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Letters

Letters commenting on recent articles as well as letters reporting cases, outbreaks, or original research are welcome. Letters commenting on articles should contain no more than 300 words and 5 references; they are more likely to be published if submitted within 4 weeks of the original article's publication. Letters reporting cases, outbreaks, or original research should contain no more than 800 words and 10 references. They may have 1 Figure or Table and should not be divided into sections. All letters should contain material not previously published and include a word count.

Pulmonary *Streptomyces* Infection in Patient with Sarcoidosis, France, 2012

To the Editor: *Streptomyces* spp. are aerobic, gram-positive bacteria of the order Actinomycetales, known for their ability to produce antimicrobial molecules such as streptomycin. *Streptomyces* spp., usually saprophytic to humans, can cause local cutaneous fistulized nodules known as actinomycetoma or mycetoma. Severe invasive infections have seldom been reported, but most cases reported have occurred in immunocompromised patients (*1–5*). We report a case of invasive pulmonary infection caused by a *Streptomyces* sp. in a splenectomized patient with sarcoidosis.

In 2003, multiorgan sarcoidosis was diagnosed in a man, 57 years of age; the disease involved lungs, skin, joints, and lymph nodes. Corticosteroids were initially given but quickly discontinued because of a severe psychiatric reaction. In 2007, a splenectomy was performed on this patient to remove an intestinal obstruction caused by a severely enlarged spleen, identified as a specific localization of sarcoidosis.

In April 2008, the patient was admitted to the internal medicine unit of Saint-André Hospital in Bordeaux, France with fever (38.9°C/102°F), progressive asthenia, anorexia, weight loss, productive cough, and New York Heart Association grade III dyspnea. Bilateral basal crackles could be heard in the lungs; physical examination findings were otherwise within normal limits. Biological tests showed inflammatory syndrome with elevated C-reactive protein (74 mg/L, reference value <5 mg/L) without any other consequential abnormality. Gamma globulin levels were normal. A chest radiograph showed bilateral interstitial infiltrate. A computed tomogra-

phy scan of the chest confirmed an interstitial micronodular infiltrate with thickening of the peribronchovascular interstitium, associated with paratracheal and left anterior mediastinal supracentimetric lymph nodes.

To determine whether this infiltrate was linked to sarcoidosis, tuberculosis, or another opportunistic infection, bronchoscopy and bronchoalveolar lavage (BAL) were performed and showed multiple submucous nodules of the left superior bronchus. Biopsy samples contained epithelioid granulomas and a nonspecific, amorphous eosinophilic material without focal necrosis, but no bacteria, by using periodic acid–Schiff, Ziehl–Neelsen, and auramine-rhodamine stains. BAL culture isolated a *Streptomyces* sp. (2×10^5 CFU/mL) but no other pathogens.

Treatment with intravenous imipenem (2 g/day for 14 days) and amikacin (1 g/day for 3 days) was initiated. After antimicrobial susceptibility tests, the treatment was changed to oral rifampin (1.2 g/day) and ciprofloxacin (1.5 g/day) for 6 months. After 3 days of treatment, clinical signs and symptoms resolved; a thoracic computed tomography scan performed 6 months later showed complete regression of pulmonary infiltrates. Bronchoscopy at that time showed no nodules, and BAL culture showed no pathogens.

Streptomyces spp. are widespread environmental bacteria that rarely cause severe invasive infections. During our literature search, we found 21 cases of invasive *Streptomyces* infections, including 8 pulmonary infections. A contributing factor was found for all cases: immunosuppression linked to HIV infection (*1*), antineoplastic chemotherapy (*2*), Crohn disease (*3*), use of oral (*4*) or inhaled corticosteroids (*5*), and presence of foreign material such as a central venous catheter (*6*) or a prosthetic aortic valve (*7*).

Specific features of pulmonary *Streptomyces* infection are summarized in the online Technical Appendix Table (wwwnc.cdc.gov/EID/pdfs/12-0797-Techapp.pdf). Death related to such an infection is mostly dependent on the underlying disease associated with *Streptomyces* infection. Deaths have not been linked to *Streptomyces* infections described in the literature when *Streptomyces* sensibility testing was performed and treatment length recommendations were followed.

