Case Report

Journal of the Royal Society of Medicine Open;
13(10) 1–2
DOI: 10.1177/20542704221124013

# A rare infective cause for recurrent exacerbations and poor asthma control – *Mycobacterium kumamotonense*

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Infective causes of airway obstruction should be investigated during the management of asthmatic patients with recurrent exacerbation and uncontrolled symptoms.

## Case report

A 74-year-old retired scientist presented with recurrent exacerbations following coryzal illnesses on a background of late-onset asthma. Each infection took over a month to resolve requiring repeated courses of antibiotics and steroids. There was only minimal exposure to cigarette smoke or environmental pollution and her total IgE test was normal. She reported well-preserved exercise tolerance, riding her horse regularly, despite dynamic lung function testing confirming forced expiratory volume in 1 s (FEV1) of 43% of predicted. Two chest x-rays showed lung hyperinflation but no parenchymal infiltrates. Skin prick testing to common aeroallergens confirmed moderate responses to house dust mite, cat and horse dander (3 × 3 mm). She experienced a modest response to the addition of an inhaled long-acting beta 2 agonist to her inhaled corticosteroid regimen, with clinical and spirometric improvement but no additional improvement with a leukotriene antagonist. Sputum was sent for conventional and mycobacterial culture because of the increased infection frequency. Two out of three sputum cultures grew *Mycobacterium kumamotonense*, a member of the *M. terrae* complex at five weeks. Drug sensitivity testing (DST) confirmed sensitivities to amikacin, clarithromycin, linezolid and ethambutol with resistance to moxifloxacin and rifampicin. The patient was treated for two years with a combination of rifampicin (four months until DST results were known), clarithromycin and ethambutol, after computed tomography of the thorax demonstrated widespread 'tree in bud' pattern of small airways inflammation. Treatment was well tolerated with initial weight gain. She has remained stable symptomatically, with radiological improvement and has been culture negative for two years since completing treatment.

## Discussion

The primary goal of asthma management is controlling the symptoms of an asthmatic patient. However, despite adequate asthma therapy, some patients remain uncontrolled. During the management of uncontrolled asthmatic patients, a review should be conducted in which the asthma diagnosis is reconfirmed and other possible differential diagnoses for airway obstruction are explored further. In this case report, we present a patient with uncontrolled asthma that was, after further evaluation, revealed to be complicated by infection with *Mycobacterium kumamotonense*, a slowly growing nontuberculous mycobacteria (NTM).

*Mycobacterium kumamotonense* is one of the 245 distinct mycobacterium species that are recognised to date.[1] It was first discovered in 2006, based on a single strain isolated from a sputum sample from an immunocompetent patient.[1] It belongs to the *M. terrae* complex as it presents the distinctive 14-nucleotide insertion in the 16S rRNA gene. It has recently been reclassified as *Mycolicibacter kumamotonensis*.[2]

The first case report of *M. kumamotonense* was published in 2010, in an immunocompetent HIV patient with disseminated lymphadenopathy.[3] Clinically, cases are characterised by respiratory symptoms with computed tomography demonstrating nodular changes, cavities, and bronchiectasis; occasionally *M. kumamotonense* may cause extra-pulmonary disease.[2,4] Having said that, these characteristics are not strongly established due to the limited number of cases reported. The first-line treatment of NTM is a combination of clarithromycin, azithromycin, rifampin, rifabutin, ethambutol, streptomycin, and amikacin.[5] However, cases are frequently resistant to first-line therapies and as a result, cause chronic disease if not identified early.

An increasing number of NTM isolates are being identified in UK clinical practice with many uncertainties around the management of pulmonary diseases caused by these bacteria.[6] NTM are a group of environmental bacteria commonly isolated from soil, water, animals

and food products, meaning we all come into daily contact with them in our lives. The identification of NTM species has been enhanced over the past few years with the introduction of molecular biology techniques. Currently, NTM is diagnosed via a sputum sample, or fibre-optic bronchoscopy if patients are non-productive.

NTM can cause a wide variety of lung infections, among these, pulmonary disease is the most common manifestation. The infections commonly occur in individuals who are immunodeficient or have long-term respiratory conditions such as COPD, cystic fibrosis and pulmonary fibrosis. The pathophysiology of NTM is unclear and some patients have been reported to carry the bacteria without any symptoms. In primary care, it is important to think about NTM in patients with chronic lung conditions who are sub-optimally controlled despite maximal inhaled therapies.

NTM species differ strongly in terms of clinical relevance, with a spectrum ranging from pathogenic species to typical saprophytes. NTM infections often take some time to diagnose as symptoms are similar to those of more common bacterial lung infections: cough, fever, weight loss or anorexia, shortness of breath and night sweats with the differentiating factor being the persistence of symptoms despite initial treatment for more common infections.

Chest physiotherapy and regular exercise can help eliminate NTM infections without treatment. However, patients with continuous symptoms may be given a combination of several antibiotics for 18 to 24 months. NTM species also have varying optimal treatment regiments with major variation between slowly and rapidly growing species. As a result of these differences in clinical relevance and specific treatment regimens, accurate identification of these species is of the highest importance. Lastly, service optimisation and a multidisciplinary working approach can improve the quality of care for patients with pulmonary diseases caused by NTM.[7]

**Declaration of Conflicting Interests:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding:** The author(s) received no financial support for the research, authorship, and/or publication of this article.

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