

however, no circulating antibodies could be detected by indirect immunofluorescence. No Western blot could be performed. The diagnosis of unilesional pemphigus vulgaris of the foreskin was then considered. Class I topical corticosteroids were initially effective but the relapse was rapid after tapering the applications. The fixity and the small size of the affected area prompted us to remove it surgically by a postectomy. No relapse occurred at the scar and the patient remained disease-free after a 3-year follow-up.

## DISCUSSION

Two main points are of interest in this unusual observation: – the occurrence of chronic, histoimmunologically proved lesions of pemphigus vulgaris limited to the prepuce area for 2 years has not, to our knowledge, been previously reported. The diagnosis was established on consistent clinical, histological and immunological data. The lack of circulating auto-antibodies is reported in at least 10% of patients (1), and the very limited clinical involvement in our patient may be partly related to a weak rate of antibodies, under the threshold of detection of the test. An atypical form of drug-induced pemphigus could be ruled out since the patient received neither the classical triggering medications, nor other long-lasting oral treatment. Regarding localized mucosal lesions in pemphigus, initial involvement of oral mucosa is a well-known feature of the disease, which originates in the oral cavity in 50 to 70% of patients. These lesions are usually followed by the onset of more disseminated ones, on other mucosa and/or on the skin, after a time lapse ranging from weeks to months, exceptionally some years. However, a small subset of patients never develop any involvement of the glabrous skin. All other stratified mucous epithelia may be affected but we are not aware of cases limited to the genital mucosa, even for shorter periods

of time before extension. On the other hand, solitary lesions on glabrous skin are very seldom reported, with sometimes an unusual, nodular presentation (2–4). We have no convincing explanation for the unusual clinical presentation of our case, the oral mucosa usually appearing more “sensitive” to the pemphigus antibodies than the genital area. – a surgical treatment of this localized pemphigus appeared to be fully effective, with no relapse after a 3-year follow-up. This original therapeutic option has not yet, to our knowledge, been reported in pemphigus vulgaris, whereas it has already been successfully applied to familial benign pemphigus by some authors. This method, potentially quickly efficient and without serious side-effects, could perhaps be more often considered in localized, long-lasting forms of pemphigus when a simple surgical procedure is technically possible.

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O. Dereure<sup>1</sup>, P. Stoebner<sup>1</sup>, G. Barnéon<sup>2</sup> and J. Guilhou<sup>1</sup>  
<sup>1</sup>Department of Dermatology-Phlebology and <sup>2</sup>Laboratory of Pathology, Saint-Eloi Hospital, 2, avenue B. Sans, CHRU Montpellier, FR-34295 Montpellier, France.

## A Case of Mycobacterial Skin Disease Caused by *Mycobacterium peregrinum* and *M. scrofulaceum*

Sir,

Ever since *M. marinum* infection in man was described by Nordén & Linell (1) in 1951, numerous cases of tropical fish tank granulomas caused by several kinds of mycobacteria have been reported in many countries. However, *M. peregrinum* and *M. scrofulaceum* infection in the skin, contracted from tropical fish tanks, has not been reported.

In this paper, we report a case of mycobacterial skin infection caused by both *M. peregrinum* and *M. scrofulaceum*, and their bacterial characterization.

## CASE REPORT

A 45-year-old Japanese man was referred to the dermatology clinic of Yokohama City University Hospital in October, 1993. He had a brown infiltrated plaque on his left arm (24 × 28 mm). Six granulomas of several millimeters in diameter were situated on the border of the plaque (Fig. 1). The lesion was dry and scaly, without abscess or pus. No bacilli or fungus were found in the scales or smears with microscope. The patient was a fish-fancier with many tropical fish tanks in his home. Laboratory examination, including chest X-ray, revealed no abnormal or immunocompromising findings.

An intradermal purified protein derivative (PPD) test was positive.

A biopsy of the skin demonstrated hyperkeratosis, parakeratosis, acanthosis, and exocytosis in the epidermis, and giant cells and epidermoid cell infiltration in the dermis. No bacillus was found by PAS or acid-fast stain.

Skin tissue was ground and placed on special media for mycobacteria (Ogawa egg medium) and fungi (Sabouraud). Fungal culture showed no growth, but the mycobacterial culture grew mycobacteria in 3 and 15 days.

