Case report

Migrating Aspirated Foreign Body With Associated Intra-Atrial Clot: A Case Report

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The authors report a case of 10-year-old girl who presented with cough and breathlessness of 7 weeks and orthopnoea of 4 weeks. An earlier consultation at a private hospital revealed echocardiographic findings of right intra-atrial clot, confirmed at our institution. Plain chest radiographs showed right lower lobe consolidation and atelectasis. Cough worsened and she desaturated (SaO2 67%) on the 5th week of antibiotic therapy. Repeat plain chest radiographs showed left lung collapse. CT scanogram of the chest revealed no additional findings but Ventilation/Perfusion (VQ) scan of the lungs suggested a foreign body in the left main bronchus. Rigid bronchoscopy confirmed presence of foreign body in the left main stem bronchus but with failed attempt at removal. Postural drainage with physiotherapy effected expulsion which was confirmed at subsequent flexible bronchoscopy. Chest opacities cleared and the right intra-atrial clot resolved except for a flail tricuspid valve leaflet. We illustrate this case to emphasize the need for a high index of suspicion of foreign body aspiration in cases of persistent lung collapse especially in children and to document the rare co-existence with intra-atrial clot.

Key words: Foreign Body Aspiration, Intra-atrial Clot, Pneumonia, Infective Endocarditis, Bronchoscopy.

INTRODUCTION

Foreign body (FB) aspiration is a condition in which a foreign body is inhaled via the mouth or nostril and lodges within the tracheobronchial tree. FB aspiration is a very common occurrence in children, especially among those younger than three years of age (79%)1,2, and up to 10 years (90%). It is a leading cause of morbidity and mortality in the under-5s3, being responsible for 300 deaths per year in the USA4, with similar findings in Brazil5. It is a potentially life-threatening emergency if the inhaled object (usually large, smooth and round) completely occludes the airway especially at the supra or infra-glottic area. With smaller and non-uniform objects, these tend to lodge in the bronchi leading to chronic debilitating symptoms with recurrent infections especially with delayed extraction2,3. The patient may however, remain asymptomatic2 or there may be a latency period prior to onset of symptoms, which may last months or years if the object is inert, bone or inorganic material. Usually, there is a suggestive history of choking, although the classic clinical triad of coughing, wheezing, and

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diminished air inflow, is seen in less than 40% of the patients1,6,7; other symptoms include cyanosis, fever, and stridor. About 19% of FB aspirations are un-witnessed but a positive history is obtained in 91% of children6. Most frequently, aspirated objects are food, which is involved in 75% of the cases; other organic materials, such as bones, teeth, and plants, 7%; nonorganic materials, such as metals and plastics, 13%; rocks, 1%; and toys or parts of toys, 1%.8 Aspirations of foreign bodies that become lodged in the tracheobronchial tree comprise a small subset of FB aspiration cases. The location of lodging of the FB has been shown to be, larynx - 3%, trachea/carina - 13%, right lung - 60% (52% in the main bronchus, 6% in the lower lobe bronchus, and <1% in the middle lobe bronchus), left lung - 23% (18% in the main bronchus and 5% in the lower bronchus), and bilateral - 2%.9 In isolated cases, as we report, they have been shown to migrate to a new location.8 Tricuspid valve anomalies are relatively uncommon. They occur as tricuspid stenosis or tricuspid regurgitation with concomitant mitral valve disease in rheumatic heart disease or as congenital anomaly in Ebstein’s anomaly of the tricuspid valve or as a flail tricuspid leaftet of unknown aetiology. In certain instances in children especially infants, occurrence of flail leaflets are attributable to ruptured or damaged chordae tendineae resulting from severe perinatal asphyxia10. Messika-Zeitoun et al11 reported trauma as a common cause of flail tricuspid leaftet, trauma being responsible for 62% in their report. Tricuspid regurgitation/insufficiency as an isolated finding remains mostly asymptomatic especially if right ventricular function is preserved. Most cases are found incidentally when a patient is being investigated for other unrelated reasons.

