

CASE REPORT OPEN ACCESS

Very Late Age-Onset Asthma: Mimic of Other Respiratory Diseases and Important Diagnosis Not to Be Missed

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ABSTRACT

Asthma is often not recognised and is frequently not diagnosed and treated in older people. This may reflect the belief that the disease is unlikely to manifest late in this group. We report a patient who presented with a respiratory infection and persistent breathlessness after the age of 80. Asthma was not initially suspected, and other diagnoses were pursued. However, subsequent spirometry suggested late age-onset asthma that responded dramatically to appropriate treatment. This case provides a timely reminder for physicians to consider this diagnosis in older patients.

1 | Introduction

Asthma is a common chronic respiratory condition that affects a significant proportion of the older population [1]. However, there is often limited recognition and diagnosis, and appropriate treatment is regularly delayed or not provided in elderly people [2]. There are several reasons for this problem that include a mistaken belief that asthma always manifests earlier in life, comorbid conditions that hide or obscure asthma (e.g., cardiac disease) and tolerance by older patients of symptoms such as breathlessness that are attributed to 'old age'. The combination of older age and asthma, leading to a higher susceptibility to recurrent and prolonged episodes of infection, is particularly prone to confusion and may result in an erroneous diagnosis of chronic bronchitis or even bronchiectasis.

We describe a clinical case demonstrating these challenges. The report also illustrates the advantages of an accurate diagnosis in an elderly person and the transformational benefits of effective modern asthma treatment.

2 | Case Report

An 82-year-old male presented with severe breathlessness and a chronic productive cough. He was a retired truck mechanic and a life-long non-smoker whose past medical history included atrial fibrillation on warfarin treatment, a mild stroke, and a prostatectomy for prostate cancer.

The patient reported several months of prior productive cough with discoloured sputum and increasing breathlessness. His cough was troublesome at night. There has been a 5–6 kg weight loss, but he did not have classic asthma symptoms, such as wheezing or chest tightness, and no history of atopy. A diagnosis of acute/chronic bronchitis was made, and a course of antibiotics (cefuroxime) improved cough and sputum production and purulence, but he remained severely breathless.

Computerised tomography (CT) chest was done to examine other diagnostic options and to exclude alternative diagnoses (such as bronchiectasis). This demonstrated diffuse bronchial

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wall thickening with areas of mucous plugging (Figure 1A) but no evidence of structural lung disease, bronchiectasis or emphysema. Sputum culture was negative except for a single positive culture for a non-tuberculous mycobacterium (*M. abscessus*). There were no risk factors for tuberculosis, and polymerase chain reaction for *Mycobacterium tuberculosis* (TB-PCR) had been negative. The focus was on infection, spirometry was not done, and the patient was advised to consider antibiotic treatment of non-tuberculous mycobacterial infection.

Prior to antibiotic treatment for non-tuberculous mycobacterial infection, the patient obtained a second respiratory review

given persistent severe breathlessness and no evidence of infection (non-productive dry cough, no fevers). Spirometry was conducted and revealed evidence of severe obstructive lung disease (Figure 2A). Forced expiratory volume in 1s (FEV_1) 39% of predicted values (0.97L), forced vital capacity (FVC) 58% of predicted values (1.96L), and FEV_1/FVC ratio was 0.45. There was no significant bronchodilator response.

Repeat CT chest imaging revealed evidence of persistent airway pathology characterised by mucous plugging. Blood counts found peripheral eosinophilia ($0.40 \times 10^9/L$) and raised total immunoglobulin E (IgE; 1666 kU/L; normal < 100 kU/L) suggesting Type-2 airway inflammation. Further blood tests

