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Methicillin-Resistant *Staphylococcus aureus* Secondary Infection as a Comorbid in Crusted Scabies Patient

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Abstract

Introduction: *Crusted scabies* (CS) is characterized by uncontrolled proliferation of mites up to thousands. Complications include glomerulonephritis, rheumatic fever, and secondary infection which can cause bacteremia and sepsis. This case report describes a case of CS that was hospitalized with secondary complications of *MRSA* infection. **Case Presentation:** A 44-year-old woman complained of thick scales and itching all over her body for 6 months. Complaints begin with reddish bumps between the fingers, toes, body, genitals, and scalp, accompanied by itching, especially at night. The patient took self-purchased corticosteroids for this complaint for 6 months. Dermatology status all over the body showed erythematous papules plaques with greenish-yellow scales, blackish crusts, hyperkeratosis, and excoriation, also erythematous base erosions and blackish crusts in the right thoracic region. Ectoparasite scrapping examination showed large amounts of *Sarcoptes scabiei*, eggs, and scybala, so the patient was diagnosed with Crusted scabies. A wound culture and nasal swab showed *MRSA*. The patient died of septic shock on day 12 of treatment. **Discussion:** Crusted scabies is a highly contagious form of scabies, characterized by thickening of the skin layer and crusts. Long-term corticosteroid consumption in this case caused a compromised immune response so that the number of mites multiplied rapidly and increased the risk of *MRSA* infection. *MRSA* mortality rates range from 5-60%. **Conclusion:** Ignored cases of scabies can develop into crusted scabies which have a high risk of secondary infection, such as *MRSA* which can cause serious morbidity and even mortality.

Keywords: *Crusted scabies, Methicillin – Resistant Staphylococcus aureus*

Case Report

INTRODUCTION

Crusted scabies (CS) or called *Norwegian scabies* is characterized by uncontrolled proliferation of mites up to thousands. Crusted scabies typically affects individuals in immunocompromised individuals (Chandler, 2019). In this condition, the number of mites can increase rapidly (Sunderkötter et al., 2021)

The World Health Organization (WHO) estimates there are 200 million cases of scabies globally with Indonesia having the highest incidence among 195 countries. There is no data on the prevalence of crusted scabies, either globally or in Indonesia (World Health Organization, 2020).

Scabies are typically spread through direct skin-to-skin contact or by touching items that have come into contact with contaminated material (fomites) (Murray RL & Crane JS, 2024). Crusted scabies clinically present as hyperkeratotic dermatosis, usually affecting the palms and soles of the feet, often accompanied by deep skin fissures, generalized lymphadenopathy, eosinophilia, and increased serum IgE levels. Secondary bacterial infections are common and associated with increased morbidity and mortality due to the frequent occurrence of secondary infections and the evolution of sepsis (Leung et al., 2019).

Complications that can arise are secondary infections by *Streptococcus pyogenes* or *Staphylococcus aureus* (Rahmawati et al., 2022). Complications include glomerulonephritis, rheumatic fever, and secondary infection. Crusted scabies have been associated with a high mortality rate of approximately 50% over the past five years, primarily due to the risk of sepsis or secondary infections (Niode et al., 2022). A delayed or missed diagnosis of crusted scabies can lead to severe complications, including potentially life-threatening infections caused by *methicillin-resistant Staphylococcus aureus* (MRSA) (Lin et al., 2009).

This case report will discuss a case of CS in the immunocompromised patient that was hospitalized with secondary complications of MRSA infection. This case explains the importance of early diagnosis of crusted scabies in immunocompromised patients to prevent secondary infections that can cause death.

CASE PRESENTATION

A 44-year-old woman complained of thick scales and itching all over her body for 6 months. Complaints begin with reddish bumps between the fingers, toes, body, genitals, and scalp, accompanied by itching, especially at night with VAS 7/10. Some bumps scratched and turn into scabs then become thick scales in several parts and felt painless at under her breast. The patient also experienced swelling on the face but had not realized it since. The patient took self-purchased corticosteroids for this complaint for 6 months. One month ago the patient was hospitalized at a private hospital in Malang for 4 days with the same complaint. The patient's husband and daughter also experienced similar complaints, with bumps appearing on their hands that felt itchy.

