A 52-year-old man suffered from recurrent erythematous papules, plaques, pustules and abscesses over the anterior chest, abdomen and back with severe pruritus for four years. He was under long term systemic steroid treatment for more than 4 years due to arthralgia. Steroid-induced folliculitis or Pityrosporum folliculitis was impressed at first, but treatment with systemic minocyclin and topical benzoyl peroxide for 4 weeks and systemic itraconazole for another 4 weeks showed no improvement. A skin biopsy of an abscess taken from the back revealed a perifollicular infiltration with plasma cells, neutrophils, eosinophils and some foreign body giant cells. Within the sebaceous duct and gland, there were Demodex mites. KOH examinations of the specimens from abscesses revealed many Demodex brevis mites. The skin lesions were unresponsive to topical antiparasitic treatment (benzoyl benzoate and crotamiton). Therefore oral administration of levamisole HCl 50 mg 3 times a day for 10 days was given and all the skin lesions and pruritus were subsided. (Dermatol Sinica 23: 144-147, 2005)

Key words: Demodex, Levamisole, Iatrogenic Cushing's syndrome

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Accepted for publication: March, 08, 2005
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INTRODUCTION

Demodex folliculorum and Demodex brevis are common inhabitants of the human pilosebaceous unit. Demodex folliculorum is more common than Demodex brevis and is characterized by a larger size, and elongated posterior segment. It is usually located in the follicular infundibulum and may be present in numbers up to 10~15 per follicle. Demodex brevis is shorter and more oval shaped. It is usually found in sebaceous glands and ducts and is solitary.1, 2 The prevalence of infestation with Demodex species increases with age.3 A relation between infestation with Demodex and several types of eruptions has been well documented.1, 4, 5, 6, 7 We describe an immune compromised patient with unusual clinical manifestation of Demodex infestation and were un-responsive to numerous antiparasitic treatments but finally cleared completely after oral levamisole therapy.

CASE REPORT

A 52-year-old man was seen with 4 years history of moderate to severe pruritic skin eruption involving mainly the chest, back and abdomen. Physical examination revealed moon face, plethora, hirsutism, but no folliculitis or rosacea over the face. Multiple confluent erythematos papules, pustules and abscess over the chest, back and abdomen were found. Tinea corporis and tinea cruris were noted over the trunk (Fig. 1). Tracing back his history, he had taken black pills, a kind of Chinese herbal medicine containing steroid, due to arthralgia for more than 4 years.

Laboratory findings including routine blood counts and acute phase proteins revealed no abnormalities. Enzyme-linked immunosorbent assay for HIV was negative. ACTH: 15.6 pg/ml(10~46), Cortisol <1 ug/dl (5~25), Aldosterone 74.6 pg/mL (37~240). Bacterial cultures of skin swabs and contents from abscesses failed to grow. A 10% potassium hydroxide preparations of skin scraping from back showed no fungal or yeast elements.

Steroid-induced folliculitis was impressed at first, but the symptom persisted after oral minocycline 200 mg/day and topical benzoyl peroxide treatment for 4 weeks. Pityrosporum folliculitis was then suspected but no significant improvement after oral itraconazole 200 mg per day for 4 weeks. Skin biopsy was performed on the abscess of back. The histopathological picture was that of a perifollicular infiltration with plasma cells, neutrophils, eosinophils and some foreign body giant cells (Fig. 2, 3). Within the sebaceous duct and gland, there were Demodex mites. 10% potassium hydroxide preparations of abscess from the back revealed multiple Demodex brevis within the pus smear (Fig. 4). Our final diagnosis was abscesses due to Demodex brevis. Antiparasitic treatment, which previously were reported to eradicate infestations with Demodex mite, including benzoyl benzoate, crotamiton, and metronidazole gel, all failed to relieve the skin manifestations.

Fig. 1
Confluene erythematos papnles, pustules, and abscess.

Fig. 2
Infiltration around hair follicle with hair follicle destruction and granulomatous infiltration. (H&E, 40X)
Rapid and complete recovery was finally achieved after systemic levamisole 50 mg orally 3 times a day for 10 days. Subsequent follow up evaluation for the next 9 months showed excellent control of the disease.

