CASE REPORT

Treasure in the chest

Lucinda Katharine McCowan Blake,¹ Elizabeth Silverstone,² Deborah Helwen Yates¹¹Department of Thoracic Medicine, St Vincent's Hospital, Sydney, New South Wales, Australia²Department of Medical Imaging, St Vincent's Hospital, Sydney, New South Wales, Australia**Correspondence to**Dr Lucinda Katharine McCowan Blake,
blakelucinda@gmail.com

Accepted 14 January 2015

SUMMARY

A 41-year-old woman with a background of asthma was preparing for a party on New Year's Eve when she developed a mild wheeze. Concerned her symptoms would develop and impact on festivities, she located her uncapped salbutamol inhaler in her handbag. Ignoring the coarse rattle as she shook it, she proceeded to take a deep inspiration. Instantly, she felt a painful scratch in her pharynx followed by a harsh cough, which persisted over the next few minutes and became associated with haemoptysis. She was taken to the accident and emergency department. Chest X-ray revealed a radiodense foreign body in the distal right main bronchus. During endoscopy, an earring, causing subtotal occlusion in the right lower lobe bronchus was found and extracted. Her observations remained within normal limits throughout. The importance of replacing caps on inhalers when not in use is illustrated and should be encouraged when inhaler technique is taught or reviewed.

BACKGROUND

The importance of good inhaler technique is well documented. Experienced asthmatics are aware of the complex inspiration and motor coordination required to deliver inhaled medications effectively; however, storage of the inhalers and preparation for their use is not usually a focus of teaching in asthma. This case illustrates that hidden objects may lodge in inhalers, and that they may be inhaled surprisingly deep into the lungs in a matter of seconds.

The bespoke design of the metred dose inhalers is disadvantaged by its ability to house small objects, which can often be neatly concealed by the perpendicular bend. Asthmatic patients often reach for their inhaler in moments of stress and understandably do not visually inspect it before use. However, this should be recommended.

Simply ensuring that the cap is replaced on inhalers after use and inspecting the inhaler reservoir thoroughly prior to use would ensure the risk of foreign body aspiration is kept to a minimum.

CASE PRESENTATION

A 41-year-old woman with a background of Ehlers-Danlos syndrome and mild asthma was preparing for a New Year's Eve party. She decided to take her salbutamol metered-dose inhaler, despite only a mild wheeze, to avoid potential asthma symptoms distracting her from the planned celebrations.

She retrieved the device from her handbag and shook it generously. She noticed a rattle, which she dismissed as a loose connection in the inhaler. Sealing her lips around the mouthpiece, she delivered a short burst of the medication and took a

deep inspiration. She instantly felt a severe scratch at the back of her throat and assumed she had aspirated some sliver foil from a paracetamol packet in her bag. Moments later she developed a harsh cough, followed by haemoptysis, which she estimated at 100 mL.

She then became short of breath, with wheezing and low-grade right-sided chest discomfort and called for an ambulance. They found her distressed, trying to cough, with her head between her legs.

She was haemodynamically stable with saturations of 96% on room air. Chest expansion and auscultation were normal and she could talk in complete sentences. Examination of the pharynx revealed two 1.5 cm vertical abrasions.

She was brought to the emergency department and remained anxious with a transient episode of hyperventilation (34 breaths/min). Her observations otherwise remained stable, but auscultation of the chest now revealed localised coarse wheeze in the right mid zone.

INVESTIGATIONS

Plain chest X-ray revealed a foreign body in the right main bronchus, with features consistent with a stud earring (figures 1 and 2). CT of the chest localised the earring in the right main bronchus (figures 3 and 4).

Blood tests were unremarkable.

DIFFERENTIAL DIAGNOSIS

The diagnosis of aspiration was likely on the basis of the history and the abrasions on the posterior

Figure 1 Posteroanterior chest X-ray showing a metallic foreign body at the right hilum, projected over the bronchus intermedius.

CrossMark

To cite: Blake LKM, Silverstone E, Havryk A, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-207398

Figure 2 Lateral chest X-ray confirming the position of the metallic foreign body in the right hilum.

pharynx. Prior to imaging, an exacerbation of asthma, as evidenced by wheeze and supported by medical history was also considered.

An infective precipitant could be entertained were it not for the abruptness of symptoms and the absence of associated cough, fever or malaise. Pulmonary embolism without obvious risk factors is a far less likely diagnosis but should be considered in the differential.

TREATMENT

She was treated with ceftriaxone as a precaution against aspiration pneumonia and rendered nil by mouth for bronchoscopy. Her anxiety successfully resolved with 10 mg temazepam.

Bronchoscopy was performed under sedation by the respiratory team. There were increased mucoid secretions throughout

the right bronchial tree, but a heart shaped diamante earring was identified in the right lower lobe bronchus (figure 5), where it was causing subtotal occlusion.

