Scabies-Associated Secondary Bacterial Abcess in a Boarding School Student: A Case Report

Dinar Ardi
Faculty of Medicine Universitas 17 Agustus 1945 Surabaya
E-mail: dinarardi@untag-sby.ac.id

ABSTRACT

Scabies is a common ectoparasitic infestation caused by Sarcoptes scabiei var. hominis. A 14-year-old male student presented with severe right foot pain following nocturnal pruritus. Examination revealed abscess formation in the interdigital space. Surgical drainage and postoperative care led to clinical improvement. This case highlights the importance of early recognition of scabies to prevent secondary bacterial complications.

ABSTRAK

Skabies merupakan infestasi ektoparasit yang disebabkan oleh Sarcoptes scabiei. Seorang laki-laki usia 14 tahun datang dengan nyeri hebat pada kaki kanan setelah pruritus malam hari. Ditemukan abses pada sela jari kaki. Dilakukan tindakan drainase dan perawatan pascaoperasi dengan hasil baik. Kasus ini menekankan pentingnya diagnosis dini untuk mencegah komplikasi.

Introduction

Scabies is an ectoparasitic skin infestation caused by the mite *Sarcoptes scabiei* var. *hominis*, an obligate human parasite that lives and completes its life cycle within the superficial layer of the epidermis, particularly the stratum corneum.[1,2] The gravid female mite burrows into the epidermis, deposits eggs and fecal pellets, and induces a host inflammatory and hypersensitivity response that clinically manifests as intense pruritus and characteristic skin lesions.[1,2] The life cycle of *S. scabiei* occurs entirely on human skin, beginning with egg deposition in the burrow, followed by larval, nymphal, and adult stages, allowing continued infestation and transmission when diagnosis or treatment is delayed.[1,3]

From a parasitological standpoint, nocturnal pruritus represents one of the most important clinical clues of scabies infestation, reflecting host immune reactivity to mite antigens, eggs, and scybala rather than direct tissue destruction alone.[1,4] The interdigital spaces are typical predilection sites because the thin stratum corneum and protected skin folds provide a favorable microenvironment for mite burrowing and survival.[1,4] In children and adolescents, lesions may involve the hands, feet, interdigital spaces, wrists, knees, axillae, and other flexural or intertriginous regions, making clinical recognition important in school-aged populations.[1,5]

Scabies transmission occurs mainly through prolonged skin-to-skin contact, although fomites such as bedding, towels, and clothing may contribute to spread, especially in crowded settings.[1,6] Islamic boarding schools (*pesantren*) represent a high-risk environment for scabies transmission because of close interpersonal contact, shared sleeping spaces, and shared personal items among students.[6,7] Indonesian studies have reported a high burden of scabies among

boarding school students, with associated risk factors including sharing beds, sharing clothes, poor personal hygiene, and inadequate room sanitation.[6,7]

Although scabies is primarily a parasitic infestation, its clinical burden is often amplified by secondary bacterial infection.[1,8] Repeated scratching caused by intense pruritus disrupts the epidermal barrier and facilitates bacterial entry into the skin.[1,8] In addition, mite-derived molecules may interfere with local host immune defense, including complement-mediated responses, potentially creating a favorable microenvironment for bacterial colonization and infection.[8,9] The most frequently implicated bacteria in secondarily infected scabies lesions are *Staphylococcus aureus* and *Streptococcus pyogenes*, although polymicrobial infections may occur depending on the lesion site.[8,10] Therefore, from a parasitological perspective, scabies should be understood not only as mite infestation but also as a parasite-driven dermatosis that can predispose to clinically significant bacterial complications.[8,9]

This case presents a 14-year-old male student living in a *pesantren* who developed an abscess of the fifth digit and interdigital spaces of the right foot following clinical features highly suggestive of scabies. The case is relevant from a parasitology perspective because it demonstrates how an ectoparasitic infestation, initially presenting as nocturnal pruritus in typical predilection sites, may progress to secondary bacterial infection and abscess formation when the skin barrier is compromised.[1,8,10]

Case Illustration

A 14-year-old male residing in an Islamic boarding school (*pesantren*) presented with a chief complaint of severe pain in the right foot. The pain had persisted for five days prior to admission and progressively worsened, resulting in marked difficulty with weight-bearing and ambulation.

The clinical course began with intense pruritus involving the interdigital spaces of the toes and both knees. The patient reported that the itching was more severe at night, consistent with nocturnal pruritus. He had previously applied an unidentified topical ointment to relieve the symptoms. Although the pruritus subsequently improved, it was followed by the rapid onset of localized swelling and progressively worsening pain in the right foot.

Physical examination of the right foot revealed clear signs of acute inflammation, including localized edema, erythema, and marked tenderness. Based on the clinical presentation, the patient was diagnosed with an abscess of the fifth digit and interdigital spaces of the right foot, likely resulting from secondary bacterial infection of highly suspected scabies.