CASE REPORT

A 10-year-old primary six female pupil was referred to the Paediatric Cardiology unit with a 7 weeks history of fever, cough, and weight loss and 4 weeks history of orthopnoea. Cough was non-paroxysmal, non-productive; she had no history of contact with an adult with chronic cough, and no night sweats. Fever was high grade, intermittent, no headaches, no convulsions, or loss of consciousness. She had become anorexic since onset of her illness as such had lost some weight. The referral hospital had done a series of chest radiographs, which showed right lower lobe consolidation, collapse, and minimal pleural effusion on same side. On account of this she was commenced on antibiotics: augmentin then erythromycin and eventually roxithromycin with minimal relief. Three weeks later, she developed orthopnoea. Echocardiography showed a serpiginous right intra-atrial clot attached to the tricuspid valve, because of which she was referred to the Paediatric Cardiology unit of UCH for anticoagulation. Physical examination was only remarkable for her asthenia, weight 67% of expected, and chest findings of collapsed right lower lobe. Other systems were essentially normal. Haematological indices were normal except for a neutrophilia of 90% and erythrocyte sedimentation rate of 88mm/hr. Sputum microscopy and culture, blood culture x3 and Mantoux test were all negative. Chest ultrasonography and radiographs confirmed right lower lobe consolidation-collapse. Echocardiography confirmed a serpiginous clot attached to leaflet of the tricuspid valve and moving in and out of the right atrium. She was commenced on a course of antimicrobials including ceftriaxone, metronidazole and amikacin for pneumonia and infective endocarditis. The cardiothoracic surgeon, the haematologist, and the microbiologist reviewed her. She showed clinical improvement with relief of orthopnoea, marked reduction in cough, and was no longer febrile. However, she suddenly deteriorated on the 5th week on admission; cough worsened and became productive of copious frothy sputum. She was severely dyspnoeic with wheezes over the entire left hemithorax, SpO2 dropped to 67%. With imminent respiratory failure, she was transferred to the ICU. Her SpO2 improved just as suddenly to 93%. Repeat plain chest radiographs showed left lung collapse. CT scanogram of the chest showed no additional findings. With a differential diagnosis of pulmonary embolism a Ventilation/Perfusion (V/Q) scan requested showed matched V/Q defects in the right lung and failed ventilation of the left lung, suggesting obstructive lesion in the left main bronchus. On further questioning patient admitted to having ‘swallowed’ a blue plastic pen (biro®) base cork 2 weeks prior to the onset of her medical problems. She had been told at the first hospital she reported to, that, she would pass out the object in her stools so she gave it no further thought. At rigid bronchoscopy, thick secretions were sucked from the right airway and a blue plastic biro base cork was sighted in the left main stem bronchus. Removal was unsuccessful and the procedure abandoned because patient suddenly deteriorated/desaturated. Subsequently chest physiotherapy and postural drainage was commenced as well as anticoagulation with ClexaneR. Thereafter, the FB was coughed up spontaneously and expelled by the patient. Flexible bronchoscopy performed a week later revealed no FB. Subsequently, repeat plain chest radiographs revealed that the chest opacities had cleared and repeat echocardiography showed absence of an intra-atrial clot but a flail tricuspid valve leaflet. Patient showed marked improvement and was discharged a week later, and is being followed up in the Paediatric Cardiology outpatient clinic.

