CASE REPORT

Pulmonary Mycobacterium abscessus infection-induced erythema induratum

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ABSTRACT

Erythema induratum (EI) is clinically characterized by recurrent crops of tender nodules on the lower legs and lobular panniculitis with granulomatous inflammation and pathologically characterized by vasculitis and focal fat necrosis. Currently, many authors consider EI to be a multifactorial disorder with diverse causes, including Mycobacterium tuberculosis and hepatitis C infection. Here, we report a case of a 65-year-old female with a 1-year history of recurrent crops of tender nodules and plaques on her bilateral lower legs. In addition, she had suffered from a chronic cough with sputum for 1 year and had contact history with pulmonary nontuberculous mycobacterial infection from her husband. The histopathological findings of the skin biopsies were consistent with the diagnosis of EI. Chest computed tomography revealed multiple lymphadenopathy and two sets of sputum cultures showed M. abscessus. After 2 months of anti-nontuberculous mycobacterial therapy with ciprofloxacin, the skin lesions resolved completely and there was no recurrence within the following year.

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Introduction

Erythema induratum (EI) was first described by Bazin in 1861 and was considered to be related to tuberculosis. Montgomery et al introduced the term nodular vasculitis in 1945 to differentiate EI as lesions of nontuberculous origin.1 EI is clinically characterized by recurrent crops of tender nodules on the lower legs, and its pathology shows lobular panniculitis with granulomatous inflammation, vasculitis, and focal fat necrosis.

Currently, many consider EI to be a multifactorial disorder with diverse causes, including tuberculosis and hepatitis C infection. Herein, we report a case of EI related to pulmonary Mycobacterium abscessus infection.

Case report

A 65-year-old woman presented with a 1-year history of recurrent crops of painful reddish nodules on both lower legs. She was administered doxycycline at the rheumatology department, but her skin condition did not show an evident response. The patient had a history of chronic hepatitis B with liver cirrhosis, which was complicated by hepatocellular carcinoma status and post-transcatheter arterial embolization that had been performed twice in 2008. Follow-up abdominal ultrasonography in 2010 revealed the absence of local recurrence. Moreover, a second cancer over the left thigh—liposarcoma—was diagnosed in 2009 and successfully treated with a wide excision.

Physical examination revealed multiple tender, reddish, and violaceous subcutaneous nodules on the right calf and both ankles (Figure 1). No ulceration or regional lymphadenopathy was identified. The laboratory examinations indicated elevated liver function (AST/ALT, 39/45 IU/L; normal ranges: 13–38/3–37 IU/L) and positive antinuclear antibody (1:160×, speckled type), but there were no remarkable findings in terms of the complete blood cell count, erythrocyte sedimentation rate, or C3 and C4 complement. Clinically, the differential diagnosis included erythema nodosum, nodular vasculitis/erythema induratum, polyarteritis nodosum, and cutaneous metastasis of liposarcoma.

We performed a skin biopsy on the right ankle nodule, and the histopathology revealed predominant lobular panniculitis with focal lipophagic and coagulative fat necrosis. Granulomatous infiltrations with epithelioid histiocytes, multinucleated giant cells, and lymphocytes were present. Small- to medium-sized blood vessels
demonstrated lymphohistiocytic infiltration and fibrinoid degeneration of the vessel walls (Figure 2). Neither Gomori methenamine silver stain nor the acid-fast stain showed evidence of microorganisms. Direct immunofluorescence showed IgM and C3 deposition on the small-sized vessel walls in the subcutis.

Chest X-rays revealed interstitial patterns in both lung fields. Chest computed tomography showed multiple enlarged lymph nodes over the right hilar, subcarinal, subaortic, and retrocaecal spaces with focal calcification (Figure 3). Two sets of the sputum cultures showed NTM, and M. abscessus type 1 was identified by molecular analysis using polymerase chain reaction (PCR)-restriction fragment length polymorphism. However, the results of the PCR and tissue culturing for M. abscessus using the biopsy specimen were all negative. The patient was diagnosed as EI caused by pulmonary M. abscessus infection. She was treated with twice-daily administrations of 1 g ciprofloxacin for 2 months, which resulted in complete resolution of the skin lesions. No recurrence was noted at the 1-year follow-up examination.

