

INSTRUCTIVE CASE

Wheezy swallow: Poorly responsive 'Asthma'Samson C Kwok,^{1*} Edward V O'Loughlin,² Alyson M Kakakios³ and Peter P van Asperen^{1,4}Departments of ¹Respiratory Medicine, ²Gastroenterology and ³Allergy and Immunology, The Children's Hospital at Westmead and ⁴The Children's Hospital at Westmead, Clinical School, Discipline of Paediatrics and Child Health, The University of Sydney, Sydney, New South Wales, Australia

Abstract: We report two children who presented with cough and wheeze, were initially misdiagnosed with asthma and were subsequently demonstrated to have achalasia as the underlying cause of their symptoms. These cases highlight the importance of considering diagnoses other than asthma when there is a suboptimal response to asthma medications, as well as the value of investigations including chest X-ray and pulmonary function tests in establishing the underlying cause.

Key words: achalasia; aspiration; asthma; pulmonary function test.

Case Reports**Case 1**

This 14-year-old boy was referred to a paediatric respiratory physician for assessment of troublesome 'asthma symptoms' despite high-dose inhaled corticosteroid therapy. He developed a persistent dry cough following an episode of glandular fever. The cough was worse at night and associated with occasional wheezing. He was using regular beclomethasone dipropionate 200 µg four times daily and salbutamol as required, without response. He also had difficulty swallowing food, occasional vomiting and chest pain. He had a past history of allergic rhinitis, and there was a strong family history of atopy.

On examination, his weight was on the 25th centile and height was on the 75th centile. Physical examination was unremarkable.

His pulmonary function test showed evidence of airway obstruction with a forced expiratory volume in 1 s (FEV1) of

52% predicted, forced vital capacity (FVC) of 90% predicted and FEV1/FVC ratio of 48%, without significant bronchodilator response. The flow loops demonstrated expiratory airflow limitation consistent with variable intrathoracic obstruction (Fig. 1a). Skin prick test was positive to rye grass only.

He proceeded to bronchoscopy, which demonstrated an erythematous oedematous larynx suggestive of gastro-oesophageal reflux, but no definite evidence of lower airway narrowing. His chest X-ray at the time of bronchoscopy showed a soft tissue density in the posterior mediastinum with an air-fluid level. Barium swallow was consistent with achalasia. Oesophageal dilatation was performed, which led to complete resolution of his symptoms.

Case 2

This 14-year-old girl presented to an Allergy Clinic with a long history of dysphagia. She complained of food getting stuck when swallowing and regurgitation of undigested food. These symptoms had been present since early childhood, and she had seen a number of health professionals who reassured her that there was no actual problem.

She also had a history of 'persistent asthma'. Symptoms of cough and wheeze developed at 12 months but resolved when she was 4 years old. She remained symptom-free until 6 months prior to her presentation to the Allergy Clinic, when she developed a recurrence of cough, with occasional post-tussive vomiting. She had been on inhaled fluticasone propionate 125 µg and salmeterol 25 µg two puffs twice daily, but continued to require frequent use of salbutamol. There was little relief in her symptoms from treatment, despite satisfactory compliance and spacer technique.

She had no other significant past medical history. Her 8-year-old brother had a history of food allergies and unexplained episodes of anaphylaxis.

On examination, her weight was between the 50–75th centile and height was on the 50th centile. Physical examination was unremarkable.

Key Points

- 1 If there is suboptimal response to asthma medications, always consider whether the diagnosis of asthma is correct.
- 2 Pulmonary function tests including the shape of the expiratory flow loop can be helpful in differentiating airflow limitation related to asthma from other causes of intrathoracic airway obstruction.
- 3 Gastrointestinal conditions, including achalasia, can mimic asthma by causing aspiration and/or obstructing the lower airway.

