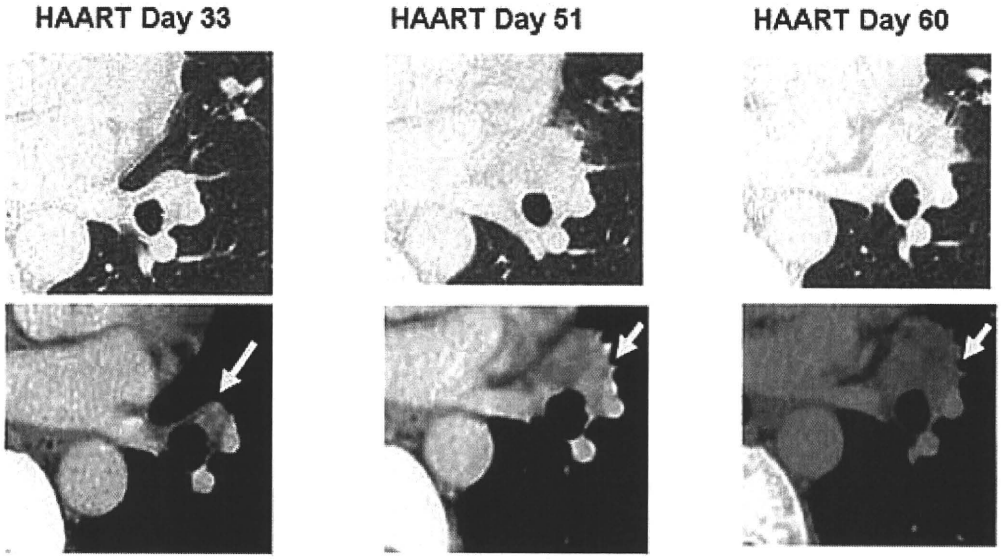
Inter Med 49: 1817-1821, 2010 DOI: 10.2169/internalmedicine.49.3616



	Dec '08	Jan '09	Feb '09	Mar '09
The day after HAART			HAART Day 15	HAART Day 43
CD4	9/μL	5/μL	42/μL	97/μL
HIV-RNA(copies/mL)	1.28×10^5	2.14×10^5	3.00×10^2	7.27×10^1

Figure 2. Lymphadenopathy which contained a low density area rapidly enlarged, paralleling the increase of CD4. Ground-glass opacity (GGO) is seen near the lymphadenopathy.

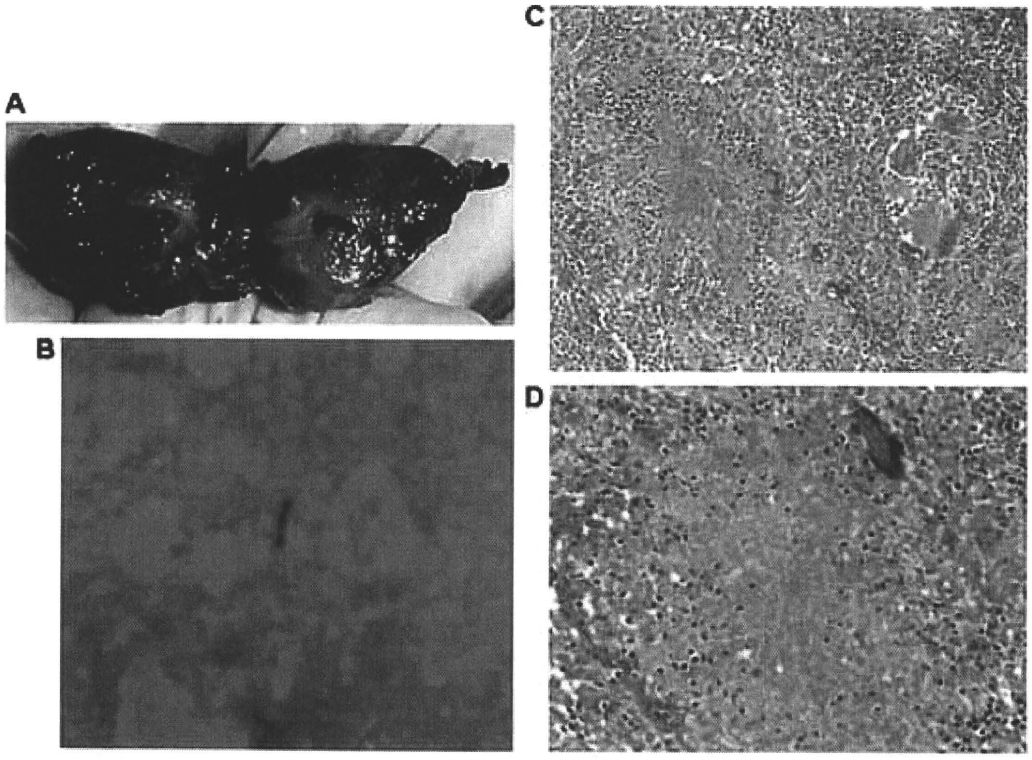


Figure 3. A: Section of segment 5 obtained by thoracoscopy. Small nodular necroses are detected. B: Acid-fast bacilli are seen in the necrotic lymphadenopathy (Ziehl-Neelsen stain, ×1000). C: Histology of the lung. There are capsulated epithelioid cell granulomas with caseous necrosis and giant cells around the granuloma (Hematoxylin and Eosin staining, ×100). D: Epithelioid cell, caseous necrosis, and giant cells are observed (Hematoxylin and Eosin staining, ×200).

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due to *M. avium* complex (MAC) or NTM, but this case had negative blood cultures indicating that this infection was a localized lesion. To diagnose the cause of lymphadenopathy, thoracoscopic surgery was performed and acid-fast bacilli were confirmed by the fluorescent staining. A part of left lung segment 5, which showed atelectasis, was also resected. Macroscopically, the resected lung showed atelectasis with a small nodular necrosis (Fig. 3A). Pathological findings demonstrated that the lymphadenopathy contained necrotic material and epithelioid cells. In addition, a Ziehl-Neelsen stain of the lymph node demonstrated acid-fast bacilli (Fig. 3B). In the lung, tissue sections were stained with Hematoxylin and Eosin (HE), and capsulated epithelioid cell granuloma with caseous necrosis and Langhans-type giant cells around granuloma were observed (Fig. 3C, D). Based on these findings, the cause of lymphadenopathy was diagnosed to be IRIS of mycobacterial infection.

Table 2. Minimum Inhibitory Concentration

antibiotics	MIC(mg/mL)
AMK	16
CAM	0.125
EB	>128
TH	16
INH	>32
KM	32
RFP	0.125
SM	8
LVFX	4

AMK, amikacin;CAM, clarithromycin; EB, ethambutol; TH, ethionamide; INH, isoniazid; KM, kanamycin; RFP, rifampicin; SM, streptomycin; LVFX, levofloxacin

PCR for *M. tuberculosis* and MAC and DNA-DNA hybridization (DDH) assay could not identify the pathogen of the IRIS. Then, 16S rRNA assay (2), rpoB assay (3), and hsp65 sequence analysis (4) were performed. *M. fortuitum*, *M. parascrofulaceum*, *M. saskatchewanense* and *Mycobacterium* sp. were nominated by the 16SrRNA assay. A database was not available for the rpoB. Hsp65 sequence analysis was in accordence with *M. parascrofulaceum* (99%) but denied *M. fortuitum*. The hsp65 sequence of *M. saskatchewanense* showed that the rate of concordance was low (96%), and therefore, *M. saskatchewanense* was denied. Finally, this organism was considered to be *M. parascrofulaceum*. Antimicrobial susceptibility test showed that this organism was susceptible to clarithromycin, rifampicin and levofloxacin (Table 2).

Ten-months after the operation, there has been no recurrence of *M. parascrofulaceum* infection and chemotherapy has not been administered.

Discussion

M. parascrofulaceum is classified as Group II by the Runyon classification because this organism is scotochromogenic and slow growing (1, 5). Genotypically, the organism is most closely related to *M. simiae*. However, it presents a similar phenotypic profile to *M. scrofulaceum* (1). Growth was observed from 25℃ to 37℃, and optimum growth was observed at 37℃ (1).

Environmental mycobacteria are normal inhabitants of a wide variety of habitats, including natural and municipal water and soil (6). Their high innate resistance to chlorine and biocides in the water distribution system and their capacities for biofilm formation can explain their prevalence, and *M. parascrofulaceum* also has similar characteristics. *M. parascrofulaceum* has another characteristic in that it can grow in acidic condition and high temperature 56℃, and

Table 3. Review of Past Case Reports

Case	Age/ Sex	Base	CD4	Symptom	X-ray	Specimens isolated	Treatment	Outcome
1	41/F	Old TB	NA	Cough	cavity	Sputum	CAM, EB, RFP	Improved
2	35/M	AIDS	7	Chorea, Fever, Diarrhea	NA	Sputum	EB, RFB	Died 1 month later
3	40/M	AIDS	39	Fever	NA	Blood	No treatment	Died 6 month later
4	67/M	Malignancy, COPD	NA	NA	NA	Sputum	NA	NA
5	63/NA	bronchiectasis	NA	NA	cavity	Bronchial aspiration	INH, EB, RFP	Died 4 month later

TB, tuberculosis; COPD, chronic obstructive pulmonary disease; CAM, clarythromycin; EB, ethambutol; RFP, rifampicin; RFB, rifabutin; NA, not available

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can be found in the acidic hot springs of Yellowstone National Park (6). Thus, the infection route of *M. parascrofulaceum* was thought to be a hot spring or municipal water and soil.

M. parascrofulaceum was first termed by Turenne et al in 2004 and five cases have been reported up to date (Table 3). All five cases had underlying diseases: one was old tuberculosis, two were AIDS, another was malignancy and the fifth was bronchiectasis (1, 7). In fact, *M. parascrofulaceum* is an opportunistic pathogen, like many other nontuberculous mycobacterial species (1). Turenne et al suggested that rifampicin, clarithromycin, amikacin, linezolid and moxifloxacin are effective. However, to date, the outcome of *M. parascrofulaceum* infection was unclear and most of the reported cases died of infection. In the present study, it was suggested that rifampicin, clarithromycin and levofloxacin were effective in accordance with the previous report (1), and rifampicin, clarithromycin and new quinolones were the key drugs for this organism.

Because, the pathologic lesion of the lung and lymph node were clearly resected, and with HAART his immunity was strengthened sufficiently to overcome *M. parascrofulaceum*, therefore it was not necessary to use chemotherapy. That was the different compared to the past cases.

Cases of *M. parascrofulaceum* have been few. Our case report discusses the clinical course, methods for organism identification, susceptibility testing, and treatment.

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