Dermatology status all over the body showed erythematous papules plaques with greenish-yellow scales, blackish crusts, hyperkeratosis, and excoriation, also erythematous base erosions and blackish crusts in the right thoracic region with total body surface area was 33% (Figure 1). Ectoparasite scrapping examination showed large amounts of *Sarcoptes scabiei*, eggs, and scybala (Figure 2), so the patient was diagnosed with Crusted scabies. The *Medical Crusted (Norwegian) Scabies Grading Scale and Treatment* score was 10 and included in grade 3, so the patient was given 7 doses of ivermectin (day 0, 1, 7, 8, 14, 21, 28) (Table 1). Abnormal results on laboratory examination were anemia (Hb: 8.8), eosinophilia (16.00), lymphopenia (16.9), and hypoalbuminemia (1.9).



Figure 1. Dermatological status

- ▲ erythematous papules plaques with greenish-yellow scales, blackish crusts, hyperkeratosis, and excoriation
- erythematous base erosions and blackish crusts ▲

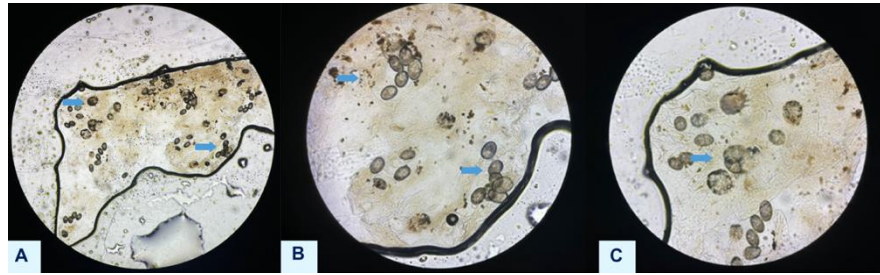


Figure 2. Ectoparasite scarring examination showed large amounts of *Sarcoptes scabiei*, eggs, and scybala (A 400x magnification, B and C 400x magnification)

Table 1. Medical Crusted (Norwegian) Scabies Grading Scale and Treatment score was 10 and included grade 3 (Davis et al., 2013).

| Medical Crusted (Norwegian) Scabies Grading Scale and Treatment | |
|--|---|
| (A) Distribution and extent of crusting | |
| 1. Wrists, web spaces, feet only (<10% Total Body Surface Area) | |
| 2. Above plus forearms, lower legs, buttocks, trunk or 10-30% TBSA | |
| 3. Above plus scalp OR >30% TBSA | |
| (B) Crusting / Shedding | |
| 1. Mild crusting (<5mm depth of crust), minimal skin shedding | |
| 2. Moderate (5-10mm) crusting, moderate skin shedding | |
| 3. Severe (>10mm), profuse skin shedding | |
| (C) Past Episodes | |
| 1. Never had it before | |
| 2. 1-3 prior hospitalizations for crusted scabies OR depigmentation of elbows, knees | |
| 3. >=4 prior hospitalizations for crusted scabies OR depigmentation as above PLUS legs/back or residual skin thickening / ichthyosis | |
| (D) Skin Condition | |
| 1. No cracking or pyoderma | |
| 2. Multiple pustules and/or weeping sore and/or superficial skin cracking | |
| 3. Deep skin cracking with bleeding, widespread purulent exudates | |
| SCORE FOR GRADING: | 4-6 = Grade 1 7-9 = Grade 2 10-12 = Grade 3 |
| Ivermectin dosing: 200mcg/kg rounded up to nearest 3mg, taken with food for better bioavailability | |
| Grade 1: 3 doses: | Days 0,1, 7 |
| Grade 2: 5 doses: | Days 0,1, 7,8, 14 |
| Grade 3: 7 doses: | Days 0,1, 7,8, 14, 21, 28 |