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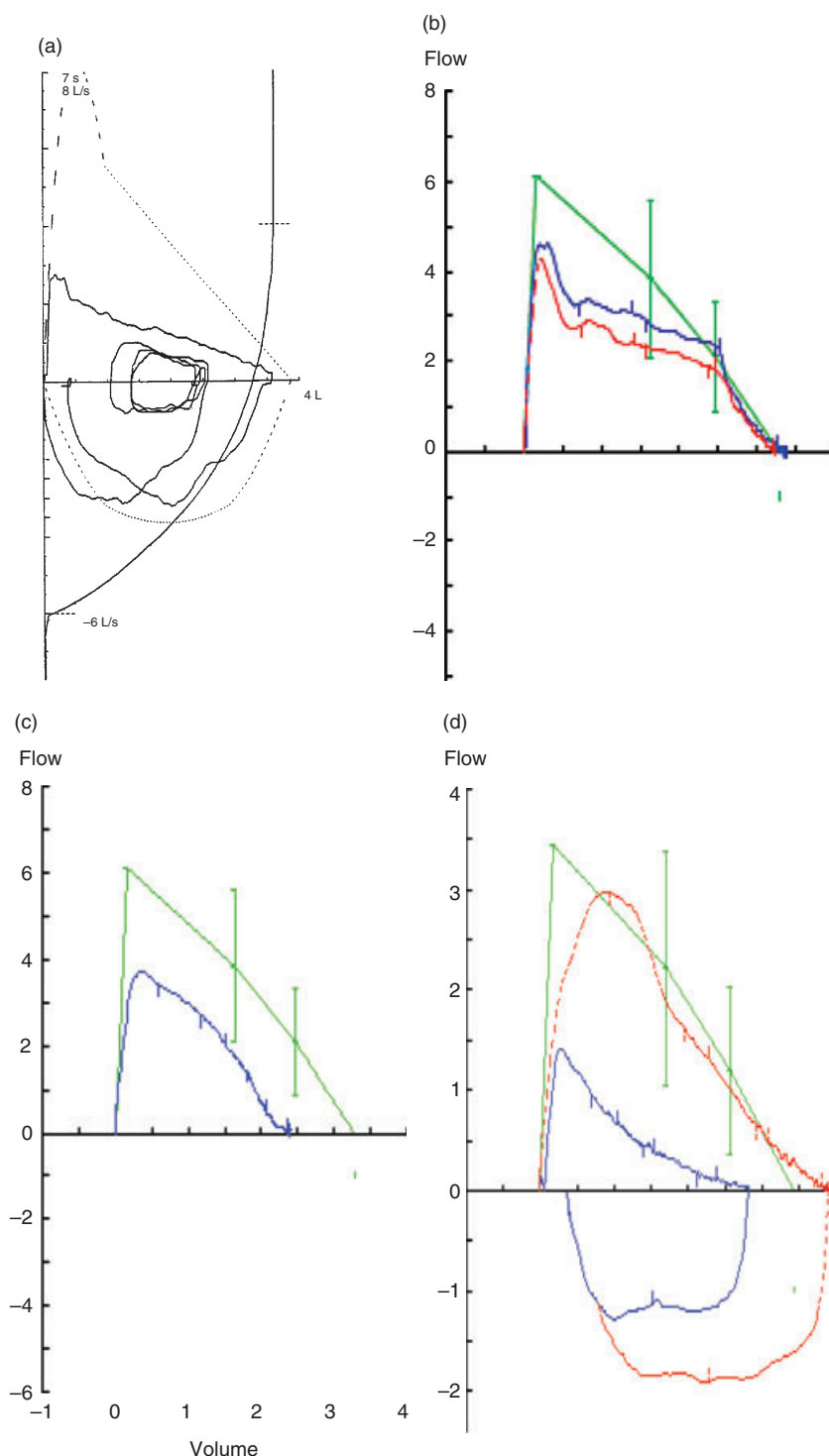


Fig. 1 Flow loop diagrams. The vertical axis represents the flow and the horizontal axis represents the volume. The blue line is the pre-bronchodilator flow loop, the red line the post-bronchodilator flow loop and the green line the predicted flow loop. (a) The flow loop of Case 1 is shown. The relatively flat section in the expiratory part of the flow loop demonstrated expiratory airflow limitation consistent with variable intrathoracic obstruction. The term 'variable' means that the flow limitation is restricted to expiration and inspiratory flow was normal in this patient. Pulmonary function test was not repeated in Case 1 following treatment. (---) predicted normal flow loop (pred.), (—) pre-bronchodilator flow loop (PRE). (b) The flow loop of Case 2 before surgery demonstrated expiratory airflow limitation consistent with variable intrathoracic obstruction. Inspiratory flow is not shown on this flow loop but there was no inspiratory flow limitation. (c) The flow loop of Case 2 after surgery returned to normal. (d) The flow loop of a typical patient with asthma demonstrated expiratory obstruction (as shown by the concavity in the expiratory part of the flow loop with flow most markedly reduced at low lung volumes) and reversibility with the use of bronchodilator.

