td>Cough</td>
<td>4 months</td>
<td>Right lower lobe consolidation</td>
<td>FB right bronchus intermedius</td>
<td>Removal flexible bronchoscopy</td>
<td>Beef bone</td>
</tr>
</tbody>
</table>

FB, foreign body; CT, computer tomography.

*FB not discovered or suspected before lobectomy.
†FB seen on CT scan.
Results

The details of the eight patients are shown in Table 1. Five of these patients were seen by either an internist or a pulmonologist, and FB inhalation was not suspected. Chest roentgenogram was useful in locating atelectasis or bronchiectasis in all patients, and was useful in showing radio-opaque objects (Case 1) as the underlying cause. Computerized tomographic scan of the chest demonstrated the associated parenchymal lung injury in all patients; however, FB was detected in only one patient by identifying a lesion having the density of a bone in the proximal bronchus (Plate 3, Case 8). Bronchoscopic examination revealed FBs in three patients (Cases 6–8). A long history of haemoptysis, as a main presentation, occurred in four patients. Granulation tissue was noted in five patients, and cicatricial stenosis was found in four patients. Bronchoscopy was therapeutic in three patients. In patients who underwent lung resection, the endobronchial FB was surrounded by excessive granulation tissue. Gross cystic bronchiectasis was noted in the diseased lobes. Pathological examination of all resected specimens confirmed the presence of cystic bronchiectatic changes and organizing pneumonia with obstructed bronchi.

The duration of symptoms in the patients who required lung resection ($n=5$) was significantly longer than those who responded to conservative treatment ($n=3$), [13.5 years vs. 4.3 months ($P<0.05$)]. All patients made complete symptomatic recovery following resection or FB removal.

Discussion

Occult FB inhalation in adults has been reported to be undetected for years leading to incorrect diagnosis of disease (5,6). The reason for the diagnostic delay in the study patients was due to neglecting the importance of detailing the remote history of FB inhalation, absence of symptoms during aspiration and the fact that none had underlying conditions predisposing them to FB inhalation. Another reason for incorrect diagnosis was due to confusing the sequelae of FB
inhalation with bronchiectasis secondary to tuberculosis or other infections.

Early complications of tracheobronchial FB aspiration include dyspnoea and cough (7), which were observed in three of the study patients; removal of FB led to complete recovery. Late complications, such as bronchiectasis, haemoptysis, bronchial stenosis and recurrent pneumonia (8), occurred in five patients where FBs were found impacted in the bronchi and caused irreversible damage to the obstructed lobe.

Hilman et al. (3) postulated the mechanism by which grass influorescences cause haemoptysis by lodging or migrating to the peripheral part of the lung. The fact that the thorn in Case 4 had a spike made it impossible to dislodge by coughing. In the present series, four of the FBs were organic objects common to the geographical area (1). Organic FBs can cause difficulty when managing cases because they are radiolucent and they tend to swell with time and later cause obstruction leading to endobronchial reaction, excessive granulation tissue, and cicatricial stenosis of the bronchus. Such changes were found in seven of the study patients.

Most of the successful results with bronchoscopic extraction of the FB were attributed to early removal of the object (4). Secondary inflammation, with formation of granulation tissue over the objects, renders the majority of FBs difficult to remove by fibre-optic bronchoscopy.

In concert with the authors’ experience, conventional chest roentgenograms were reported to be poor in identifying the inhaled FB because of radiolucency (5). The value of CT scan of the chest in identifying the inhaled object is not known; its superiority over the chest roentgenogram was observed by showing a lesion with bone density in the proximal airway (Case 8). In the literature, only a few case reports gave details of the chronic complications resulting from tracheobronchial FB aspiration (9–11). Organizing pneumonia and bronchiectatic changes were the predominant changes seen in the study patients who underwent lobectomy.

The authors believe that a high index of suspicion is the best diagnostic factor leading to discovery of inhaled FBs. Factors that should alert the clinician not to overlook inhaled FB include the presence of unilateral disease and bronchoscopic finding of granulation tissue or cicatricial stenosis. Absence of early symptoms and radio-opaque objects should not exclude the possibility of FB inhalation.

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References