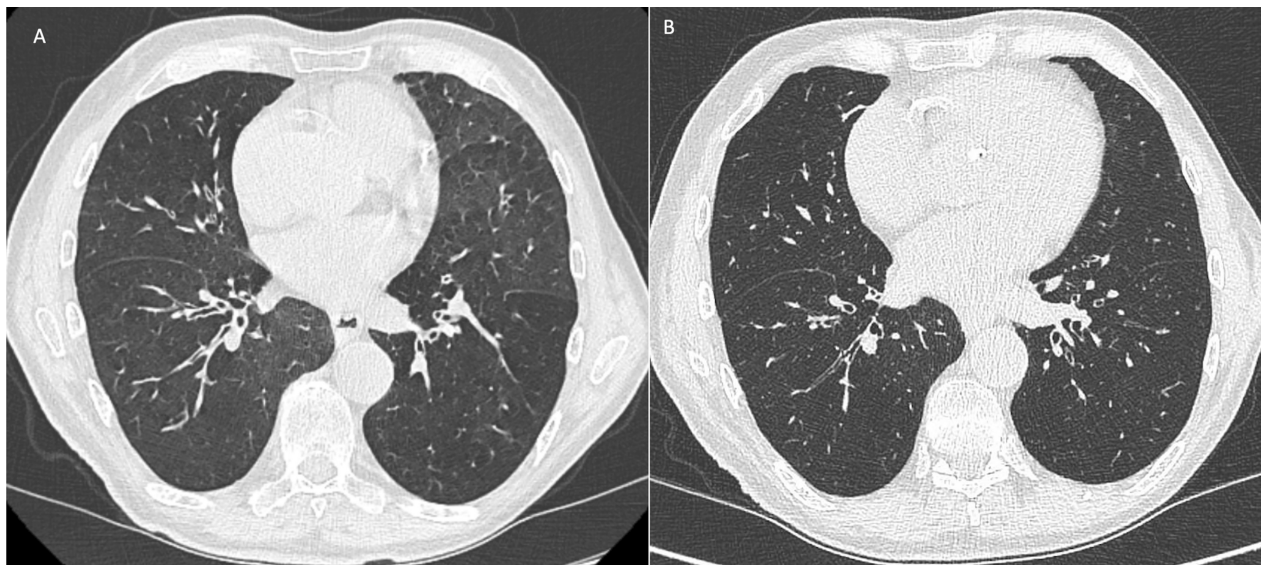


FIGURE 1 | Chest computed tomography demonstrating: (A) diffuse bronchial wall thickening with mucous plugging and (B) improvement after treatment.

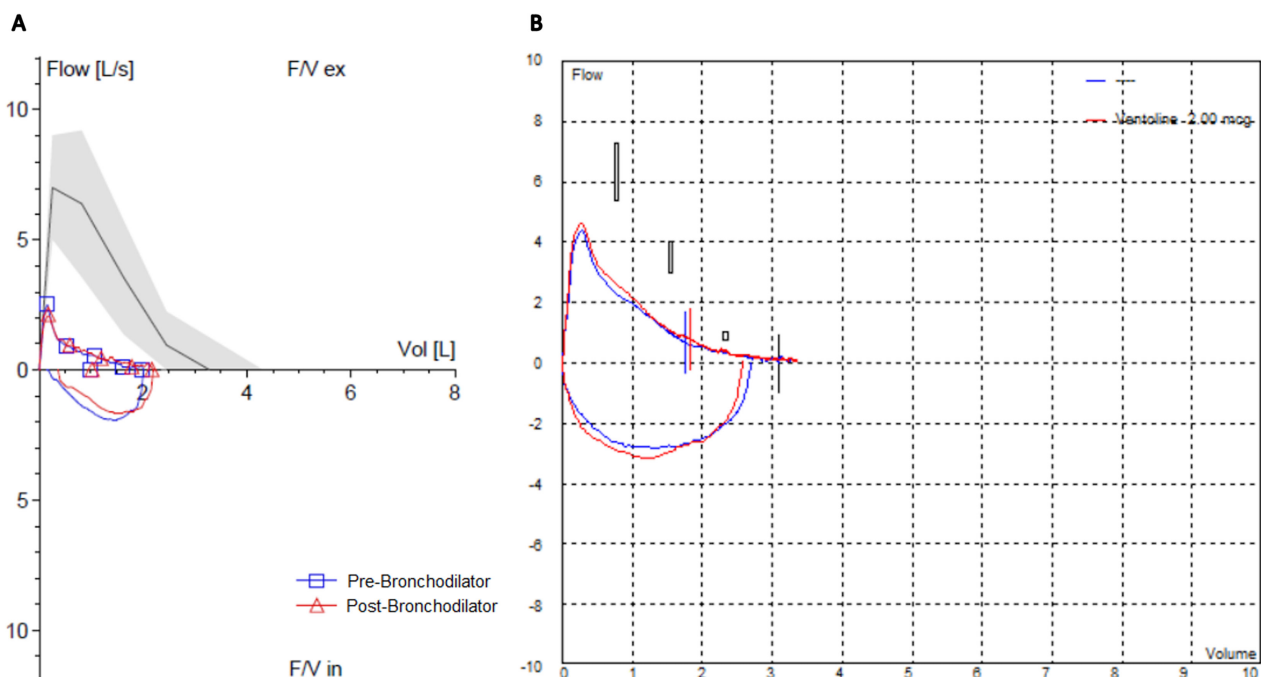


FIGURE 2 | Flow-volume curves showing: (A) severe obstructive defect and (B) improvement after treatment.

were positive for aspergillus IgE but negative for aspergillus immunoglobulin G. Other immunoglobulin levels were normal.

Based on the clinical gestalt, obstructive spirometry and the absence of structural lung disease, a provisional diagnosis of asthma was made. The patient was treated for a month with a moderate dose of oral prednisolone (37.5 mg daily for 2 weeks, then 25 mg daily for 2 weeks). An inhaled corticosteroid (ICS) and long-acting beta agonist (LABA) combination was started twice daily (budesonide 400 µg/formoterol 12 µg).

Follow-up review after 6 weeks demonstrated a dramatic response with absence of breathlessness, cough, or sputum production. Spirometry showed marked improvement (Figure 2B) with FEV₁ 70% (1.76 L) of predicted values, FVC 99% of predicted values (3.32 L) and FEV₁/FVC ratio 0.53. Fractional exhaled nitric oxide values were normal (17 parts per billion—ppb). Repeat CT chest imaging found improvement in bronchial wall thickening and mucous plugging following 6 weeks treatment (Figure 1B). The patient reported: ‘after being crippled by this illness my quality of life has hugely improved. I can now again do everything I want and have no breathlessness or chest issues’.

