Tehran University of Medical Sciences Publication
http://tums.ac.ir

Iran J Parasitol

Open access Journal at
http://ijpa.tums.ac.ir

Iranian Society of Parasitology
http://isp.tums.ac.ir

Case Report

Norwegian Scabies in a 70-Year-Old Renal Transplant Recipient: A Case Report

Aida Vafae Eslahi [1], Negar Sheikhdavoodi [2], *Milad Badri [1,2]

1. *Medical Microbiology Research Center, Qazvin University of Medical Sciences, Qazvin, Iran*
2. *Metabolic Diseases Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University of Medical Sciences, Qazvin, Iran*

Received 20 Nov 2022
Accepted 18 Feb 2023

Keywords:
Crusted scabies;
Kidney transplant;
Septic shock

***Correspondence Email:**
badri22.milad@gmail.com

Abstract
Crusted scabies (CS) is an extremely contagious variant of classical scabies with substantial morbidity and mortality. It is the most prevalent in immunocompromised patients, those with some underlying diseases, and individuals with physical and mental disabilities. Herein, we report a 70-year-old woman who presented with generalized erythema with itchy hyperkeratotic plaques and crusted lesions on her face, hands, between fingers, neck, scalp, abdomen, and legs up to the knees. She was diagnosed with CS and subsequently isolated and treated with ivermectin (200 µg/kg) and 5% permethrin cream. She died a short time after being admitted, and it was due to severe septic shock and cardiac arrest. Immediate isolation and treatment of CS patients is essential to prevent morbidity and mortality. Prompt diagnosis and precise medical management in both patients and healthcare settings is required.

Introduction

Scabies is a Neglected Tropical Disease (NTD) caused by infestation of *Sarcoptes scabiei* var. *hominis* mite (1,2). It is regarded as one of the 30 most prevalent diseases in humans with more than 200 million annual cases worldwide (3). CS also called Norwegian scabies and was first discovered and reported by Danielsen and Boeck in 1848 in a patient with leprosy in Norway (4). It is a severe and extremely contagious form of the disease with large-scale and widely disseminated erythematous plaques which appear following the uncontrolled proliferation and heavy mite burden of *S. scabiei* in the horny layer of the epidermis (2,5). Hyperkeratosis is a

hallmark clinical presentation of this rare variant of the disease that purported to be due to the elevated levels of interleukin-4 (IL-4).

The development of CS is highly related to defective T-cell immune response. It typically occurs in immunocompromised conditions, and immunosuppressive therapies (e.g., using corticosteroids), some underlying diseases as well as physical and mental disabilities, which are among the risk factors of the disease (2,5,6). The incubation period for the first infestation of the mite is between 3 to 6 weeks, and it may reduce to 1-3 days in case of re-infestation (6). The infection is mainly transmitted throughout the direct skin-to-skin contact. However, mites are transmitted between people indirectly via fabric materials such as bedding and clothing that is mostly common in hyperinfested conditions similar to CS (7). CS is significantly correlated with mortality and it often progresses to sepsis (8). So far, twelve cases of CS have been reported from Iran (Table 1). Here we report a case of CS from Qazvin, northwest of Iran in 2022.

Table 1: Characteristics of patients with crusted scabies in Iran based on reported in the literature