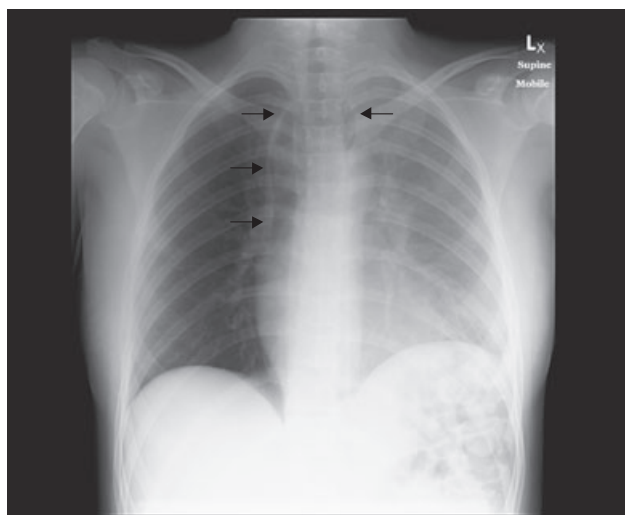


Fig. 2 The chest X-ray of Case 2 demonstrated increased density of the left hemithorax, consistent with left lower lobe collapse and airspace opacification. There was also an area of lucency projected over the mediastinum suggestive of a dilated oesophagus (as outlined by the black arrows).

A provisional diagnosis of oesophageal narrowing, possibly owing to eosinophilic oesophagitis, was made. Allergen skin prick test was negative. Pulmonary function test showed an essentially normal FEV1 (82% predicted), FVC (103% predicted) and FEV1/FVC ratio (76%), but evidence of expiratory airflow limitation on the flow loop consistent with variable intrathoracic obstruction (Fig. 1b).

She was referred to a paediatric gastroenterologist for further investigations and proceeded to upper gastrointestinal endoscopy. This demonstrated undigested food residue in a markedly dilated oesophagus (despite an overnight fast of 12 h) without mucosal abnormalities, and a very tight lower oesophageal sphincter. The findings were more consistent with achalasia than eosinophilic oesophagitis.

In the first few hours after endoscopy, she developed a moist cough and shortness of breath. Chest X-ray showed evidence of aspiration pneumonia and a dilated oesophagus (Fig. 2). She was kept nil by mouth, given intravenous antibiotics and chest physiotherapy, and showed excellent clinical improvement.

A non-ionic contrast study of the upper gastrointestinal tract was performed a few days later, and showed a markedly dilated oesophagus in most of its intrathoracic portion, with a tiny beak noted at the cardio-oesophageal junction, consistent with the diagnosis of achalasia (Fig. 3).

She went on to have laparoscopic cardiomyotomy and partial posterior fundoplication, and made an uneventful recovery. There was substantial improvement in her symptoms following surgery. A repeat chest X-ray just prior to hospital discharge showed resolution of the previously noted changes. Repeat pulmonary function tests showed that her flow loop had returned to normal (Fig. 1c). A short synacthen test was also performed to exclude adrenal insufficiency and was normal.

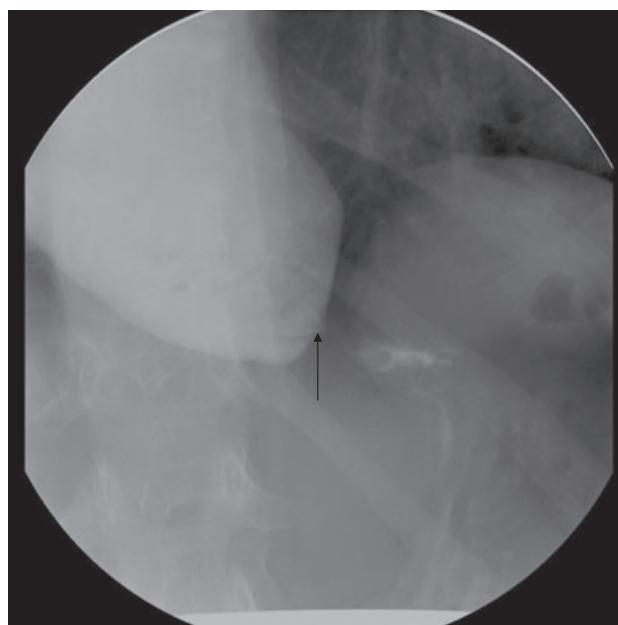


Fig. 3 The non-ionic contrast study of Case 2 demonstrated marked oesophageal dilatation and a 'beak' at the gastro-oesophageal junction (as indicated by the black arrow). These findings were consistent with achalasia.