In summary, a dramatic response to appropriate treatment confirmed a diagnosis of very late-onset severe Type-2 asthma. After 12 months, the patient remains asymptomatic on treatment with inhaled ICS/LABA treatment.

3 | Discussion

The aim of the current report is to remind physicians that asthma can present at an advanced age. The notion that asthma can affect older individuals was often not recognised in the past, and many challenges exist in the detection and treatment of asthma in the elderly. Although this report does not detail a novel disease scenario, it provides a timely reminder for physicians to consider this diagnosis in older patients.

Whilst the peak incidence of asthma in young boys and middle-aged women is well recognised [3], prevalence in an older population has been shown to be equally high [1, 2]. According to self-reported data in the 2022 Australian Bureau of Statistics (ABS) National Health Survey (NHS), around 2.8 million (11%) people in Australia were estimated to be living with asthma [1]. Of this group, a significant portion was aged 65 years or older (23.6%). Asthma mortality significantly increases after the age of 70, and contributing factors are frequent mis- or non-diagnosis, insufficient diagnostic assessment, and subsequent under-treatment of asthma.

There are many challenges to the recognition and treatment of asthma in the elderly. Clinical presentations are often atypical and may be complicated by comorbid conditions common in older age. Breathlessness can be attributed to cardiac disease, functional decline, or a history of smoking in the past. A portion of elderly asthmatic patients will also consider respiratory symptoms as being ‘normal’ and associated with aging [2]. This misconception, along with other factors, adds to the complexity and challenge of a correct and swift diagnosis in this group.

Pathophysiology may be different in this age group, with a predisposition to endobronchial infections with more neutrophilic airway inflammation and severe airway obstruction [4].

A diagnosis of asthma made in this patient does not strictly adhere to GINA and other guidelines. However, whilst there was no significant bronchodilator reversibility on initial spirometry, the patient had some symptoms consistent with asthma (breathlessness was the chief complaint) coupled with a clear obstructive abnormality (FEV₁/FVC ratio 43%) and evidence of Type 2 inflammation. A bronchial provocation test was considered but not pursued due to safety concerns and a very low FEV₁ (39% predicted). It was therefore deemed reasonable to consider a trial of asthma treatment, and systemic steroids and ICS were initiated. This resulted in complete resolution of symptoms and a dramatic improvement in FEV₁ (from 39% to 70% predicted). The case therefore shows a significant improvement in FEV₁ after a 4-week period of treatment, indicating variable expiratory airflow limitation that supports the diagnosis of asthma in accordance with GINA guidelines. It is a single case, but based on this reasoning, it should be considered that GINA guidelines for diagnosis could be adapted to take into account the clinical presentation and overall pre-test probability of asthma as the likely diagnosis.

As demonstrated in this patient, asthma symptoms in the elderly can be atypical and overlap with other differential diagnoses. Classical asthma symptoms such as episodic wheezing, shortness of breath, and chest tightness may be absent. Moreover, breathlessness is not an uncommon complaint in advanced age and may be attributed to chronic obstructive pulmonary disease, cardiac failure, aspiration, malignancy, or infections. Initially, the patient was worked up closely for infection and found a single positive sputum culture for non-tuberculous mycobacterium (*M. abscessus*). However, this was likely a contaminant and not clinically significant given his resolution of symptoms without further antibiotic treatment. Other diagnoses, including Immunoglobulin G4-related disease, sarcoidosis and Allergic Bronchopulmonary Aspergillosis, were all highly unlikely given the overall clinical picture, radiological changes, and response to treatment. CT chest imaging was useful to exclude other pathologies such as bronchiectasis and to follow the progress of an unusual clinical presentation.

Combined with the difficulties of an asthma diagnosis in the elderly, effective management in this population can be equally complex. Comorbidities associated with asthma increase with age and can affect asthma control [5] with conditions such as cardiac disease, obstructive sleep apnoea, gastro-oesophageal reflux disease and chronic rhinosinusitis potentially interfering with effective therapy. Other barriers to successful therapy include medication side effects, reduced adherence, poor inhaler technique, memory impairment and economic difficulties [2]. A multidisciplinary approach that considers the various aspects of pharmacotherapy, education and comorbid conditions is integral to effective asthma treatment in the elderly [6].

In summary, asthma may masquerade as an infection or other chronic cardiorespiratory disorders in older people. It is important to consider late age-onset asthma in the differential diagnosis and to perform appropriate diagnostic testing, particularly

spirometry, to facilitate an accurate and timeous diagnosis of a treatable condition.

Author Contributions

H.S.: writing, editing and final preparation of manuscript. **A.M.:** review, editing and final preparation of manuscript. **P.G.B.:** conception and design of the case report and final review of the manuscript.

Ethics Statement

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

Conflicts of Interest

P.G.B. is an Editorial Board member of Respiratory Case Reports and a co-author of this article. He was excluded from all editorial decision-making related to the acceptance of this article for publication.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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