NO	*Sex |age| region| year of report*	*Risk factors*	*Symptoms |signs*	*Diagnostic methods*	*Treatment*	*Outcome*	*Ref.*
1	M \ 70 \ Tehran \ 2002	No history of significant medical problems	Psoriasiform plaques that were teeming with scabies mites and egg \ hyperkeratotic, scaly plaques on the trunk, abdomen, and extremities	Scraping method	-	Alive	(9)
2	M\ 31\ Tehran\ 2010	Brain tumour (astrocytoma)	Pruritic rashes of 5-month duration diffuse scaly erythematous papules on the patient's trunk and upper and lower limbs	Scraping method	Lindane lotion	Died as a result of the brain tumour in October 2007	(10)
3	M\ 55 \ Tabriz/2014	Diabetes and hypertension	Hyperkeratotic, erosive nodules scattered over the trunk and limbs presented honey-coloured crusting and burrow	Scraping method	Topical sulphur ointments (6%), oral ivermectin 3mg/Kg on days 1 and 15, and sedating antihistamines	Alive	(11)
4	F\ 30 \ Shiraz \ 2018	History of a thermal burn, and using topical corticosteroid for the past 3 months.	Severe pruritus and a burning sensation for 3 months and thick erythematous scaling plaques at the site of infection.	Scraping method, and pathologic slide	Permethrin 5%	Alive	(12)
5	M \55\ Khuzestan\ 2019	Renal transplant	Dermatitis lesions and itching with sever hyperkeratosis, several macula and papules on neck and armpits for one-month duration.	Scraping method, and pathologic slide	Permethrin 5%	Alive	(13)
6	M \ 49 \ Khuzestan\ 2019	Diabetic mellitus, and Autoimmune disease	Severe rash, hyperkratosis, and itching over his thigh, buttock and legs	Scraping method, and pathologic slide	Permethrin 5%	Alive	(13)
7	Two patients \ Gonabad \ 2019	Mentally handicapped	Hand skin thickening, skin lesion and rash under armpit, Inflammation of the skin in the armpit	Scraping method	Permethrin 5%	Alive	(14)
8	M \ 57 \ Mashhad \ 2020	3-year history of refractory, biopsy-confirmed mucocutaneous pemphigus vulgaris	Severe burning sensation on dry patches of her skin. diffuse, fine white scale on the trunk and extremities, most prominent on multiple, dusky erythematous plaques	Scraping method	Ivermectin and 5% permethrin cream	Alive	(15)
9	F \ 43 \ Tehran \ 2020	4-year history of moderate plaque-type psoriasis and using topical corticosteroid	Yellow-erythematous hyperkeratotic plaques on the trunk, extremities, face, and the scalp	Scraping method, and pathologic slide	Permethrin 5%	Alive	(16)
10	M \ 85 \ Isfahan\ 2021	No history of significant medical problems	Severe itching and a pimple-like rash in the neck, buttocks, and waist area.	Scraping method	-	Alive	(17)
11	F\ 2 month\ Kashan\ 2022	Severe night itching and cutaneous lesions	Multiple excoriated papules and erythematous lesions on her abdomen, back, legs, and arms, palms and between fingers	Scraping method	Permethrin 5%	Alive	(18)

Ethical considerations

Ethical approval was required and provided for this study, as stated by our institutional review board no. IR.QUMS.REC.1401.031.

A 70-year-old woman with a severely altered general condition, decreased urine volume, shortness of breath, nausea, vomit, generalised dermatosis, and pruritus was admitted to the intensive care unit (ICU) of Velayat Hospital, Qazvin, Iran. She was an insulin-dependent diabetic patient with a history of kidney transplant, an elevated serum creatinine level (6 mg/dL), grade II fatty liver, and asthma. As the patient was a kidney transplant recipient, she was using corticosteroid immunosuppressant including prednisolone, cyclosporine, and mycophenolate continuously. Her vital signs revealed a heart rate of 90 beats per minute, and a blood pressure of 90/60 mm Hg. The dermal lesions and pruritus started 9 months ago, and they have become exacerbated during the last few weeks. On clinical examination, we observed generalized erythema with itchy hyperkeratotic plaques and crusted lesions on the face, hands, between fingers, neck, scalp, abdomen, and legs up to the knees (Fig. 1).

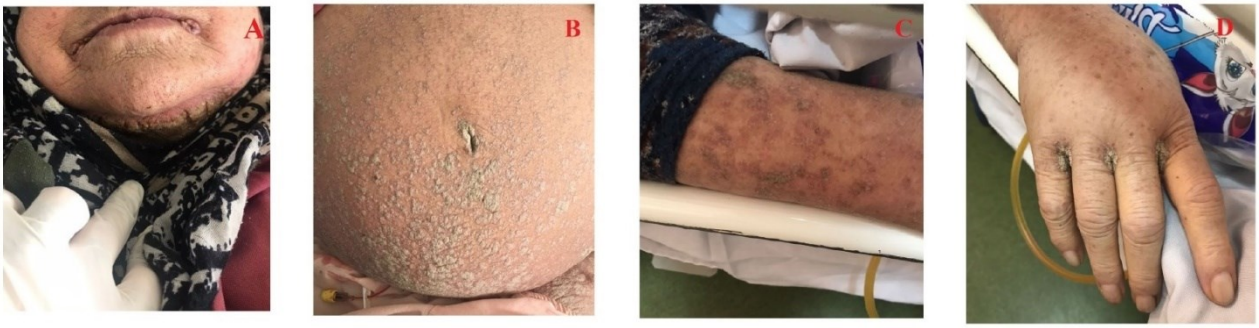

Fig. 1: Hyperkeratosis plaques and cursed lesions on chin (A), trunk (B), arm (C) and finger web spaces (D)

Skin specimens were collected and examined by direct microscopy. The detection of a high concentration of *S. scabiei* mites, with ova and faeces, confirmed that the case is CS. After diagnosis, the patient was maintained in isolation to prevent the possible outbreak in the hospital. Oral ivermectin (200 µg/kg) and 5% topical permethrin cream were initiated. Unfortunately, treatment of her condition was ineffective and, she died a short time after being admitted. The cause of death was related to septic shock and heart failure.

