Rare disease

Pneumonia caused by *Mycobacterium smegmatis* in a patient with a previous gastrectomyMichael Driks,¹ Frank Weinhold,² Quintin Cokingtin³¹Infectious Disease Associates of Kansas City, Kansas City, Missouri, USA;²Department of Pharmacy, Menorah Medical Center, Overland Park, Kansas, USA;³Metropolitan Pulmonary and Hospital Medicine, Lee's Summit, Missouri, USA

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Summary

Mycobacterium smegmatis pneumonia is rare, with only five cases reported in literature. The authors report a case in an adult male with a history that includes total gastrectomy. A transbronchial biopsy revealed non-caseating granuloma. Broncho-alveolar lavage culture identified *M smegmatis*. This case meets all 2007 American Thoracic Society criteria for the diagnosis of atypical mycobacterial pneumonia. The patient responded to a long course of trimethoprim/sulfamethoxazole and ciprofloxacin.

BACKGROUND

Mycobacterium smegmatis is a rapidly growing mycobacteria, first described in 1884 by Lustgarten¹ in syphilitic chancres and smegma and then in 1885 by Alvares¹ in genital secretions, but never recovered from the genitourinary tract in modern microbiology. *M smegmatis* is similar to *Mycobacterium fortuitum* but can be distinguished by various growth characteristics, biochemical markers and a unique genetic pattern.

M smegmatis was not felt to be a human pathogen until Vonmoos² described a pneumonic infection complicating lipoid pneumonia in 1986. Wallace added 21 cases to the literature by determining that some *M fortuitum/fortuitum*-like isolates were actually *M smegmatis*.¹ Human infection with *M smegmatis* is uncommon with most case reports involving skin and soft tissue, surgical site or catheter-related infection. *M smegmatis* pneumonia is rare, with only five cases reported in literature^{1–5} (table 1).

CASE PRESENTATION

A 63-year-old male with a 7-month history of drenching sweats and a productive cough was admitted with chest discomfort and dyspnoea. Medical history included total gastrectomy 4 years earlier for a rapidly enlarging adenomatous polyp with dysplastic features. Chest x-ray revealed bilateral upper lobe nodules and lingular infiltrates (figure 1). Chest CT angiography confirmed nodular infiltrates and a spiculated left lung mass (figure 2). Bronchoscopy revealed no endobronchial lesions. A left

upper lobe transbronchial biopsy revealed non-caseating granuloma with negative stains for organisms. Broncho-alveolar lavage cultures turned positive for acid-fast organisms at day 10, subsequently identified as *M smegmatis* by the Missouri State Laboratory and confirmed by National Jewish Hospital. Susceptibilities revealed the organism to be sensitive to amikacin, amoxicillin/clavulanate, ciprofloxacin, doxycycline, imipenem, linezolid, tigecycline, tobramycin, trimethoprim/sulfamethoxazole (TMP/Sulfa) and ciprofloxacin, intermediate to cefoxitin and resistant to azithromycin and clarithromycin.

TREATMENT

The patient received a brief course of empiric doxycycline and ciprofloxacin, then switched to TMP/Sulfa and ciprofloxacin due to nausea and vomiting. Symptoms completely resolved within a few months. Based on clinical and radiographic response, antibiotic therapy was continued for 14 months.

OUTCOME AND FOLLOW-UP

Follow-up chest CT angiogram at 13 months revealed marked diminution of the bilateral upper lobe nodules and lingular mass (figure 3). The patient continues to be symptom free 6 months off antibiotics.

DISCUSSION

Like many atypical mycobacteria, *M smegmatis* is susceptible to many antibacterial antibiotics and resistant to

Table 1 Summary of literature

	Age	Gender	Comorbidity	Rx	Outcome
Vonmoos 1986	–	–	Lipoid pneumonia	Doxy, ETB, T/S	Recovered
Wallace 1988	56	M	Lipoid pneumonia	–	–
Cox 1994	17	M	Lipoid pneumonia	Cipro, Amik, Doxy, Imip	Recovered (>15 mos Rx)
Kumar 1995	6 weeks	–	None	PAS/ETB	Died
Ergan 2004	70	M	None	Doxy, Cipro ×3 mos	Recovered

Figure 1 Chest x-ray pretreatment.

Figure 2 CT chest angiogram pretreatment.

Figure 3 CT angiogram post-treatment.

most antimycobacterial antibiotics but is distinguished by its resistance to macrolides and its sensitivity to ethambutol.

Three of the five cases reported in literature occurred in patients with lipoid pneumonia. Three of four cases, for which outcomes were reported, survived. The lone death occurred in a 6-week-old infant treated with pyrazinamide and ethambutol for presumed *Mycobacterium tuberculosis*. The preferred treatment for *M smegmatis* pneumonia is unknown but an extensive course (3 to >15 months) with two or more active antibiotics appears to be effective. Literature review identified an additional five instances of *M smegmatis* respiratory isolates; however, no clinical data were available, raising questions about colonisation versus pathogenicity.

The current case is well documented, including lung biopsy, and meets all 2007 American Thoracic Society (ATS) criteria for the diagnosis of atypical mycobacterial pneumonia.⁶ It is the first reported case to occur in a gastrectomised host. Gastrectomy and/or hypochlorhydria has been associated with a variety of pneumonic syndromes, including ventilator-associated pneumonia, non-ventilator hospital-acquired pneumonia and community-acquired pneumonia.¹ In addition, gastrectomy has long been recognised as a risk factor for *M tuberculosis*. Snider reviewed multiple observational studies between 1927 and 1977 with 1.7–12% of tuberculosis patients found to have previous gastrectomy and 0.4–5% of gastrectomised patients developing tuberculosis over 1–16 years. The latest Centers for

Disease Control and Prevention core curriculum on tuberculosis continues to list gastrectomy as a risk factor for the reactivation of latent tuberculosis. The relationship of gastrectomy to the development of *M smegmatis* pneumonia in our patient is speculative, but intriguing.

In summary, *M smegmatis* pneumonia is rare and seemingly associated with lipoid pneumonia. *M smegmatis* should be considered for any rapidly growing mycobacterial isolate and laboratories should distinguish between *M fortuitum* and *M smegmatis*. The significance of pulmonary isolates should be guided by the clinical picture and the 2007 ATS criteria. Though no specific antibiotic recommendations can be made, treatment should include at least two active agents for at least 3 months.

Competing interests None.

Patient consent Obtained.

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Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Driks M, Weinhold F, Cokingtin Q. Pneumonia caused by *Mycobacterium smegmatis* in a patient with a previous gastrectomy. *BMJ Case Reports* 2011; 10.1136/bcr.08.2010.3281, date of publication

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