The patient received therapy of Ivermectin orally 12 mg (equivalent to 200 mcg/kgBB) 7 times, on day 0, 1, 7, 8, 14, 21, 28, PO Cetizirine 2 x 10 mg, Permethrine 5% cream left for 8-12 hours used 7 days in a row, wound dressing NS 3x10 minutes + Gentamicin ointment 2dd ue on the erosion area. Before administering ivermectin, ensured that the patient does not experience impaired liver or kidney function. On the 5th day the patient was treated, the patient's leukocyte value was increased and was given Cloxacilin 4x500 mg. During the treatment period, ectoparasite scarring was carried out after 1 week of therapy with the finding that the number of mites, eggs and scabala were decreasing and skin complaints were getting better (Figure 3). The patient's wound culture swab and nasal swab showed the presence of MDR (Multidrug Resistant Acinetobacter) *Acinetobacter baumannii* and *Methicillin Resistant Staphylococcus aureus (MRSA)*. After 8 days of treatment, the patient experienced respiratory distress due to HAP (Hospital Acquired Pneumonia) high risk of MRSA, so he was given additional oxygen therapy with a 2-4 lpm nasal cannula and Levofloxacin injection 1 x 750 mg. Laboratory results showed cortisol within normal limits, leukocytosis (18,300), increased CRP (12.36) and procalcitonin (25.0). The patient died of septic shock on the 12th day of treatment.

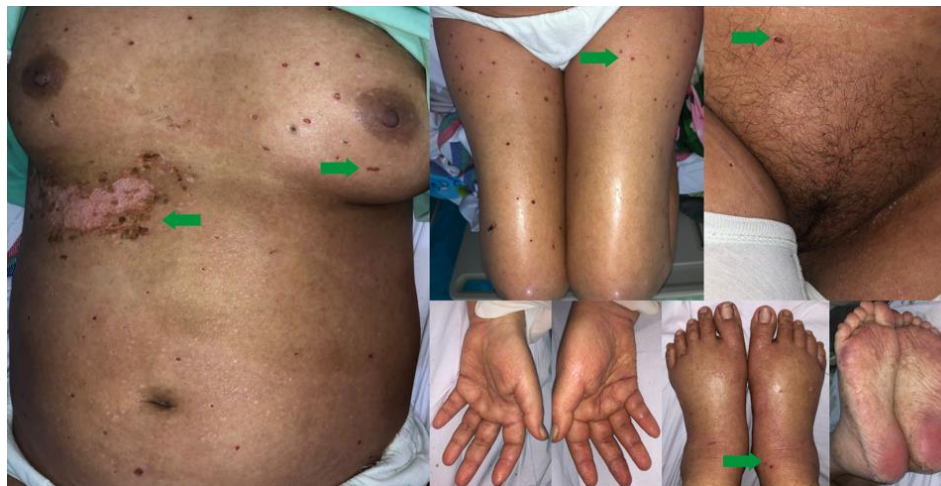


Figure 3. Dermatological status Status dermatologis on the 12th day of follow-up
- erythematous base erosions and blackish crusts

DISCUSSION

Crusted scabies (*Norwegian scabies*) is a relatively uncommon variant of the skin condition scabies. caused by infestation mites up to thousands (Lause et al., 2023). CS mainly occurs in patients with HIV/AIDS, Down syndrome, long-term corticosteroid use, and malnutrition (Arlan & Morgan, 2017). The suppression of immune system and the poor ability of host to stop mite proliferation can results mite hyperinfestation (Meraz Soto et al., 2023). In this case report, the patients complained of thick scales and itching all over her body for 6 months. Complaints begin with reddish bumps between the fingers, toes, body, genitals, and scalp that felt itchy especially at night with VAS 7/10. Some bumps scratched and turn into scabs then become thick scales in several parts. One month ago the patient was hospitalized at a private hospital in Malang with the same complaint. The patient's husband and daughter also experienced similar complaints, bumps appearing on their hands that felt itchy.

Crusted scabies is more severe symptoms than those of classic scabies, contains a large number of mites (Wijaya et al., 2024). Crusted scabies is a highly contagious form of scabies, characterized by thickening of the skin layer and crusts (Lydiawati et al., 2019). Dermatology status all over the body in this patient showed erythematous papules plaques with greenish-yellow scales, blackish crusts, hyperkeratosis, and excoriation, also erythematous base erosions and blackish crusts in the right thoracic region with total body surface area was 33%.

Definitive diagnosis by microscopic identification of *Sarcoptes scabiei*, eggs, or scybala (Engelman et al., 2020). There are 3 classifications the severity of Crusted Scabies according to *Medical Crusted (Norwegian) Scabies Grading Scale and Treatment* that assessed from the aspects of crust distribution and expansion, crust thickness, past history episodes, and skin condition (Chandler & Fuller, 2019). Ectoparasite scrapping examination in this case report showed large amounts of *Sarcoptes scabiei*, eggs, and scybala.

