Abstract

This report describes the presence of cutaneous nodules and ulceration of the right leg of 1-year duration in an elderly woman. Prior biopsies had demonstrated dermal and subcutaneous granulomatous inflammation. Special stains for microorganisms and cultures were repeatedly negative. Polymerase chain reaction evaluation of the tissue block demonstrated the presence of *Mycobacterium obuense*.

**Keywords:** Granulomatous dermatitis, granulomatous panniculitis, *Mycobacterium obuense*

**INTRODUCTION**

Cutaneous mycobacterial infections are increasing in incidence, due in part to the rising numbers of immunocompromised patients with HIV infection, hematopoietic and solid organ transplantation, and chemotherapy administration.[1] They present in a myriad of patterns including ulcers, nodules, and pseudocellulitis. Until now, an infection with *Mycobacterium obuense* has not been reported in the skin or any other organ system.

**CASE REPORT**

An elderly Caucasian female presented to the Vanderbilt University Medical Center Dermatology Clinic with a 1-year history of enlarging nodules on her right lower leg. She had experienced an insect bite, believed to have been a spider, several months before the onset of her condition. She had been seen elsewhere, and a biopsy performed revealing granulomatous dermatitis and panniculitis. Special stains for microorganisms and bacteria were unremarkable. A subsequent biopsy was performed and sent for fungal and mycobacterial culture, but no growth was seen. She was begun on doxycycline 100 mg twice daily but without improvement.

On examination, she demonstrated numerous nodules of the right lower leg with erythema, focal ulceration, and pustulation [Figure 1]. Postinflammatory hyperpigmented nodules were also appreciated, but her left leg was unaffected. Two punch biopsies were performed, one for routine histology and the other was sent for mycobacterial, fungal, and bacterial cultures. The histology demonstrated a diffuse suppurative and granulomatous infiltrate in the dermis and superficial subcutis [Figures 2 and 3]. Special stains for microorganisms were negative, and her cultures failed to grow any pathogens. The tissue block was sent for mycobacterial polymerase chain reaction (PCR), the results demonstrating the presence of a mycobacterium consistent with *M. obuense*. She was begun empirically on clarithromycin 250 mg twice daily but discontinued it due to gastrointestinal side effects. Given that no drug sensitivities were available, an attempt was made to place her on long-term minocycline, but the patient has subsequently been lost to follow-up.

**DISCUSSION**

In 1971, Tsukamura and Mizuno[2] described the ability of a newly isolated mycobacterium to form a black pigmented product following exposure to *p*-aminosalicylate and salicylate. They evaluated five separate strains, one from human sputum and four from soil. Previously, this type of pigment production had only been found in rapidly growing scotochromogenic mycobacterium including *Mycobacterium fortuitum*, *Mycobacterium abscessus*, and *Mycobacterium borstelense*. They named this organism for the soil of its origin, Obu, a city in southern Japan. At 72 h *M. obuense* demonstrated...
Presumably, *M. obuense* is a ubiquitous organism being found in 7 (2.1%) of 341 water and soil samples taken from towns around Tehran, Iran. Human infection has not been definitely shown. Buijtels *et al.* evaluated 173 patients in Zambia with clinically diagnosed tuberculosis, 73% of whom were also HIV infected. In 627 sputum samples, one grew *M. obuense*, but it was unstated if this organism was pathogenic or if the patient was also infected with *Mycobacterium tuberculosis*.

This organism has been employed as an adjunctive immune modulator in the treatment of internal malignancies. Similar to *Mycobacterium vaccae*, it is used to stimulate the immune system when given concomitantly with other chemotherapeutic agents. IMM-101 (Immodulon Therapeutics, London, England) is a heat-killed suspension of *M. obuense* (NCTC 13365) administered subcutaneously continuously during chemotherapy administration. It was initially tested on patients with Stage III or IV melanoma without additional treatment. Interestingly, despite no additional therapy, one-third of the treated patients were alive after 5 years, an improved survival rate over what would normally be expected. The only substantive adverse effect was local site injection discomfort. Mild pyrexia postinjection has also been reported.

In patients with solid organ malignancies, IM-101 is believed to upregulate the innate and adaptive immune systems including γδ T-cells, granulocytes, and antigen-presenting cells through interaction with a number of receptors. Mouse models involving pancreatic and colorectal cancer demonstrated that IMM-101 administration alone resulted in improved survival rates. Elia *et al.* noted increased numbers of cytotoxic CD8+ effector T cells producing IFN-γ, perforin, and granzyme. In patients with advanced and inoperable pancreatic cancer, use of IMM-101 and gemcitabine demonstrated modest improvement in several measured parameters compared to gemcitabine alone.

A search of the medical literature revealed very little about *M. obuense* aside from what is described above. Its preferred environment, natural hosts or vectors (if any), antimicrobial susceptibility, virulence, and potential for spread to other organ systems are entirely unknown. Nor is it clear what physiologic factors make patients more or less likely to become infected. As noted, this infection was only detected using PCR since tissue cultures twice failed to demonstrate growth. Whether additional patients will demonstrate infection with *M. obuense* remains to be seen.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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