To understand how the patient was infected with a *Streptomyces* sp., we explored 2 possibilities. First, sarcoidosis induces immune deficiency (*8*). This phenomenon is clinically well known as anergy to tuberculin or other immunogenic haptens after subcutaneous injections. Expansion of regulatory T lymphocytes (*8*) and attenuated myeloid dendritic cell functions (*9*) decrease cellular immunity efficiency and increase infectious episodes in affected patients. Second, splenectomy can increase susceptibility to infection, such as bloodstream infections with encapsulated bacteria or opportunistic infections with *Campylobacter jejuni*, *Pneumocystis jiroveci*, or *Babesia* spp. The lung infection with *Streptomyces* in the patient described was not acquired through the bloodstream, but through direct airway contact. However, we could not exclude other immune mechanisms not related to blood, such as dysregulation or lack of some lymphocyte populations.

A pathologic feature of pulmonary infections with *Streptomyces* spp. is the presence of granulomas sometimes associated with focal necrosis. This feature makes differentiating infection with these species from that of tuberculosis difficult. Bacterial culture is often used to confirm the diagnosis. Histologic differences between the 2 entities are not well defined because of the rarity of invasive *Streptomyces* infections. In our observation of this patient, histologic examination revealed granulomas potentially linked to sarcoidosis and a nonspecific, amorphous eosinophilic material that was not caseous necrosis. Both lesions could have also resulted from the *Streptomyces* infection. For further identification, Dunne et al. added the presence of sulfur granules to the specific histological description of *Streptomyces* infection (*1*).

An overall literature review for results of in vitro testing for *Streptomyces* spp. identified a common susceptibility to aminoglycosides, macrolides, imipenem, or trimethoprim/sulfamethoxazole. This finding suggests that the first-line treatment against invasive *Streptomyces* infections should begin with imipenem and aminoglycosides for at least 6 weeks (online Technical Appendix Table). Quinolones have an immunomodulatory effect that might be therapeutic in patients with disease-induced immunosuppression such as sarcoidosis or after splenectomy (*10*). In conclusion, invasive *Streptomyces* infection of the lungs should be included in differential diagnoses of interstitial pneumonia in immunocompromised patients.

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Pneumonia after Earthquake, Japan, 2011

To the Editor: The earthquake that occurred in Japan on March 11, 2011, triggered an extremely destructive tsunami (*1*), which destroyed cities along the Pacific coastline in the Tohoku area and resulted in the loss of >19,000 human lives. Water from the tsunami inundated ≈33.7% of Tagajo City (population ≈61,000) and caused 188 deaths. Many local residents were left without lifeline utilities, including electricity, gas, water, or any means of transportation and thus were forced to live in crowded shelters or limited small spaces (e.g., the upper floor of their home); ≈11,000 persons were displaced from their damaged or destroyed homes to crowded school gymnasiums or community centers. In March, the mean daily maximum air temperature in Tagajo City was cold (8°C/46.4°F). After the earthquake, cases of pneumonia increased rapidly.

Saka General Hospital is located in this region near the coast. The destruction around the hospital was so severe that persons were without electricity, water, gas, and fuel for several weeks. Fortunately, the hospital laboratory was almost completely functional and could perform bacterial and other tests at a near-normal level, despite the earthquake. However, several other hospitals in the area were severely damaged and thus had difficulty treating patients with severe pneumonia.

To determine the characteristics of pneumonia after the earthquake, we conducted a retrospective study of patients who had pneumonia during the 6 weeks before the earthquake and the first 9 weeks after the earthquake. To identify patients with pneumonia, we checked all chest radiographs and computed tomography scans of adult patients (>16 years of age) who had visited the hospital. We examined clinical and bacteriologic data for these patients. We excluded from the study patients without sputum culture and patients with other conditions, such as lung cancer, pulmonary infarction, or cardiac failure.