Discussion

CS is a cosmopolitan and highly contagious dermatitis that commonly develops in patients with T-cell lymphoma and leukaemia, HTLV-I, HIV, diabetes mellitus, organ transplantation, in subjects that have received systemic steroid treatment, and in elderly patients (5,19,20). Moreover, this variant of scabies has been documented in patients with different neuropathies, mental retardation, Down syndrome, systemic lupus erythematosus, rheumatoid arthritis, and malnutrition (5).

Rahdar et al. reported CS in two male patients (55-year-old and 49-year-old) in Ahvaz, Southwest Iran. One of them was a patient with diabetes mellitus and autoimmune disease, and the other had a history of renal transplant. The clinical signs of the patients were dermatitis lesions, itching, and sever hyperkeratosis along with several macula and papules on the neck and armpits (13). Yaghoob et al. reported a case of CS in a 55-year-old man with a history of diabetes and

hypertension in Tabriz, northwestern Iran. The patient presented with scratching lesions and marked scaling, hyperkeratosis, and erosive nodules on the trunk and limbs (11).

The remarkable clinical manifestation of CS is a thick crust with a considerable number of mites and increased keratin production in the stratum corneum (5). This infection has a higher severity and it is more contagious than classical scabies (19). Fatal secondary bacterial sepsis has been observed in cases, especially in HIV patients with scabies (8,19,21). Patients with CS are a potential source of scabies outbreaks because they are heavily infested with mites. Skin-to-skin contact is the primary mode of transmission. Thus, hospitalization of the patient, room isolation, disinfecting of fomites, and wearing protective garments are highly recommended to reduce the risk of transmission to individuals in physical contact with these cases and to prevent institutional outbreaks (5). The control and management of fluid and electrolyte balance are required. The suggested treatment strategies involve a combination of topical and oral prescriptions. The topical medications consist of scabicides, such as keratolytic agents (e.g. salicylic acid and urea), and permethrin 5% cream (5,19,22). Also, it is required to repeat the application of topical scabicides for 3-day intervals up to two parasitological examinations that become negative (19). The oral treatment is carried out via 200 µg per kg of ivermectin taken in five doses, which are administrated on days 1, 2, 8, 9, and 15. In severe cases, an additional two doses were administrated on days 22 and 29 (5,19,22). Prophylactic oral treatment with ivermectin (200 µg/kg) on days 1 and 14 is recommended for individuals who are in contact with CS patients (5). Furthermore, for efficient treatment of hyperkeratosis, soaking in a hot bath can help to decrease the mite load and increase the effectiveness of topical prescriptions (23,24). As well, clipping fingernails and brushing nails with a scabicidal agent may be an effective approach during treatment procedures (19).

Conclusion

The current study is the first report of CS in Qazvin Province, Iran. The most common complications associated with CS are delayed diagnosis, impaired treatment, recurrent infection, as well as mortality due to secondary infections. We suggest that consideration should be given to prompt recognition in elderly diabetic patients and transplant recipients who are exposed to environments contaminated with *S. scabiei* mites. Delayed diagnosis in these cases may cause secondary bacterial infection and, consequently, septic shock. Immediately after the diagnosis of CS, the isolation and treatment of the patient is required to limit morbidity and mortality. Furthermore, the hyper-infestation condition in CS makes it a highly contagious disease, which may lead to an outbreak. Hence, there is a necessity for rapid diagnosis and precise medical management in both affected patients and healthcare settings. Moreover, additional research regarding an effective anti-mite vaccine for the prevention of scabies or CS is needed.

Acknowledgements

The authors would like to thank the medical staff of the Velayat Hospital in Qazvin, Iran.

Conflict of interest

No potential conflict of interest was reported by the authors.

References

1. Engelman D, Cantey PT, Marks M, Solomon AW, Chang AY, Chosidow O, et al. The public health control of scabies: priorities for research and action. Lancet. 2019;394(10192):81–92.
2. Binić I, Janković A, Jovanović D, Ljubenović M. Crusted (Norwegian) scabies following systemic and topical corticosteroid therapy. J Korean Med Sci. 2010;25(1):188–91.