The patient received sparfloxacin (SPFX, 200 mg/d) for 8 weeks. Granulation diminished only very slowly. Therefore, he was put on minocycline (MINO, 200 mg/d) for 7 weeks. Lesions progressively shrank during treatment with MINO and then disappeared after 7 weeks, leaving only a few scarred spots.

No recurrence has been noted during a follow-up period of 3 years.

The characterization of different kinds of mycobacteria was studied. To identify the genes of mycobacteria, we applied a series of tests in consideration of the properties described in the narrative parts of the text and DNA-DNA hybridization described by Kusunoki et al. (2). Briefly, quantitative microdilution plate hybridization was used to identify *Mycobacterium* species. DNAs of our samples were rapidly extracted and labeled with photoreactive biotin. Labeled DNAs were



Fig. 1. Brown infiltrated plaque with granulomas on the left arm.

distributed into the wells of a microdilution plate, in which reference DNAs had been immobilized. After 2 h of hybridization, hybridized DNAs were quantitatively detected with peroxidase-conjugated streptavidin and the substrate, tetramethylbenzidine. We identified *M. peregrinum* and *M. scrofulaceum* from the skin, and *M. peregrinum*, *M. scrofulaceum*, *M. fortuitum* and *M. marinum* from the water of the aquarium tanks of the patient.

We tested the sensitivity of the four mycobacteria to several kinds of antibiotics. Four antibiotics (SPFX, MINO, tetracycline:TC, and clarithromycin:CAM) were dissolved and diluted with distilled water. Final concentration of antibiotics was 100–0.025 µg/ml in Middlebrook 7H11 agar (Difco) medium. Mycobacteria at 10<sup>6</sup> CFU/ml were inoculated into antibiotic-containing medium at 35°C. Minimal inhibition concentration was determined at minimal visual non-growing concentration, compared with controlled non-antibiotic medium. The mycobacteria were most sensitive to SPFX, and then to MINO.

In the culture sensitivity test, *M. peregrinum* was sensitive to ciprofloxacin and amikacin, but not to cefoxitin or sulfonamides.

## DISCUSSION

We detected two kinds of atypical mycobacteria from skin tissue, and four kinds of atypical mycobacteria from aquarium water.

It is important to differentiate mycobacterial infection from other granulomatous skin diseases. DNA-DNA hybridization is a very sensitive and time-saving clinical technique for

identifying atypical mycobacteria (2). We were able to identify *M. peregrinum* and *M. scrofulaceum* in a few days after culture. The PCR technique is an even quicker technique for identifying atypical mycobacteria. Culture, DNA-DNA hybridization and PCR should be standard techniques for identifying atypical mycobacterial species.

Most atypical mycobacteria are poorly susceptible to anti-tubercular drugs. Recently, tetracycline and minocycline have been reported to be effective (3, 4). Clarithromycin appears to be a promising drug for the treatment of patients infected with *M. avium* complex, *M. chelonae*, *M. fortuitum*, *M. marinum*, as well as for other bacterial skin diseases (5, 6). Recently, new quinolones have been used for treatment of atypical mycobacteria. Sparfloxacin was more effective against *M. peregrinum* and *M. scrofulaceum* than minocycline in culture. However, sparfloxacin did not work well in our case. The reason for the discrepancy might be that the concentration in the skin tissue and the anti-inflammatory effect of minocycline were more effective against mycobacteria than those of sparfloxacin.

The above four kinds of atypical mycobacteria are found in tropical fish tanks. *M. marinum* is the most common and infects many people. However, the other three atypical mycobacteria are not common in skin diseases.

Only one mycobacterium is usually detected in affected skin tissue. It is very rare that two kinds of mycobacteria are found in the same portion of skin. The reason for the present double infection may be that the patient took care of many fish tanks, which contained a lot of bacteria.

Mycobacterial skin infection is increasing in Japan. It does not depend on HIV infection. The main cause is that the keeping of tropical marine fish is increasing and that marine sports are very common in Japan. It is important to promptly identify and treat atypical mycobacterial infections.

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Norihisa Ishii, Yasuyuki Sugita, Ichiro Sato and Hiroshi Nakajima  
Department of Dermatology, Yokohama City University School of Medicine, 3–9 Fukuura, Kanazawa-ku, Yokohama 236–8567 Japan.