The rash and itch in scabies shows features of both immediate (type I) and delayed (type IV) hypersensitivity reactions (Bhat et al., 2017). While the pathophysiology of non-crusting scabies classically involves Th1-mediated immune responses playing a dominant role, Th2 immune responses play a more significant role in the pathogenesis of crusted scabies (Ständer & Ständer, 2021).

Administration of oral ivermectin at a moderate dose of 200 mcg/kgBW can be adjusted according to the degree of severity, namely 3x the dose (mild, score 4-6), 5x the dose (score 7-9), and 7x the dose (severe 10-12) (Chandler & Fuller, 2019). Cochrane recently concluded that 5% permethrin and ivermectin is highly effective (Rosumeck et al., 2018). The Royal Darwin Hospital Infectious Diseases Department Protocol, namely grades 1-3 which are assessed from the aspects of crust distribution and expansion, crust thickness, past episodes, and skin condition (Davis et al., 2013). The patient was diagnosed with Crusted scabies. The *Medical Crusted (Norwegian) Scabies Grading Scale*

and Treatment score was 10 and included in grade 3, so the patient was given 7 doses of ivermectin (day 0, 1, 7, 8, 14, 21, 28).

Complications of scabies such as secondary bacterial infection of the burrow by *Staphylococcus aureus* and *Streptococcus pyogenes* can result in bacteremia and sepsis (Rahdar & Maraghi, 2019). In crusted scabies which experiences secondary infection, the surface of the skin can become a wound caused by scratching (Rahmawati *et al.*, 2022). A case report showed an erythematous plaque that developed into a thick, brown-yellow-gray crust (Alexandris *et al.*, 2024). These patients also complained of sores under her breasts that appear after the patient often scratches that area. The right thoracic region showed erythematous base erosions and blackish crusts and gram examination revealed PMN and Coccus.

Individuals with compromised immune systems, especially immunocompromised immune conditions such as lymphoma, acquired immunodeficiency syndrome, immunosuppressive and corticosteroid treatment, malnutrition, can develop a severe form of scabies called Crusted Scabies (Zhang *et al.*, 2022). The patient also experienced swelling on the face had not realized since when. The patient took self-purchased corticosteroids for this complaint for 6 months. The patient was immunocompromised due to long term consumption of corticosteroids and diagnosed as Cushing's syndrome by internal medicine department.

High scabies-related mortality has been reported due to *Staphylococcus aureus* bacteremia (Khan *et al.*, 2018). Delayed or missed diagnosis of CS can result in serious morbidity and mortality, including secondary infections with life-threatening *Methicillin Resistant Staphylococcus aureus* (MRSA) (Manyindo *et al.*, 2022). If septicemia occurs, aggressive treatment with broad-spectrum antibiotics is necessary (Asnawi *et al.*, 2023). MRSA mortality rates range from 5-60%, depending on the patient population and location of infection. About 60% of patients get MRSA within 48 hours (Abdul & Janak, 2023). The patient's wound and nasal culture showed the presence of *MDR Acinetobacter baumannii* and *Methicillin Resistant Staphylococcus aureus* (MRSA). After 8 days of treatment, the patient experienced respiratory distress due to HAP high risk of MRSA, so he was given additional oxygen therapy with a 2-4 lpm nasal cannula and Levofloxacin injection 1 x 750 mg. Laboratory results showed cortisol within normal limits, leukocytosis (18,300), increased CRP (12.36) and procalcitonin (25.0). The patient died of septic shock on the 12th day of treatment.

In this case, Long-term corticosteroid consumption in this case caused a compromised immune response so that the number of mites multiplied rapidly and increased the risk of MRSA infection. This infection increases because the patient is hospitalized.

CONCLUSION

Reported a death case of a 44 years old woman with Crusted scabies in immunocompromised patient due to long term consumption of corticosteroids. The patient was accompanied by a secondary MRSA infection and was diagnosed with HAP high risk of MRSA, the wound culture swab and nasal swab culture showed the presence of *MDR Acinetobacter baumannii* and *Methicillin Resistant Staphylococcus* (MRSA). Ignored cases of scabies can develop into crusted scabies which have high risk of secondary infection, such as *Methicillin Resistant Staphylococcus Aureus* (MRSA) which can cause serious morbidity and even mortality.

