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LETTERS TO THE EDITOR

A Case of Acne Fulminans Successfully Treated with Cyclosporin A and Prednisolone

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Acne fulminans (AF) is a rare condition and the most severe form of acne. It is characterized by the sudden onset of painful and ulcerative pustules and systemic symptoms including high fever and polyarthralgia. Response to ordinary antibiotic agents is poor, and the treatment most often recommended is systemic corticosteroids. We report here a case of a young Japanese man with acne fulminans presenting with severe pustules and pyoderma gangrenosum (PG)-like ulcerations.

CASE REPORT

A 20-year-old Japanese man was referred to our hospital in February 2005, due to a 3-week history of painful erythematous pustular eruptions with high fever. Neither arthralgia nor myalgia were noted. He had been diagnosed as having acne vulgaris for the past 5 years and had sometimes been administered antibiotics such as minocycline. He was otherwise healthy and had no remarkable family history. Neither intensive physical training nor steroid use before the onset of the disease were seen.

Physical examination revealed multiple follicular pustules and reddish papulonodular eruptions with crusts on his scalp and face (Fig. 1a). Ulcerated nodules were scattered on the nape and extremities. Walnut-sized ulcerative erythematous plaques with vegetative surface and elevated edges were observed on the extremities (Fig. 1b). These lesions resembled PG. A high temperature up to 38.7°C was noted.

Abnormal laboratory findings included an increase in leukocytes ($16.3 \times 10^4/mm^3$) and neutrophils (84.3%). C-reactive protein levels were moderately high at 5.0 mg/dl. The complement value was high: CH_{50}, > 60 U/ml. Erythrocyte count, haemoglobin value and platelet count were normal. Anti-nuclear antibodies and rheumatoid factor were negative. The serum protein fractions, and liver and renal function, were normal or negative. Bacterial and fungal cultures from the skin lesions were negative. X-ray of the chest, vertebrae, ileosacral joints, wrist and finger joints showed no abnormality. A technetium-99 scintigram revealed no abnormal accumulation. Colon fiberscopy was not performed, but the absence of abdominal pain, negative of occult blood of stools suggested the absence of inflammatory bowel disease.

A skin biopsy was performed from the ulcerative nodule on his upper back. The epidermis was slightly hypertrophic with a dense crust. In the dermis, a mixed infiltration of polymorphonuclear cells and lymphocytes was observed around the blood vessels and appendages. A massive accumulation of inflammatory cells was seen in and around the hair follicles (Fig. 2a). Peri- and intrafollicular infiltration of inflammatory cells consisted of polymorphonuclear cells and lymphocytes and destruction of the hair follicles was prominent. Numerous giant cells were also observed. No necrotizing vasculitis was noted (Fig. 2b, 2c).

Oral administration of prednisolone 40 mg/day and intravenous injection of minocycline rapidly improved the symptoms. The dose of prednisolone was tapered to 10 mg/day in one month, and the skin lesions healed completely with scarring.

Two months later, new ulcers emerged on his upper arm. Neither fever nor arthralgia were noted. Oral prednisolone was increased to 30 mg/day; however, new pustules or ulcers developed on the neck and chest. He was admitted again in July 2005, and prednisolone was increased to 50 mg/day, which was effective. However, new ulcers and papulonodular lesions appeared after the prednisolone dosage was tapered to 30 mg/day. Cyclosporin A (CyA), 300 mg/day (5 mg/kg/day) was added in August 2005. The skin lesions gradually improved and the ulcers healed completely within one month. The doses of prednisolone and CyA were subsequently gradually tapered and were discontinued completely in 2 years. The patient has been treated with oral minocycline for his mild acne, and has been well controlled for one year.

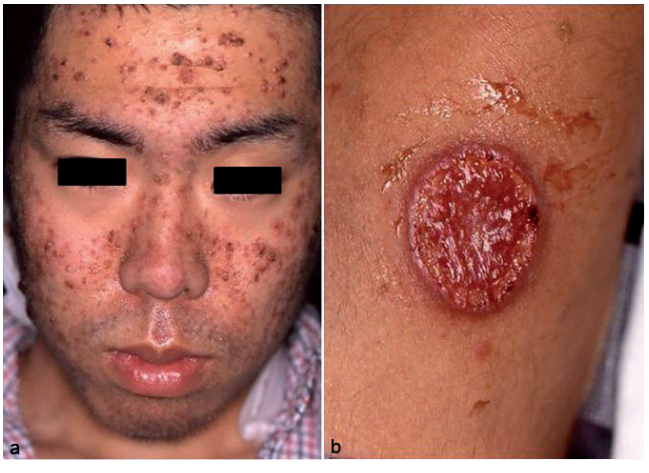

Fig. 1. (a) Physical examination revealed pustules and papulonodular eruptions with crusts on the face. (b) Erythematous plaques with ulceration and eschar resembling pyoderma gangrenosum.