**DISCUSSION**

Demodex folliculorum and Demodex brevis are common parasites in the hair follicles and in the pilosebaceous gland of human skin.\(^1,2\) The mites are generally found on the forehead, cheeks, nose and nasolabial folds, occasionally on the trunk. In certain circumstances, abnormally large numbers of mites probably induced some skin disorders. The clinical manifestations of demodicidosis include granulomatous rosacea, granulomatous perioral dermatitis, and pustular folliculitis, papulopustular dermatosis of scalp, blepharitis, and spinulosis of the face.\(^4-7\)

Unlike previously reported Demodex-associated cases, our patient did not have the usual symptoms or signs. There is no report of skin lesion on the trunk with or without face involvement. In our patient, there are multiple confluent erythematous papules, nodules and pustules with severe itching, but no other skin lesion over the face.

The participation of Demodex in the pathogenesis of skin lesions has long been debated. Current hypotheses state that either an immunologic deficiency favoring an increase in the number of mites or an abnormal immunologic reaction of the skin to the parasites might provoke the appearance of cutaneous lesions.\(^3, 8-10, 21\)

In report of Demodex folliculitis, use of topical antiparasitic agent result in clearing the lesions;\(^5, 7, 11\) some investigator point out, Demodex brevis is far more difficult to eradicate in using topical antiparasitic agent.\(^12, 13\) In our case, the patient with Demodex brevis folliculitis refractory to all topical antiparasitic remedies, including benzoyl benzoate, crotamiton, metronidazole (Table 1). The response to the topical or systemic drugs listed in Table 1 was not convincing. The symptom improved rapidly after systemic monotherapy with 150 mg levamisole orally 3 times a day for 2 weeks.

Levamisole is an anti-helminthic drug with immuno-modulating properties. It can restore depressed immune function, stimulate formation of antibodies, enhance T-cell responses by stimulating T cell activation and proliferation.

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<tr>
<th>Table 1. Unsuccessful attempts in treatment</th>
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<td>Medication</td>
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<td>Minocycline</td>
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<td>Itraconazole</td>
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<td>Nimesulide</td>
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<td>Topical:</td>
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<td>Fusidic acid cream</td>
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<td>Crotamiton</td>
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<td>Metronidazole gel</td>
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*Fig. 3*
Demodex brevis in the sebaceous duct and gland with perifollicular infiltration. (H&E, 400X)

*Fig. 4*
Demodex brevis within pus smear (KOH)
and increase neutrophil mobility, adherence and chemotaxis.\textsuperscript{14-16} It is also an acetylcholine nicotinic receptor agonist,\textsuperscript{16, 17} which is highly effective in eradicating 	extit{Ascarid} and 	extit{Trichostrongylus}. Levamisole has been reported to be effective against pediculosis as well.\textsuperscript{16} Our report first demonstrates that systemic levamisole is effective in the deep 	extit{Demodex} abscess while topical medicines are in vain.

The 	extit{Demodex} mites which are the same to lice belong to class \textit{Arachnida}.\textsuperscript{2} Recent reports of demodicidosis in association with acquired immunodeficiency syndrome (AIDS) and cancer chemotherapy have suggested that immune deficiency might cause overgrowth of the mite.\textsuperscript{10, 18-20} Akilov \textit{et al.} evaluated immune response in demodicosis, they found the readiness of lymphocytes to undergo apoptosis in parallel to the increasing density of the mites. This could be the result of local immunosuppression caused by the mites, which allows mites to survival and provoke the skin lesions.\textsuperscript{21} In short, levamisole can enhance T-cell responses and increase the function of the neutrophil, it can also eradicate 	extit{Ascarid}, hence we chose levamisole to treat our patient.

In conclusion, we were confused by the clinical symptoms and disappointed in our numerous therapeutic attempts, but we were surprised by the rapid and lasting clearing with oral levamisole. We encourage further trials with oral levamisole to provide evidence-base support for this therapeutic approach.

\textbf{REFERENCES}