Discussion

EI clinically presents as painless to tender, deep-seated, circumscripted nodules and plaques, usually on the lower legs with a predilection for the posterior calf. Most of the lesions extend toward the surface, become ulcerated, and heal with scarring and atrophy. EI may be associated with erythrocyanosis, heavy column-like calves, and cutis marmorata. It more frequently presents in middle-aged obese women with some degree of venous insufficiency in the lower extremities and is exacerbated by cold weather. The clinical course is often protracted and recurrent episodes can develop over subsequent years.

The histopathology of EI is mainly lobular panniculitis that shows granulomatous inflammation with focal necrosis, vasculitis, and septal fibrosis with varying combinations. However, vasculitis is not always identified and is not a requisite for the diagnosis. Sequira et al found that EI can demonstrate a variety of presentations of vasculitis and that in approximately 10% of cases the...
Clinicopathological patterns of vasculitis cannot be demonstrated.\(^3\) Thrombosis and occlusion of the lumen produce ischemic and caseous necrosis. Extensive necrosis leads to the involvement of the dermis, subsequent ulceration, and the discharge of liquefied necrotic fat.\(^5\) The histological features vary depending on the stage of the lesion that is biopsied. Fully developed lesions show granulomatous inflammatory infiltrates, epithelioid cells, foamy histiocytes, and either Langhans-type or foreign body-type giant cells.

The pathophysiology of EI is believed to be a hypersensitivity reaction to a variety of antigens and immune complexes. \(M.\) \textit{tuberculosis}\ is considered to be the etiological factor for EI, especially in \(M.\) \textit{tuberculosis}\ endemic areas.\(^4,5\) PCR indicates the presence of \(M.\) \textit{tuberculosis}\ DNA in approximately 50% of skin lesions, and the pathological findings for EI are consistent in Taiwan.\(^6\) Bayer-Garner et al examined their EI patients for nontuberculous mycobacterium DNA using PCR, but the results were negative, as in our case.\(^10\) The negative result of PCR may be due to a hypersensitivity reaction. Recently, hepatitis C virus has also been suggested as a possible causative agent, and this association is probably mediated by circulating immune complexes.\(^7,9\) However, the etiology can only be identified in a small proportion of EI patients.

\(M.\) \textit{abscessus}\ has been ranked as one of the top five most frequently isolated mycobacterial species in Taiwan and is classified as a rapidly growing, Runyon group IV mycobacterium. It is distributed worldwide and is found in soil, natural and processed water sources, and medical devices. \(M.\) \textit{abscessus}\ causes a wide range of clinical diseases, including skin and soft tissue infection, keratitis, osteomyelitis, pulmonary infection, and disseminated infection. In skin and soft tissue infections, it usually follows penetrating trauma and typically occurs in immunocompetent individuals. The clinical presentation ranges from asymptomatic to tender erythematous nodules and plaques, cellulitis, abscesses, ulcers, and draining sinus with serosanguinous discharge. The lesions may be solitary or multiple, and localized lymphadenopathy is occasionally seen.\(^11\) In addition, nontuberculous mycobacteria has been reported in association with Sweet's syndrome, but these reports are quite rare.\(^12\) Until now, only 18 cases have been reported in the English medical literature and 11 of these were caused by \(M.\) \textit{abscessus}\ infection. The drugs used to treat \(M.\) \textit{abscessus}\ infections include cefoxitin, imipenem, minocycline, doxycycline, clarithromycin, amikacin, tigecycline, and ciprofloxacin; generally, these drugs are administered in combinations of at least two drugs in order to prevent resistance.\(^11\)

Our patient was an immunocompromised host with hepatocellular carcinoma, liposarcoma, and was susceptible to atypical mycobacterium infection. She suffered from chronic cough with sputum for 1 year and had a contact history of exposure to pulmonary nontuberculous mycobacterial infection. Chest computed tomography revealed multiple mediastinal lymphadenopathies, and two sets of the sputum cultures and molecular analysis indicated \(M.\) \textit{abscessus}. Based on the clinical presentation and the imaging and microbiological studies, the diagnosis for this patient was pulmonary \(M.\) \textit{abscessus}\ infection. The patient was treated with ciprofloxacin, and the skin manifestations regressed within 2 months. The abovementioned findings supported the diagnosis of EI caused by pulmonary \(M.\) \textit{abscessus}\ infection, although the \(M.\) \textit{abscessus}\ DNA-PCR examination of the skin lesion produced a negative result.

To the best of our knowledge, this is the first documented case of EI caused by \(M.\) \textit{abscessus}\ lung infection, and it was successfully treated with ciprofloxacin. We hope our experience can be of help to physicians and patients faced with this disorder.

References