Suppurative Inflammation With Microabscess and Pseudocyst Formation Is a Characteristic Histologic Manifestation of Cutaneous Infections With Rapid-Growing Mycobacterium Species

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Abstract

Mycobacterial infections of the skin classically cause a granulomatous tissue reaction. We have observed a suppurative pattern of inflammation associated with infections by rapid-growing Mycobacterium species in immunocompromised patients. We report 6 cases in skin and soft tissue with an unusual but consistent lack of a predominance of granulomatous inflammation. Of the 6 cases, 4 had predominantly (~75%) suppurative inflammation, 1 case predominantly demonstrated (~75%) a mix of acute and chronic inflammation, and 1 case showed an approximately equal contribution of suppurative and granulomatous inflammation. All 6 cases showed abscess formation and numerous acid-fast bacilli (AFB) on AFB stain and were confirmed by tissue culture. Of these 6 cases, 2 had microabscesses with central pseudocysts harboring microorganisms. Five patients were taking oral prednisone, and 1 had an uncharacterized immunodeficiency. These cases highlight the need for awareness of this unusual manifestation of infection with rapid-growing Mycobacterium species, particularly in immunocompromised patients.

Materials and Methods

We studied 6 cases of infection with rapid-growing Mycobacterium species in skin and soft tissue, 5 with Mycobacterium abscessus and 1 with Mycobacterium chelonae. Of the 6 patients, 5 were taking oral prednisone for various chronic illnesses and 1 had an uncharacterized immunodeficiency with a CD4 cell count of 25/µL in the face of multiple negative HIV serologic test results. This patient also had chronic hepatitis B and hepatitis C virus infections. Of the 6 patients, 4 had multiple nodules on the bilateral lower extremities only, 1 had multiple papules and nodules on all 4 extremities and 1 abscess on the lower extremity, and 1 had a single abscess and sinus tract on the chest wall. Clinical suspicion for cutaneous mycobacterial infection was present in only 2 of the 6 cases. Additional details about the clinical manifestations for each patient are given in Table 1.
The mycobacteria were cultured using liquid and solid media for growth. The specimens were inoculated into a bacT/alert bottle (bioMérieux, Durham, NC), which has a liquid medium containing Middlebrook 7H 9 broth, oleic acid, and a mixture of antibiotic and antifungal agents (polymyxin B, amphotericin B, nalidixic acid, trimethoprim, and azlocillin). Once growth was detected by an automated system, a smear with Kinyoun stain was made to confirm that the culture grew AFB. Once confirmation of AFB was made, species identification was attempted with genetic probes (Gen-Probe technology [Gen-Probe, San Diego, CA] with probes for Mycobacterium tuberculosis complex, Mycobacterium avium, Mycobacterium intracellulare, Mycobacterium gordonae, and Mycobacterium kansasii). In our cases, the AFB were not identified with any of our probes, so the samples were submitted to the Massachusetts State Laboratory. At that facility, the mycobacteria species were identified by using growth characteristics and standard biochemical techniques.

**Results**

Of the 6 cases, 4 (67%) histologically showed greater than 75% suppurative inflammation and less than 25% granulomatous inflammation; 1 case (17%) showed a greater than 75% mixture of acute and chronic inflammation with less than 25% granulomatous inflammation; and 1 case (17%) showed 50% suppurative inflammation and 50% granulomatous inflammation. All 6 cases (100%) showed frank dermal abscess or microabscess formation. When present, the granulomatous inflammation was nonnecrotizing and was intimately admixed with the suppurative inflammation. In 3 cases (50%), the inflammatory response was centered in the panniculus, and in 2 cases (33%), the response was centered in mid and deep levels of the dermis with less prominent involvement of the superficial subcutis. In 1 case (17%), the inflammatory response was present only in the superficial and mid dermis. Of the 6 cases, 2 (33%) cases, both with greater than 75% suppuration, showed formation of small pseudocysts within the abscesses. These pseudocysts were clear or filled with amorphous “fluffy” blue-gray material that on AFB staining represented AFB.

**Discussion**

Mycobacterial infections classically cause a granulomatous tissue reaction in most body sites, including the skin. Therefore, AFB stains are routinely performed along with...
The rapid-growing *Mycobacterium* species, including *M. abscessus, M. chelonae, and M. fortuitum*, are separated from other nontuberculous mycobacteria because of their tendency to grow out in culture in 3 to 5 days rather than the more typical 2 to 4 weeks of other *M. tuberculosis* species. These organisms are ubiquitous and rarely cause significant clinical infection in immunocompetent hosts. However, in the past 2 decades with the emergence of AIDS and the increased use of immunosuppression in transplant recipients and other chronically ill patients, the recognition of infections caused by rapid-growing mycobacteria has increased. These infections often are disseminated in
immunocompromised hosts but can also be localized to the
skin and soft tissue. Immunocompromised patients in whom
nontuberculous mycobacterial infections develop have been
reported to have an increased number of cutaneous lesions
compared with immunocompetent patients with similar infec-
tions. The immunocompromised patients tend to have more
prominent ulceration of and abscess formation within the
cutaneous lesions. Histologically, immunocompromised
hosts show more involvement of the subcutaneous tissue with
more prominent microabscess formation.

We report a characteristic histologic reaction pattern in
cutaneous rapid-growing Mycobacterium infections in a series
of immunocompromised patients. A high index of suspicion
for AFB should be present when faced with a skin or soft
tissue sample with predominantly suppurative inflammation,
especially in immunocompromised patients. In some cases,
small pseudocysts within the abscesses were found to be filled
with acid-fast bacteria. We recommend routine use of an AFB
stain, in addition to Gram and fungal stains, for the histologic
evaluation of suppurative inflammations of skin and soft tis-

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