Discussion

Both of our patients presented with cough and wheezing, and had past and family histories of atopy or allergies. While an initial diagnosis of asthma was reasonable, the suboptimal response to asthma treatment should have prompted consideration of other diagnoses.

There have been other case reports in the medical literature of achalasia presenting with respiratory symptoms, which were initially misdiagnosed.^{1–3} Common features to these included chronic respiratory symptoms, failure to respond to asthma medications, and abnormal flow loops in pulmonary function testing. In our patients, pulmonary function tests also provided useful clues to the eventual diagnosis. The expiratory airflow limitation seen on the flow loops was consistent with variable intrathoracic obstruction, owing to the dilated oesophagus obstructing the intrathoracic trachea, and was not typical of asthma (for comparison, a typical flow loop seen in asthma is shown in Fig. 1d). Even though our patients presented with both cough and wheezing, achalasia can result in persistent coughing alone. In a recent review of 49 children with persistent coughing, many of them were initially diagnosed as having asthma but later found to have other conditions including achalasia in one child.⁴

Achalasia is a condition characterised by a reduction in the number of inhibitory ganglion cells, with subsequent oesophageal dilatation.⁵ It is a rare disorder with an estimated overall incidence of 0.5–1/100 000 per year.⁶ It is rare in childhood, with only 2–3% of all cases being seen in this group.² Typical symptoms include dysphagia for solids and liquids, regurgitation

of undigested food and weight loss. Some patients also have respiratory symptoms. Diagnosis can be made by endoscopy, manometry or barium swallow. CT scans are usually not of use in the diagnosis of achalasia.

The aetiology of achalasia remains largely unknown in Western countries. It has been described in monozygous twins, suggesting that genetic factors are involved. There is some evidence that it has an autoimmune basis.⁵ It is interesting that Case 1 developed symptoms following glandular fever, as viral causes have been postulated in achalasia, although attempts to identify viral particles have not been successful.⁵ Chagas' disease is a common cause of achalasia in some countries, but neither of our patients had travelled overseas. Achalasia may be associated with alacrima and adrenal insufficiency to form the 'triple A syndrome'.⁷ This is an autosomal recessive condition, which usually manifests in the first decade of life with symptoms of adrenal insufficiency.⁵

A number of treatment modalities has been used for achalasia, including myotomy, pneumatic dilation, injection of botulinum toxin into the lower oesophageal sphincter and pharmacological treatment. Surgical myotomy and pneumatic dilation are both effective treatments with good long-term results. Botulinum toxin injection leads to a similar initial response rate as pneumatic dilation, but is less effective in the

long term. Pharmacological treatments have also been used but are associated with disappointing results.⁸

References

- 1 Mincewicz G, Wasilewska E, Aloszko A, Kurowski W, Siergiejko Z, Mierzejewska E. Pseudoasthmatic syndrome due to achalasia cardia. *Pol. Merkur. Lekarski* 2004; **17**: 483–5.
- 2 Chapman S, Weller PH, Campbell CA, Buick RG. Tracheal compression caused by achalasia. *Pediatr. Pulmonol.* 1989; **7**: 49–51.
- 3 Adachi K, Hayashida M, Toyoshima K. Airway obstruction in a child with esophageal achalasia. *Acta Paediatr. Jpn.* 1989; **31**: 600–4.
- 4 Thomson F, Masters IB, Chang AB. Persistent cough in children and the overuse of medications. *J. Paediatr. Child Health* 2002; **38**.
- 5 Zilberstein B, de Cleve R, Gabriel AG, Neto SG, Gama-Rodrigues JJ. Congenital achalasia: facts and fantasies. *Dis. Esophagus* 2005; **18**: 335–7.
- 6 Boeckxstaens GE, Jonge WD, van den Wijngaard RM, Benninga MA. Achalasia: from new insights in pathophysiology to treatment. *J. Paediatr. Gastroenterol. Nutr.* 2005; **41** (Suppl. 1): S36–7.
- 7 Iwanczak F, Smigiel R, Blitek A, Huebner A. The triple 'a' syndrome confirmed by molecular analysis: a case report of 7-year-old boy. *J. Paediatr. Gastroenterol. Nutr.* 2005; **40**: 87–9.
- 8 Leyden JE, Moss AC, MacMathuna P. Endoscopic pneumatic dilation versus botulinum toxin injection in the management of primary achalasia. *Cochrane Database Syst. Rev.* 2006; **4**: CD005046.