DISCUSSION

The aetiology of AF is unclear. Immunological reaction to *Propionibacterium acnes* (1), altered neutrophil function (2), genetic factors (3), and other yet-unknown factors could be associated with the disease. Our patient presented with typical cutaneous lesions of AF and PG-like eruptions, which suggests a relationship between AF and PG. Although there has been only one reported case of AF with PG-like eruptions (4), PGs with severe acne lesions (such as acne conglobata) were reported previously (5, 6). PG can show features similar to AF; histological association of early lesions as folliculitis, sometimes with fever or arthralgia, elevated levels of leukocytes and C-reactive protein, absence of specific autoantibodies and altered function of neutrophils. These features are referred as "autoinflammatory reactions".

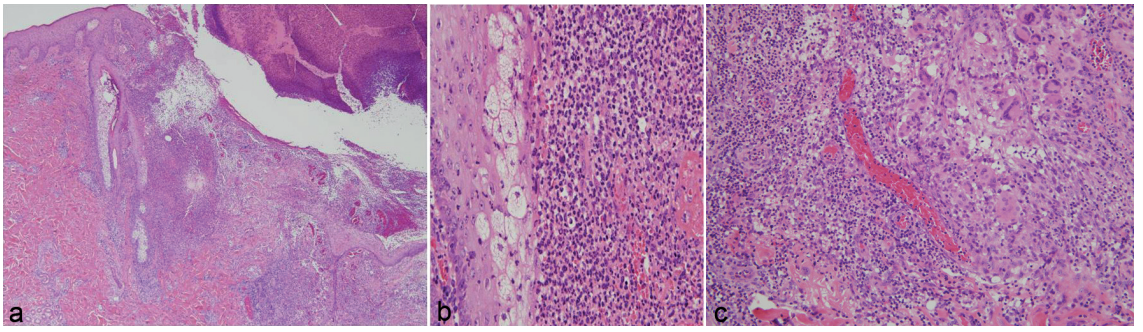

Fig. 2. (a) Histological findings of the ulcerative nodule on the upper back. Massive accumulation of inflammatory cells with dense crusts in the dermis. (b) Peri- and intrafollicular infiltration of inflammatory cells and the destruction of the hair follicle. (c) Infiltration of polymorphonuclear cells and lymphocytes with numerous giant cells.

In 1997, an inherited disorder named PAPA syndrome (7) was described, which showed similar symptoms to AF such as pyogenic arthritis, PG and acne. This disorder is autosomal dominant, affecting mainly the skin and joints. The susceptibility gene is CD2-binding protein 1 (CD2BP1) gene (12). The CD2BP1 protein interacts with pyrin and a mutation in the protein may increase its binding ability to pyrin, then reduce the inhibitory effect in IL-1β pathway and innate immunity, resulting in autoinflammatory reactions (8). It is hypothesized that abnormal innate immunity, such as the IL-1 pathway, might be involved in the pathogenesis of AF and PG or other neutrophilic dermatoses.

The treatment of AF is sometimes difficult. Antibiotic treatment including minocycline shows a poor response. Systemic corticosteroid administration usually improves the symptoms, but dose reduction sometimes leads to relapse. Karvonen (9) summarized the treatment of AF and recommended that primary treatment should be with systemic steroids (e.g. prednisolone 0.5–1.0 mg/kg/day). A combination of isotretinoin and steroids had a better outcome in the long-term treatment of AF. Seukeran & Cunliffe (10) also proposed a treatment regimen consisting of oral prednisolone 0.5–1.0 mg/kg daily for 4–6 weeks with oral isotretinoin being added at the fourth week, initially at 0.5 mg/kg daily and gradually increased. But isotretinoin therapy is not permitted in Japan. Other opinion options for treatment include dapsone (11) or infliximab (12).

Our patient was successfully treated with the combination of oral cyclosporine and prednisolone. The effectiveness of CyA has been reported in PG (13) and Behcet's uveitis as well, by modification of natural killer (NK)-like T-cell function (14). There has been only one case of AF successfully treated with prednisolone and CyA. CyA selectively suppresses the activation of T cells via suppression of calcineurin and leads to the inhibition of IL-2 production. It also affects innate immunity, inhibits monocyte and neutrophil phagocytosis and prolongs NK cell survival (15). We suggest combined therapy with CyA and corticosteroids could be an effective therapeutic choice for AF.

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