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## **Misdiagnosed scabies leads to hyperinfestation in an immobile patient: a case report of crusted scabies and its alternative treatment**

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### **Abstract**

**Background.** Crusted scabies is rare, highly contagious parasitic infestation caused by human mite *Sarcoptes scabiei* var. *hominis* and predominantly manifesting in immunocompromised patients. Due to insidious beginning, misdiagnosis is likely which may result in an outbreak of the infection. In countries where oral ivermectin is unavailable, treatment of crusted scabies presents a challenge.

**Case report.** An 84-year-old immobile female patient with underlying malignancy was diagnosed with crusted scabies and successfully treated with keratolytic agents, surgical removal of crusts, permethrin cream, followed by daily applications of benzyl benzoate solution. Patient's condition improved markedly after 14 days of treatment. However, 9 family members and part of medical staff became infected.

**Conclusions:** a combination of keratolytic agents, surgical removal of infected masses and topical scabidical medications is equally effective treatment method for crusted scabies.

**Keywords:** scabies, crusted scabies, keratolytic, sulphur, surgical removal.

## Introduction

Crusted scabies is rare, highly contagious parasitic infestation caused by human mite *Sarcoptes scabiei var. hominis* and predominantly manifesting in immunocompromised patients (1). Other risk factors for the disease include sensory neuropathy, dementia, physical or mental debilitation, topical potent steroids, limited access to bathing, underlying psoriasis etc (2–5). The infection spreads via direct skin-to-skin contact or by contact with infested fomites (6,7). Contrary to conventional scabies, the hallmark lesion of crusted scabies is hyperkeratotic, fissured plaques covered with yellowish crusts whose thickness varies from 3- 15 mm (8). Limbs, trunk, and scalp are most commonly affected. However, if left untreated, the disease spreads fast and may involve the entire integument, sometimes leading to erythroderma, secondary bacterial infections and other complications (8). Diagnosis is confirmed by a microscopic examination of skin scrapings that reveal mites, eggs or fecal pellets (6). Characteristic burrows and intense pruritus are usually absent and that in some cases leads to misdiagnosis followed by inappropriate treatment (9). Moreover, an undiagnosed case of crusted scabies may be the cause of an outbreak of scabies in health care and residential facilities (1).

Herein we present a case of crusted scabies in an immobile patient with underlying malignancy when misdiagnosis led not only to generalized cutaneous

involvement but also 9 family members and part of medical staff were infected.

## Case report

An 84- year old female presented to university hospital, Dermatovenereology unit in Vilnius, Lithuania, in October 2018. She complained of marked hyperkeratosis of whole body, itchy and flaking skin. Her skin condition had been gradually worsening for 1,5 years, when generalized itch and skin rash first appeared. Since then various treatments, (including topical and intralesional corticosteroids), suspecting unspecified dermatitis, have been unsuccessfully attempted. In August 2018, the patient was admitted to peripheral hospital, Nephrology and Urology unit because of urinary bladder tumor that initially manifested as bilateral hydronephrosis. For this reason, bilateral nephrostomies were formed. Treatment of „dermatitis“, consisting of various forms of corticosteroids, continued. Due to the patient's immobility and lack of possibilities to bath, the patient hadn't bathed for 4 months. Lately diffuse marked hyperkeratosis, prominent scale developed and accordingly, she was admitted to Dermatovenereology unit in a tertiary care hospital. Her other medical history is irrelevant.

On physical examination, diffuse skin scaling and marked hyperkeratosis with fissures was noted in interdigital spaces, under neck, on the chest, on calves and on the back. All nails were dystrophic with

prominent subungual hyperkeratosis. Skin condition on admission day is shown in Figures 1a and 1b.

Total blood count was relevant for lymphopenia ( $0,8 \times 10^9/l$ ), eosinophilia ( $2,3 \times 10^9/l$ ), anemia (hemoglobin 107 g/l, erythropenia  $3,21 \times 10^{12}/l$ ). Biochemical blood analysis showed increased levels of immunoglobulin E (268,7 U/l), C- reactive protein (CRP) (22,8 mg/l) and urea (11,3 mmol/l). Microscopy of skin scrapings taken from multiple body sites revealed abundance of live mites (Figure 2), and diagnosis of crusted scabies was made.

Having the diagnosis confirmed, scabicial treatment was initiated. Firstly, it consisted of daily bathing, application of salicylic acid- sulphur 5% ointment on affected areas under occlusion for 5 days as well as mechanical removal of crusts (Figure 3). Once the crusts had been removed, permethrin 5% cream was applied for three days, next followed by application of benzyl benzoate 20% solution to the whole body daily. Additionally, oral antihistamine (clemastine 1 mg) was given. Subungual areas were treated with daily applications of salicylic acid- sulphur 5% ointment under occlusion and mechanical removal of infected masses.

The patient's condition improved markedly after 14 days of treatment. Crusts were removed almost completely; the itch was greatly reduced. Skin condition on discharge day is shown in Figures 4a and 4b. Despite the fact that repeated microscopic analysis of skin scrapings was negative for mites, for outpatient

treatment, she was recommended to continue salicylic acid ointment daily, permethrin 5% cream every fourth day for one week, nail trimming every 3<sup>rd</sup> day because of very high mite load in nail debris. After 2 weeks an appointment was scheduled to evaluate the condition of the patient, unfortunately, she did not come and so the outcome remains unknown.