Endobronchial biopsy forceps (2.8 mm alligator) were used to retrieve the earring (figure 6) but the procedure was complicated by the earring migrating distally, which was resolved only after the patient was tilted head down.

OUTCOME AND FOLLOW-UP

She recovered rapidly post procedure and was discharged on Augmentin Duo Forte the following day. She made a full recovery, but is now very careful about replacing the cap of her inhaler before use.

DISCUSSION

Aspiration describes the abnormal sequestration of a solid or liquid substance in the bronchial tree. It is unusual in well adults; the incidence favours extremes of age and is more common in those with cognitive impairment, structural or neurological dysphagia or in the setting of sedating medication or alcohol. Many different foreign bodies may be inhaled. These most often include vegetable materials (often peas)¹ but greater than 7% total aspirated substances are reported to be medicinal pills.²

Patients may be asymptomatic, particularly in the early stages; in one study a suggestive history of aspiration was found in only 68% of cases.¹ This study also noted that symptoms were often delayed by up to 3 days and if present usually consisted of cough and dyspnoea. Decreased expansion on the affected side (usually the right) and associated collapse on chest X-ray were the most common signs, with atelectasis being the underlying cause.

Aspiration related to inhaler use has been reported previously. In one case a patient disassembled his Turbuhaler and while attempting to inhale remnants of medication from its 22 mm plastic dispensing disc, accidentally aspirated it too.³

Another patient aspirated a US one cent coin, which similar to our case, was lodged in the inhaler container.⁴ Following this, the authors examined the ease at which other American coins could be aspirated in a similar manner. The dimensions of dimes (17.91 mm) and one-cent coins (19.05 mm) were concluded to pose the greatest aspiration potential. In these

Figure 3 Coronal CT (bone window) shows the metallic body lodged in the bronchus intermedius.

Figure 4 Sagittal CT (lung window) shows the earring at the bifurcation of the bronchus intermedius into the right middle and lower lobe bronchi.

Figure 5 Image taken at bronchoscopy showing earring lodged in the right lower lobe bronchus with associated mucoid secretions.

Figure 6 The offending article. A heart shaped diamante earring, recovered at bronchoscopy.

cases, and ours, the patient was aware of the aspiration and laryngoscopy and bronchoscopy successfully retrieved the objects.

Pill aspiration, however, can present more indolently. In addition to the obstructive changes described above, dissolution of the medicine can cause harmful local inflammatory effects in the bronchial mucosa. Of additional concern, some drugs may be systemically absorbed. Patients are often asymptomatic or misdiagnosed with asthma⁵ and therefore retrieval of the drug before detrimental effects ensue is delayed.

These detrimental effects centre around chronic bronchial inflammatory change, which when severe may only be treated by lobectomy. Early detection is key, which will avoid this and the requirement for frequent bronchoscopic monitoring of the affected lobe(s).

However, difficulties in diagnosis include initial delay of symptoms, radiolucency on chest imaging and dissolution by the

Learning points

- ▶ Inhaler technique training should include instruction to diligently replace the inhaler's cap and checking the reservoir for resident objects before use.
- ▶ Aspiration can cause bronchial obstruction, or if undetected can cause silent, chronic disease, usually in the lower lobes.
- ▶ Aspirated objects may be radiolucent or dissolve before bronchoscopy.
- ▶ Once identified, the foreign body should be removed promptly to avoid inflammation and development of granulation tissue.
- ▶ If there is a risk of pill aspiration, early bronchoscopic intervention is indicated to limit reactive changes and prevent chronic lung disease.

time of bronchoscopic examination. With the advent of newer inhalers, which have attached caps, it is hoped that the risk of aspiration will be diminished; however, it is easy to neglect and visual inspection before use is a simple precaution, which should be highlighted to the patient.

Contributors The patient was admitted under the care of DHY and the bronchoscopy was performed under the instruction of Dr Adrian Havryk. LKMB wrote the first draft of the case report and this was edited by DHY. The radiological images were reviewed and discussed with ES, who also contributed to the descriptions of the figures.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Sumanth TJ, Bokare BD, Mahore DM, *et al.* Management of tracheobronchial foreign bodies: a retrospective and prospective study. *Indian J Otolaryngol Head Neck Surg* 2014;66(Suppl 1):60–4.
- 2 Mehta AC, Khemasuwan D. A foreign body of a different kind: Pill aspiration. *Ann Thorac Med* 2014;9:1–2.
- 3 Campisi P, Backman SB, Sweet R. Foreign body aspiration following unconventional use of a metered dose inhaler. *Can J Anaesth* 2000;47:796–9.
- 4 Hannan SE, Pratt DS, Hannan JM, *et al.* Foreign body aspiration associated with the use of an aerosol inhaler. *Am Rev Respir Dis* 1984;129:1025–7.
- 5 Kam JC, Doraiswamy V, Dieguez JF, *et al.* Foreign body aspiration presenting with asthma-like symptoms. *Case Rep Med* 2013;2013:317104.

Copyright 2015 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow