BRIEF ARTICLES

Disseminated Cutaneous *Mycobacterium haemophilum* Infection and Concomitant Crusted Scabies in an Iatrogenically Immunocompromised Patient—A Case Report

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ABSTRACT

Mycobacterium haemophilum and crusted scabies are rare cutaneous diseases reported in distinct immunocompromised hosts. *M. haemophilum* is a skin and soft tissue infection, whereas crusted scabies is an infestation of the skin. Whereas scabies infestation is readily diagnosed, *M. haemophilum* infection poses a diagnostic challenge due to its rarity as well as varied clinical and histologic presentations. Although both scabies infestation and *M. haemophilum* have been reported in the literature separately, to our knowledge no previous reports have described these diseases occurring simultaneously in an iatrogenically immunosuppressed patient. We report herein a rare case of concomitant *M. haemophilum* and scabies infestation in a 38-year-old woman with dermatomyositis on multiple immunosuppressive agents.

INTRODUCTION

Mycobacterium haemophilum is a slow-growing nontuberculous mycobacterium that causes skin and soft tissue infections in immunocompromised hosts.[1] Between 1978 and 2010, fewer than 100 cases were reported.[2] Likewise, crusted scabies is a rare infestation with the *Sarcoptes scabiei* var *hominis* mite which occurs in immunocompromised patients.[3] While scabies infestation can be diagnosed with a scraping and direct microscopy, *M. haemophilum* infection poses a diagnostic challenge due to its broad clinical presentation, nonspecific histopathological findings, and culture requirements.[1,4] We report a case of concomitant *M. haemophilum* infection and scabies infestation in a 38-year-old woman on multiple immunosuppressive agents for dermatomyositis. This case highlights the unique presentation of two rare cutaneous diseases in an immunocompromised host, and aims to raise awareness regarding complications of immunosuppressive therapies.

CASE REPORT

A 38-year-old woman with history of dermatomyositis presented with erythroderma and a non-healing ulcer on her right hand. Her treatment regimen consisted of prednisone 20-60 mg daily, mycophenolate mofetil (MMF) 1500 mg daily, hydroxychloroquine 200 mg twice daily, and methotrexate (MTX) 15 mg weekly for multiple years without control of her disease. She was admitted to an outside hospital six times prior where she was given antibiotics for methicillin-resistant *Staphylococcus aureus* (MRSA) without improvement of her finger ulceration. She complained of severe pain and pruritus of her skin diffusely. The patient's husband reported recent treatment for scabies of himself and two sons, however, the patient was not treated.

Initial physical exam demonstrated erythroderma with significant scaling and crusting on the head, neck, trunk, and bilateral upper and lower extremities. Excoriated papulovesicles were present, and the right third finger had a five-centimeter ulceration with purulent exudate (Figure 1). She also had white patches on her posterior pharynx and tongue as well as superficial ulcerations on her buttocks without genital involvement. Cutaneous sensation was intact, and there was no proximal muscle weakness.

Laboratory studies demonstrated leukocytosis of 20.46 x 10^9/L with 30% eosinophils as well as an elevated C-reactive protein (CRP) of 5.84 mg/dl and an elevated erythrocyte sedimentation rate (ESR) of 70 mm/hr. Initial microbiology studies revealed oropharyngeal candidiasis, herpes simplex virus-2 from a gluteal ulcer, and MRSA from the right hand ulceration. Blood cultures were negative. HIV, hepatitis serologies, quantiferon gold, and rapid plasma reagin were negative. Rheumatologic workup including rheumatoid factor and autoantibodies were negative (anti-nuclear, double stranded DNA, Smith, ribonucleoprotein, Sjögren's-syndrome-related antigen A and B, histidyl tRNA synthetase, topoisomerase 1, and centromere). Creatine phosphokinase (CPK) was normal and aldolase was mildly elevated.

Skin biopsies revealed a deep dermal and subcutaneous noncaseating granulomatous dermatitis associated with numerous acid fast bacilli (Figure 2). In addition, there was a *Sarcoptes scabiei* mite identified. Polymerase chain reaction (PCR) studies for rapid-growing nontuberculous mycobacteria (NTM), *M. avium complex*, *M. tuberculosis, and M. leprae* were negative. Initial tissue cultures were negative, however, after eight weeks, cultures grew *M. haemophilum* confirmed by rpoB gene sequencing.

With the diagnosis of scabies infestation and mycobacterial infection and no evidence of active dermatomyositis, prednisone was slowly tapered. MTX, MMF, and hydroxychloroquine were held upon admission given the acute infection. The patient received multiple doses of oral ivermectin and topical permethrin for scabies infestation with clearance. Subcutaneous nodules became apparent, and biopsies of these nodules also revealed *M. haemophilum* (Figure 3). Her final antimicrobial regimen was clarithromycin, ciprofloxacin and rifampin, according to culture susceptibilities. At her two month follow up visit, the underlying erythroderma

had resolved and the nodules remained present, although improved. IVIG and plaquenil were initiated to treat her active dermatomyositis.

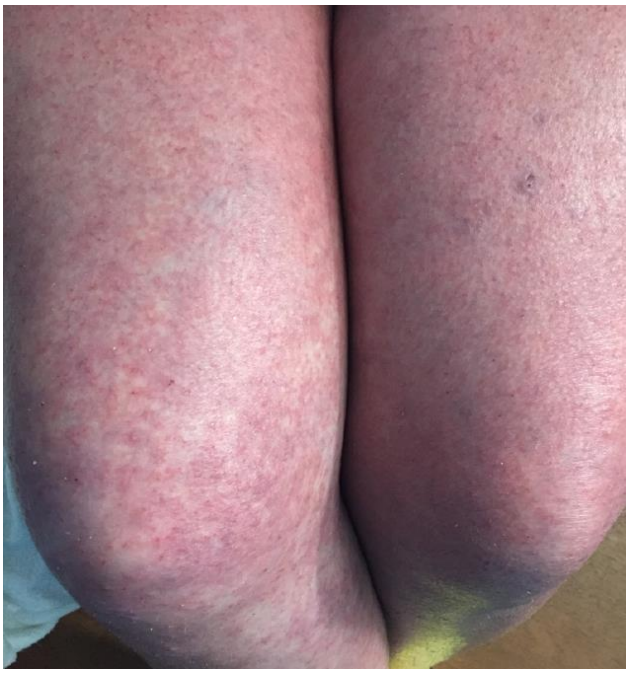

Figure 1. Confluent erythematous papulovesicles and plaques on the bilateral lower extremities.

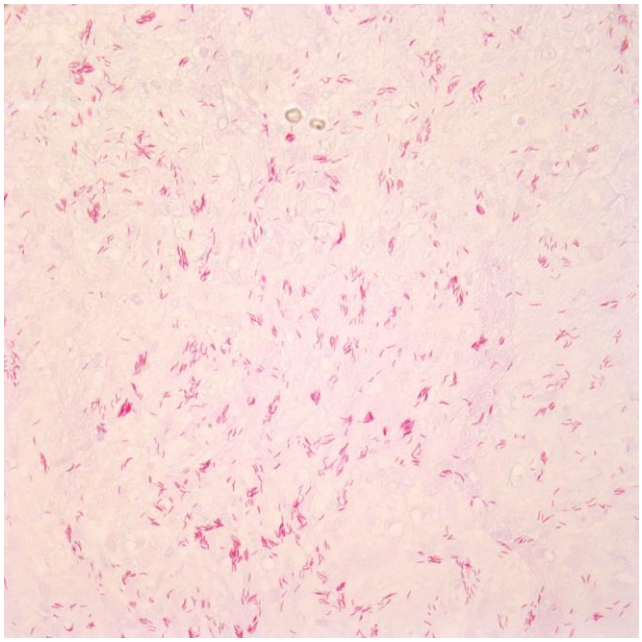

Figure 2. Numerous acid-fast bacilli (Fite stain, original magnification x400).

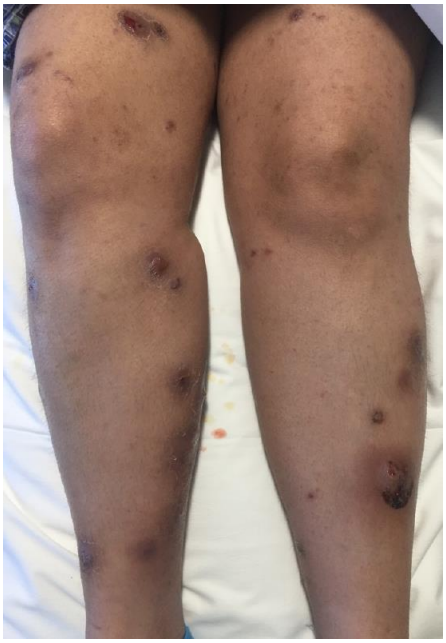

Figure 3. Subcutaneous nodules on the bilateral lower extremities.

DISCUSSION

M. haemophilum skin infections most commonly occur in immunocompromised patients.[1] There are few reported cases of *M. haemophilum* cutaneous infection in patients taking immunosuppressive agents other than for post-transplant immunosuppression. We identified 15 cases in the literature. Reported cases include patients who were on immunosuppressive medications for systemic lupus erythematous, rheumatoid arthritis, polymyositis, myasthenia gravis, autoimmune cirrhosis, cutaneous vasculitis, Sjogren's disease and Crohn's disease.[5-9]

Clinically, *M. haemophilum* infection presents as asymptomatic or painful, solitary or disseminated, papules, nodules, and/or ulcers.[1,4] Histopathological features of *M. haemophilum* include necrotic granulomas containing granulocytes, lymphocytes, monocytes and multinucleated giant cells.[1] Cultures are crucial for identification of the correct species and antimicrobial susceptibilities to determine an appropriate treatment. *M. haemophilum* may take up to eight weeks to grow in culture, requires iron supplemented media, and grows optimally at 30-32°C. There is no standardized antibiotic regimen for *M. haemophilum* infection. Treatment usually includes any combination of clarithromycin, a fluoroquinolone and a rifampicin for 12-24 months.[1,9]

There have been few reported cases of crusted scabies occurring with lepromatous leprosy. One patient in Brazil with a known history of lepromatous leprosy presented with hyperkeratosis and crusted lesions of the hands and feet as well as a disseminated erythematous scaling rash, which was diagnosed by skin scrapings as crusted scabies.[10] Another case was reported of a 26-year-old patient with lepromatous leprosy and widespread crusted scabies infestation.[11] Additionally, there is a reported case of a disseminated NTM infection with *M. kansasii* and scabies in a 21-year-old male who was found to have GATA2 deficiency.[12] Although not clearly defined, a defect in cell-mediated immunity may play a role in susceptibility to both atypical mycobacteria infections and infestations with *S. scabiei*. We report a case of concomitant *M. haemophilum* and *Sarcoptes scabiei* infestation, and encourage readers to include both diseases in the differential diagnosis of immunocompromised patients presenting with generalized symptomalogy with lesions of different morphologies.

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References:

1. Lindeboom JA, Bruijnesteijn van Coppenraet LE, Van Soolingen D, Prins JM, Kuijper EJ. Clinical manifestations, diagnosis, and treatment of Mycobacterium haemophilum infections. *Clin Microbiol Rev*. 2011;24(4):701–17.

2. Sampaio JL, Alves VA, Leão SC, et al. Mycobacterium haemophilum: emerging or underdiagnosed in Brazil?. *Emerg Infect Dis*. 2002;8(11):1359–60.

3. Walton SF, Beroukas D, Roberts-Thomson P, Currie BJ. New insights into disease pathogenesis in crusted (Norwegian) scabies: the skin immune response in crusted scabies. *Br J Dermatol*. 2008;158(6):1247–55.

4. Saubolle MA, Kiehn TE, White MH, Rudinsky MF, Armstrong D. Mycobacterium haemophilum: microbiology and expanding clinical and geographic spectra of disease in humans. *Clin Microbiol Rev*. 1996;9(4):435–47.

5. Lott JP, Werth VP, Kovarik CL. Cutaneous Mycobacterium haemophilum infection in iatrogenically immunocompromised patients without transplantation. *J Am Acad Dermatol*. 2008;59(1):139d–42.

6. Teh CL, Kong KO, Chong AP, Badsha H. Mycobacterium haemophilum infection in an SLE patient on mycophenolate mofetil. *Lupus*. 2002;11(4):249-52.

7. Seitz CS, Trautemann A, Bröcker EB, Abele-horn M, Goebeler M. Skin nodules in rheumatoid arthritis due to infection with Mycobacterium haemophilum. . 2008;88(4):428–9.

8. Lee WJ, Kang SM, Sung H, et al. Non-tuberculous mycobacterial infections of the skin: a retrospective study of 29 cases. *J Dermatol*. 2010;37(11):965–72.

9. Shah MK, Sebti A, Kiehn TE, Massarella SA, Sepkowitz KA. Mycobacterium haemophilum in immunocompromised patients. *Clin Infect Dis*. 2001;33(3):330–7.

10. Pedra e cal AP, Ferreira CP, Da Costa Nery JA. Crusted scabies in a patient with lepromatous leprosy. *Braz J Infect Dis*. 2016;20(4):399–400.

11. Barbosa júnior Ade A, Silva TM, Santos MI, et al. Coexistence of an unusual form of scabies and lepromatous leprosy. A case report. *Pathol Res Pract*. 1996;192(1):88–90.

12. Brondfield S, Reid M, Patel K, Ten R, Dhaliwal G. Disseminated mycobacterial infection and scabies infestation. *Am J Med*. 2015;128(10):e41–2.