The patient infested at least nine family members (her husband, son, daughter, 2 granddaughters, their husbands, 2 great- grandchildren). All of them were diagnosed with conventional scabies, but only son's and husband's microscopic evaluation of skin scrapings revealed mites. Patient's son and husband were admitted to the same hospital. They received in-patient scabicial treatment with permethrin 5% cream for 3 days, next followed by daily application of benzyl benzoate 20% solution. In addition, the son helped to nurse, bath the patient and remove the crusts mechanically, in such way limiting the spread of the disease. Other family members, whose skin lesions were not so prominent, received outpatient scabicial treatment consisting of permethrin 5% cream.

Moreover, part of previous medical staff that nursed the patient in Nephrology and Urology unit, also became infected. Unfortunately, the total number of infested persons remains unknown. To our knowledge, they all received scabicial treatment with benzoyl benzoate 20% solution for two days, with reapplication in need after 7 days.



Figure 1a

Figure 1b

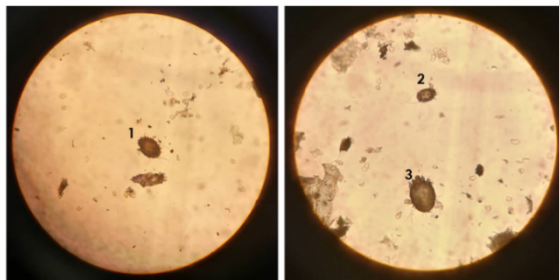


Figure 2



Figure 3



Figure 4a

Figure 4b

Figures 1a and 1 b. Patient's condition on admission day.

Figure 2. Live mites (1, 2, 3) seen in microscopic evaluation of skin scrapings.

Figure 3. Mechanical removal of crusts.

Figures 4a and 4b. Patient's skin condition on discharge day.

## Discussion

Crusted scabies is a severe variant of highly contagious scabies. Often course of the disease is insidious because the eruption is slow in onset. Moreover, sometimes this infestation might present as psoriasiform dermatitis (10,11), which only makes it harder to determine the real diagnosis. The disease mimics a wide variety of other cutaneous disorders, for example, eczema, seborrheic dermatitis, *pityriasis rubra pilaris*, cutaneous lymphoma or *ichthyosis vulgaris* (8). For this reason, misdiagnosed and mistreated scabies poses a significant public health risk because patients with crusted scabies have millions of mites on the skin, as opposed to tens of mites found on skin in case of ordinary scabies (12,13). Early recognition and proper treatment of the disease is crucial to prevent widespread outbreaks. For example, there was a scabies outbreak reported at Kettering Medical Center in January 2017, when 86 employees were infected (12). In our case, 9 family members and unknown number of medical staff became infected. Therefore, whenever a patient presents with atypical psoriasis, keratoderma, diagnosis of crusted scabies should be considered (9).

Apart from typical hyperkeratotic, fissured lesions on extensor surfaces, other characteristic feature of crusted scabies is dystrophic nails. Because of abundant psoriasis- like subungual hyperkeratosis and debris, the nails are the main source of relapse (8,14). In addition, there are case reports of crusted scabies where a novel clinical sign of the disease is described, i. e. reverse pattern focal palmoplantar keratoderma, which spares the most common pressure points, but instead affects the areas of least friction or pressure. As authors suggest,

this symptom may aid in early diagnosis and treatment of crusted scabies (13). However, this case was not suitable to apply the symptom because of diffuse distribution of hyperkeratotic lesions.

Once crusted scabies are diagnosed, it is of crucial importance to look for underlying malignancy or other immunosuppressive condition (2,9). Patients with compromised immune system show abnormal inflammatory response and hyperkeratotic reaction (15). Hyperkeratosis is related to increased levels of IL- 4, whereas cytotoxic T- cells play a part in imbalanced dermal inflammation (16). These factors along with the lack of B- cells results in skin failure to suppress proliferation of mites (8). Uncontrolled growth of parasites leads not only to very high contagion of the disease, but is also responsible for peripheral eosinophilia as well as increased levels of immunoglobulin E and immunoglobulin G (8,12), as is demonstrated in this case.

Treatment of crusted scabies is rather challenging. Aggravating factors include compromised immunity, high mite burden and, most importantly, limited penetration of topical scabicide medication into thick hyperkeratotic plaques (12). For this reason, we initially applied salicylic acid- sulphur 5% ointment. It acted as a keratolytic agent, i. e. softened thick hyperkeratotic plaques so they could be removed mechanically with a surgical blade, and sulphur is the oldest scabicide medication whose efficacy, according to published investigations, varies from 45,2 -52% (17,18). Once the crusts had been removed, scabicide treatment with permethrin 5%, followed by application of benzyl benzoate 20% solution was started. Permethrin

preparations are treatment of choice in many countries because of high efficacy and low toxicity (18). Although oral ivermectin is strongly recommended in cases of crusted scabies (19), the drug was not present in market in Lithuania at given time, so alternative treatment strategies had to be applied, in this case- combination of various topical scabicial medications. In addition, there are cases reported where currently available acaricidal agents are ineffective so there is need for the development of different treatment modalities (20).

In conclusion, crusted scabies is highly contagious parasitic infestation, which usually manifests in immunocompromised, elderly and immobile patients who lack access to bath. Due to insidious presentation and not so prominent typical symptoms, misdiagnosis is possible, which leads to widespread outbreaks. In countries where oral ivermectin is unavailable, mechanical removal of crusts followed by application of combined topical scabicial medications is equally effective treatment method.

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