Discussion

Foreign bodies in the tracheobronchial tree are a
common problem involving an infinite variety of objects that are inhaled and present in different ways posing different diagnostic problems. An adequate positive history is very informative and helpful for diagnosis if timely obtained. In our case, this was not timely; the finding of a serpiginous clot on the tricuspid valve leaflet on echocardiography added a cardiovascular component to her illness and became the focus at the referring hospital. Migration of aspirated FB is uncommon and infrequently reported. Shape and chemical nature are two important factors that may have increased the possibility of migration. First, irregularly shaped objects and sharply pointed objects have a tendency to stick to the mucosa of the tracheobronchial tree and become fixed12. Second, airways FB are classified into organic and inorganic substances. Generally, an organic FB results in more severe mucosal inflammation, and within a few hours, causes the development of granulation tissue around it12. Some organic foreign FB can absorb water and swell, resulting in total occlusion of the airway12. Therefore, organic FBs have the tendency to readily immobilize. On the other hand, inorganic FBs are generally inert, and sometimes may be tolerated for many years without prominent symptoms10. The aforementioned means that inorganic FBs may migrate even when they have been aspirated a long time previously11. Reskin13 and Pawan et al14 both reported prolonged stay of a migrating FB in bronchi in a child. In the latter case the child, a-one year old had cyanotic spells from desaturation as the FB changed location just as occurred in our case though our patient is older. The desaturation occurred at the instance when the FB was at the carina. Diagnosis of FB aspiration is often delayed especially when a positive history is not forthcoming because symptoms and signs would be attributed to other causes of respiratory illnesses, as is the case here; she was being treated for recurrent pneumonia. Diagnosis of FB aspiration can easily be based on cumulative evidences provided by three parameters including a history of aspiration, physical examination and a plain chest radiograph15. The hallmark radiographic signs associated with foreign body aspiration are demonstrated on expiratory plain chest X-ray film; findings such as mediastinal shift and air trapping (obstructive emphysema) 16. Diagnosis of radio-opaque aspirated FB is easy when the entire respiratory tract is depicted. Non-opaque FB needs a more differentiated diagnostic approach. The first step is usually plain films in inspiration and expiration, and if needed fluoroscopy and CT or ventilation perfusion scan17. Lim-Dunham18, described "interrupted bronchus sign" seen at fluoroscopy. Interrupted bronchus sign has a sensitivity of 100% for detection of foreign bodies in the main bronchus but specificity is only 71% because other endobronchial lesions can disrupt the air column. Computed tomography is a useful non-invasive technique for guiding diagnosis and assessing the need for bronchoscopy19. It is not recommended as a routine in the diagnosis of tracheobronchial foreign bodies but can be of value in the more difficult cases as it is superior to plain radiography and xeroradiography in visualizing foreign bodies20. CT scan is quite useful in finding radiolucent or soft density foreign bodies and has been proven useful in defining complex anatomical areas21,22. In our patient, because the FB was small, inert and had been in situ for a long duration, it caused repeated lower respiratory tract infections, an expected complication. The expected respiratory auscultation and chest radiography (unilateral air trapping17, rarely atelectasis) findings in FB aspiration were not initially typical. The dislodgement and migration of the FB and radiography at that instance gave the suspicion of FB; this was confirmed by the resultant ventilation perfusion scan (V/Q). However, it should be noted that in FB aspiration, chest X-ray film shows the lowest sensitivity compared to physical examination and respiratory auscultation, which has a sensitivity of 90% 23. The absence of positive radiological findings does not therefore exclude the diagnosis of foreign body aspiration. In this case, the patient apparently already had an anomalous flail tricuspid valve. The aetiology we are yet to establish and had remained asymptomatic until the FB aspiration and the resultant sequelae. The recurrent lower respiratory tract infection because of the lodged FB with the associated bacteraemia resulted in seeding of vegetation on the tricuspid valve. The development of infective endocarditis was thus inevitable. This was promptly treated with resolution seen on echocardiography. The occurrence of intra-cardiac lesions in FB aspiration has added a new aspect to the morbidity associated with prolonged FB in the lungs and the importance of its removal as soon as possible. Our patient despite being asymptomatic may require surgery for the flail tricuspid valve in future. For even patients asymptomatic at presentation experienced high tricuspid-related event rates, at 10 years, 75% ± 15% had symptoms or heart failure, atrial fibrillation, surgical intervention, or death11. This case report illustrates a patient with an existing anomalous tricuspid valve leaflet, who had aspirated a FB, had recurrent lower respiratory tract infections without clinical response to medical management, and subsequently developed infective endocarditis. In such patients, history of FB aspiration should be sought; failing this, rigid bronchoscopy is mandatory and should not be delayed irrespective of age of patient. High index of clinical suspicion is mandatory for early diagnosis and management to prevent fatal outcome and long-term morbidity24.

References