Limitation of this case report is no generalizations can be made based on this case report, but can provide information for diagnosing and managing crusted scabies in the future to prevent secondary infections that can cause morbidity and mortality.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

- Abdul H. Siddiqui, & Janak Koirala. (2023). Methicillin-resistant *Staphylococcus aureus*. In *Treasure Island (FL): StatPearls Publishing*. <https://pubmed.ncbi.nlm.nih.gov/29489200/>
- Alexandris, D., Alevizopoulos, N., Nennes, P., Basagianni, E., Rousou, P., Kioupi, M., & Gerakini, F. (2024). Case report of crusted scabies, brief review of its pathophysiology and latest data. *AME Case Reports*, 8, 30–30. <https://doi.org/10.21037/ACR-23-125>
- Arlian, L. G., & Morgan, M. S. (2017). A review of *Sarcoptes scabiei*: past, present and future. *Parasites & Vectors*, 10(1). <https://doi.org/10.1186/S13071-017-2234-1>
- Asnawi, V., Maulida, M., Hidayati, A., Gunawan, H., Hindritiani, R., & Dwiyan, R. F. (2023). Combination of Crusted Scabies with Bullous Scabies: A Rare Case. *International Medical Case Reports Journal*, 16, 153–158. <https://doi.org/10.2147/IMCRJ.S396234>
- Bhat, S. A., Mounsey, K. E., Liu, X., & Walton, S. F. (2017). Host immune responses to the itch mite, *Sarcoptes scabiei*, in humans. *Parasites & Vectors* 2017 10:1, 10(1), 1–12. <https://doi.org/10.1186/S13071-017-2320-4>
- Chandler, D. J., & Fuller, L. C. (2019). A Review of Scabies: An Infestation More than Skin Deep. *Dermatology (Basel, Switzerland)*, 235(2), 79–80. <https://doi.org/10.1159/000495290>
- Davis, J. S., McGloughlin, S., Tong, S. Y. C., Walton, S. F., & Currie, B. J. (2013). A novel clinical grading scale to guide the management of crusted scabies. *PLoS Neglected Tropical Diseases*, 7(9). <https://doi.org/10.1371/JOURNAL.PNTD.0002387>
- Engelman, D., Yoshizumi, J., Hay, R. J., Osti, M., Micali, G., Norton, S., Walton, S., Boralevi, F., Bernigaud, C., Bowen, A. C., Chang, A. Y., Chosidow, O., Estrada-Chavez, G., Feldmeier, H., Ishii, N., Lacarrubba, F., Mahé, A., Maurer, T., Mahdi, M. M. A., ... Fuller, L. C. (2020). The 2020 International Alliance for the Control of Scabies Consensus Criteria for the Diagnosis of Scabies. *British Journal of Dermatology*, 183(5), 808–820. <https://doi.org/10.1111/BJD.18943>
- Khan, T. M., Kok, Y. L., Bukhsh, A., Lee, L. H., Chan, K. G., & Goh, B. H. (2018). Incidence of methicillin resistant *Staphylococcus aureus* (MRSA) in burn intensive care unit: a systematic review. *Germs*, 8(3), 113–125. <https://doi.org/10.18683/GERMS.2018.1138>
- Lause, M., Libson, K., Korman, A. M., Colburn, N., Day, S., Greer, M., Hardgrow, M., Malcolm, K., Mcginnis, M., Seely, E., Smyer, J., & Trinidad, J. (2023). Crusted scabies at a tertiary care center: Case series and cautionary tale. *JAAD Case Reports*, 41, 17. <https://doi.org/10.1016/J.JDCR.2023.08.030>
- Leung, A. K. C., Leong, K. F., Lam, J. M., & Li, A. M. (2019). Pruritic Crusted Scabies in an Immunocompetent Infant. *Case Reports in Pediatrics*, 2019(1), 9542857. <https://doi.org/10.1155/2019/9542857>
- Lin, S., Farber, J., & Lado, L. (2009). A case report of crusted scabies with methicillin-resistant *Staphylococcus aureus* bacteremia. *Journal of the American Geriatrics Society*, 57(9), 1713–1714. <https://doi.org/10.1111/J.1532-5415.2009.02412.X>
- Lydiawati, E., Agusni, I., Murtiastutik, D., Ervianti, E., Sawitri, Indranarum, T., Widyantari, S., & Mappamasing, H. (2019). Crusted scabies in systemic lupus erythematosus: More than a mite contagious case. *Dermatology Reports*, 11(s1), 163–165. <https://doi.org/10.4081/dr.2019.8085>
- Manyindo, N., Pamireddy, P., McDonald, M., Vijayan, J., Adenuga, B., & Adams, R. (2022). Severe methicillin-resistant *staphylococcus aureus* septicemia in a case of misdiagnosed crusted (Norwegian) scabies. *Clinical Geriatrics*, 19(8), 43–47. https://www.researchgate.net/publication/289162301_Severe_methicillin-