3. Hindle IJ, Forbes LK, Carver S. The effect of spatial dynamics on the behaviour of an environmentally transmitted disease. J Biol Dyn. 2022;16(1):144–59.
4. Niode NJ, Adji A, Gazpers S, Kandou RT, Pandaleke H, Trisnowati DM, et al. Crusted Scabies, a Neglected Tropical Disease: Case Series and Literature Review. Infect Dis Rep. 2022;14(3):479–91.
5. Cuellar-Barboza A, la Garza JA, Garc'ia-Lozano JA, Martinez-Moreno A, Jaramillo-Moreno G, Ocampo-Candiani J. A case of hyperkeratotic crusted scabies. Public Library of Science San Francisco, CA USA; 2020.
6. Karthikeyan K. Crusted scabies. Indian J Dermatol Venereol Leprol. 2009;75(4):340-7.
7. Engelman D, Steer AC. Control strategies for scabies. Trop Med Infect Dis. 2018;3(3):98.
8. Cartron AM, Boettler M, Chung C, Trinidad JC. Crusted scabies in an elderly woman. Dermatol Online J. 2020;26(10).
9. Namazi MR, Barikbin B. Atypical crusted scabies in an Iranian man. Dermatol Online J. 2002;8(2):17.
10. Mortazavi H, Abedini R, Sadri F, Soori T, Vasheghani-Farahani A. Crusted scabies in a patient with brain astrocytoma: Report of a case. Int J Infect Dis. 2010;14(6):e526--e527.
11. Yagoob G, others. A case-report of *Sarcoptes scabiei* var. *hominis* in a 55-year-old male sheepherder in Tabriz, Iran. Indian J Fundam Appl Life Sci. 2014;4(3):228–30.
12. Dastgheib L, Boroujeni NH, Aslani FS. Crusted scabies masquerading as psoriasis plaques in a patient suffering from burn scars. Dermatol Online J. 2018;24(6).
13. Rahdar M, Maraghi S. Norwegian scabies in two immune-compromised patients: a case report. Iran J Public Health. 2019;48(6):1169.
14. RIABI HRA. The Outbreak of Classic and Norwegian Type Scabies, in Mentally Handicapped Persons in a Rehabilitation Centre-Iran. J Clin & Diagnostic Res. 2019;13(3).
15. Ashrafzadeh S, Layegh P. Crusted scabies in a patient with pemphigus vulgaris after treatment with rituximab and corticosteroids. JAAD Case Reports. 2020;6(8):722–4.
16. Azizpour A, Nasimi M, Ghanadan A, Mohammadi F, Shakoei S. Crusted scabies complicated with *Herpes simplex* and sepsis. Indian J Dermatol. 2020;65(4):304.
17. Soleimanifard S, Hejazi SH, Abtahi SM. A Case of Crusted Scabies in Isfahan, Iran. J Isfahan Med Sch. 2021;39(647):821–5.
18. Rasti S, Talaee R, Abdoli A. Disseminated scabies in a 2-month-old infant. Clin Case Rep. 2022;10(9):e6334.
19. Paparizos V, Vasalou V, Velissariou E, Kourkounti S, Daskalakis E, Rigopoulos D. Norwegian scabies presenting as erythroderma in HIV: A case report. Infez Med. 2019;27(3):332–5.
20. Rahdar M, Vazirianzadeh B, Maraghi S. A case report of *Sarcoptes scabiei* infection in Ahwaz, Iran. J Arthropod Borne Dis. 2008;2(1):44–8.
21. Wang MK, Chin-Yee B, Lo CK-L, Lee S, El-Helou P, Alowami S, et al. Crusted scabies in a renal transplant recipient treated with daily ivermectin: a case report and literature review. Transpl Infect Dis. 2019;21(3):e13077.
22. Perna AG, Bell K, Rosen T. Localised genital Norwegian scabies in an AIDS patient. Sex Transm Infect. 2004;80(1):72–3.
23. Mahajan SA, Chhonkar A, Dave JS, Muhammed N. Unusual presentation of crusted scabies with osteolysis in immunocompetent. Australas J Dermatol. 2021;62(4):e563--e567.
24. Baumrin E, Piette E, Micheletti R. A crusted rash in a patient with AIDS. JAMA. 2015;313(3):298–9.