During the 6 weeks before the earthquake, pneumonia had been diagnosed for 49 adults (controls), and within the 9 weeks after the earthquake, community-acquired or health care–associated pneumonia was newly diagnosed for 172 adults. Patient data from 2 pre-earthquake periods and 3 postearthquake periods are shown in the Table. Although the number of patients with pneumonia in the first 3 weeks after the earthquake increased sharply, no substantial differences were noted in mean age, death rates, or underlying concurrent conditions among these patients. The interval between the onset of respiratory signs and symptoms and a diagnosis of pneumonia did not increase after the earthquake. The proportion of patients who received antimicrobial drugs before the diagnosis of pneumonia (premedication) in the early postearthquake period did not differ significantly. The number of patients with pneumonia peaked in the first 3 weeks after the earthquake, followed by a gradual decrease starting from 4 weeks after the earthquake.

Chest radiographs were taken and hematologic examinations were performed for all patients; computed tomography of the chest and rapid diagnostic tests for influenza were performed for 42.2% and 54.2% of 83 patients, respectively, who had pneumonia in the early postearthquake period. During the first 3 weeks after the earthquake, *Haemophilus influenzae* and *Moraxella catarrhalis* were more predominant than *Streptococcus pneumoniae*; most strains were isolated from purulent sputum specimens. In contrast, pneumonia caused by enterobacteria, staphylococci, or atypical pathogens did not increase after earthquake.

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Pulmonary *Streptomyces* Infection in Patient with Sarcoidosis, France, 2012

Technical Appendix

Table. Pulmonary *Streptomyces* infection in a patient with sarcoidosis and case-patients studied in review of literature, France, 2012

Age, y/sex	Contributing factor	Fever	Results of chest CT scan	Diagnosis	*Streptomyces* sp.	Antibacterial treatment	Treatment duration, wks	Reference
57/M	Sarcoidosis, splenectomy	Yes	Micronodular interstitial infiltrate with mediastinal supracentimetric lymph nodes	BAL/culture	Unknown	Imipenem and amikacin, then rifampin and ciprofloxacin	24	This case
43/M	HIV infection for 8 y	Yes	Multiple lung nodules	Lung biopsy specimen	Unknown	Ceftriaxone, then TMP/SMZ, then clarithromycin	>24	Dunne et al. (*1*)
21/F	AML/chemotherapy	No	Multiple lung nodules	Fine-needle aspiration/culture	*maritimus or olivaceus*	Minocyclin and clarithromycin and moxifloxacin	2 (died)	Kapadia et al. Case 1 (*4*)
23/F	SLE/corticosteroids	No	Lung nodule and mediastinal lymph nodes	Lung biopsy specimen	*albus*	None (surgery: excised nodule)	NA	Kapadia et al. Case 2 (*4*)
18/M	Burkitt lymphoma/ chemotherapy	No	Multiple lung nodules	Lung biopsy specimen	Unknown	None (surgery: excised nodule)	NA	Kapadia et al. Case 6 (*4*)
52/F	Inhaled corticosteroids	Yes	Multiple alveolar-type limited fibrotic lesions and bronchiectasies	BAL/culture	*lanatus*	Ceftriaxone, then TMP/SMZ, then clarithromycin	24	Kofteridis et al. (*5*)
35/M	HIV infection	Yes	Alveolar-type infiltration	Sputum sample, BAL/culture	Unknown	Piperacilline and tazobactam, then imipenem	Unknown	Ahmed et al. (*11*)
30/M	HIV infection	Yes	Multiple lung nodules in an interstitial infiltrate	BAL/culture	Unknown	Cefuroxim and amikacin, then amoxicillin and clavulanate	6	Caron et al. (*12*)
50/M	None	Yes	Alveolar-type infiltration	Blood cultures	Unknown	Penicillin, sulfasalazine, streptomycin, aureomycin, and terramycin	6	Kohn et al. (*13*)

*CT, computed tomography; TMP/SMZ, trimethoprim/sulfamethoxazole; AML, acute myeloid leukemia; SLE, systemic lupus erythematosus; NA, not applicable; BAL, bronchoalveolar lavage.

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