[resistant staphylococcus aureus septicemia in a case of misdiagnosed crusted Norwegian scabies](#)

- Meraz Soto, J. M., Alvarado Motte, R. A., Ramírez Carrillo, P., Meraz Soto, A. A., Bayón Villaseñor, V., & Cheirif Wolosky, O. (2023). Crusted Hyperkeratotic Scabies: A Case Report. *Cureus*, 15(2). <https://doi.org/10.7759/CUREUS.34520>
- Murray RL, & Crane JS. (2024). *Scabies - StatPearls - NCBI Bookshelf*. Treasure Island (FL): StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK544306/>
- Niode, N. J., Adji, A., Gazpers, S., Kandou, R. T., Pandaleke, H., Trisnowati, D. M., Tumbelaka, C., Donata, E., Djaafara, F. N., Kusuma, H. I., Rabaan, A. A., Garout, M., Almuthree, S. A., Alhani, H. M., Aljeldah, M., Albayat, H., Alsaheed, M., Alfouzan, W. A., Nainu, F., ... Tallei, T. E. (2022). Crusted Scabies, a Neglected Tropical Disease: Case Series and Literature Review. *Infectious Disease Reports*, 14(3), 479–491. <https://doi.org/10.3390/IDR14030051>
- Rahdar, M., & Maraghi, S. (2019). Norwegian Scabies in Two Immune-Compromised Patients: A Case Report. *Iranian Journal of Public Health*, 48(6), 1169–1173. <https://doi.org/10.18502/IJPH.V48I6.2933>
- Rahmawati, N. A., Chomariyati, A., & Mudjanarko, S. W. (2022). A fatal case of Norwegian scabies in a patient with diabetes mellitus. *Bali Medical Journal*, 11(2), 870–874. <https://doi.org/10.15562/BMJ.V11I2.3500>
- Rosumeck, S., Nast, A., & Dressler, C. (2018). Ivermectin and permethrin for treating scabies. *The Cochrane Database of Systematic Reviews*, 4(4). <https://doi.org/10.1002/14651858.CD012994>
- Ständer, S., & Ständer, S. (2021). Itch in Scabies—What Do We Know? *Frontiers in Medicine*, 8, 628392. <https://doi.org/10.3389/FMED.2021.628392>
- Sunderkötter, C., Wohlrab, J., & Hamm, H. (2021). Scabies: Epidemiology, Diagnosis, and Treatment. *Deutsches Arzteblatt International*, 118(41), 695–704. <https://doi.org/10.3238/ARZTEBL.M2021.0296>
- Wijaya, H., Kollins, F., Lubis, I. ND., Pasaribu, A. P., Evalina, R., Nababan, K. A., & Paramita, D. A. (2024). Norwegian scabies in human immunodeficiency virus and tuberculosis-infected child: A case report. *Narra J*, 4(1), e661. <https://doi.org/10.52225/NARRA.V4I1.661>
- World Health Organization. (2020). *Scabies*. <https://www.who.int/news-room/fact-sheets/detail/scabies>
- Zhang, L. Y., Yu, X., Zou, J. J., Hu, Y. H., Jie, L., Wu, Y. W., & Fang, M. P. (2022). Norwegian Scabies Mimicking Seborrheic Scalp Dermatitis in a Patient with Chronic Hepatitis C. *International Journal of Dermatology and Venereology*, 3(1), 52–55. <https://doi.org/10.1097/JD9.000000000000059>