The patient underwent surgical debridement and drainage of the abscess to evacuate purulent material and remove necrotic tissue. Postoperative management included wound care and appropriate pharmacological therapy. The postoperative course was uneventful, with significant improvement in pain and swelling. The patient remained clinically stable and was discharged on postoperative day 3 (POD 3).

Fig. 1 Scabies lesions on the soles of the feet

Fig. 2 Itchy feet appear due to scabies

Fig 3. Burrows due to scabies were seen during surgery

Discussion

This case highlights the parasitological importance of recognizing scabies as an ectoparasitic infestation with potential downstream infectious complications. The patient's initial

symptoms of intense nocturnal pruritus involving the interdigital spaces of the toes and knees are highly suggestive of infestation by *Sarcoptes scabiei* var. *hominis*.[1,4] Nocturnal pruritus is a hallmark of scabies and is largely mediated by host hypersensitivity reactions to mite antigens, eggs, and fecal pellets deposited within the epidermal burrows.[1,2]

The interdigital involvement observed in this patient is consistent with the biological behavior of *S. scabiei*. The mite preferentially burrows into areas with thin stratum corneum, skin folds, and protected surfaces, such as the interdigital spaces, wrists, elbows, axillae, and genital region.[1,4] In this case, the localization of symptoms to the interdigital spaces of the foot supports the clinical suspicion of scabies, although definitive parasitological confirmation would require visualization of mites, eggs, or scybala using skin scraping, dermoscopy, or microscopy.[1,4]

The patient's residence in an Islamic boarding school is also highly relevant from a parasitological epidemiology perspective. Scabies mites are transmitted primarily through close and prolonged skin-to-skin contact, which is common in crowded communal environments.[1,6] Shared bedding, clothing, towels, and sleeping areas may further facilitate transmission, particularly when infestations are unrecognized or untreated.[6,7] Studies from Indonesian boarding schools have shown that scabies remains prevalent in these settings and is associated with personal hygiene practices, sharing of personal items, and poor environmental sanitation.[6,7]

The progression from pruritus to painful swelling, erythema, and abscess formation reflects an important complication in the parasite–host interaction. Persistent scratching due to mite-induced pruritus damages the epidermal barrier, allowing skin flora and pathogenic bacteria to invade deeper tissues.[1,8] This mechanism explains why scabies is frequently complicated by impetigo, cellulitis, and occasionally abscess formation.[8,10] In this patient, the interdigital space of the foot likely provided a moist and friction-prone environment that further supported bacterial proliferation after barrier disruption.[8,10]

From a mechanistic parasitology perspective, secondary bacterial infection in scabies may not be caused solely by scratching. Experimental and clinical evidence suggests that *S. scabiei* may contribute to bacterial survival by modulating host immune responses, including inhibition of complement pathways.[9] Mite-derived complement inhibitors may reduce local bacterial clearance, thereby supporting colonization by organisms such as *S. aureus* and *S. pyogenes*.[9] This provides a biological explanation for the frequent coexistence of scabies and bacterial skin infection, particularly in tropical and crowded settings.[8,9]

The development of an abscess in this case indicates that the secondary bacterial infection had progressed beyond superficial epidermal involvement. While scabies itself is confined mainly to the stratum corneum, bacterial entry through excoriated lesions can extend into the dermis and subcutaneous tissue.[1,8,10] This distinction is important: the primary disease process is parasitic, but the severe pain, localized edema, erythema, tenderness, and purulent discharge are consequences of secondary bacterial soft tissue infection.[8,10] Therefore, the clinical severity in this case reflects the combined effect of ectoparasitic infestation, host scratching response, barrier disruption, and bacterial invasion.[1,8,9]

Surgical debridement and drainage were appropriate because abscess formation represents a localized purulent collection that usually requires evacuation of pus and removal of necrotic tissue.[11] However, from a parasitology-based management perspective, treating the abscess alone is not sufficient if the underlying scabies infestation remains untreated.[1,6] Effective management should include scabicidal therapy, treatment of close contacts, hygiene education, and environmental control measures to interrupt the parasite life cycle and prevent reinfestation.[1,6,7]

In communal settings such as *pesantren*, management should extend beyond the index patient. Because scabies has an incubation period and asymptomatic contacts may still harbor mites, simultaneous treatment of close contacts is recommended to prevent repeated transmission cycles.[1,6] Environmental interventions, including washing or heat-drying bedding and clothing, avoiding shared towels and clothes, improving room sanitation, and health education for students and caregivers, are essential components of scabies control.[6,7]

This case emphasizes that scabies should be viewed not merely as a benign itchy dermatosis but as an ectoparasitic infestation capable of causing significant morbidity through secondary bacterial complications. Early recognition of nocturnal pruritus, identification of typical predilection sites, and assessment of communal exposure are essential for diagnosis.[1,4,6] The favorable outcome after drainage and postoperative care in this patient demonstrates the benefit of timely management; however, long-term prevention requires eradication of the mite reservoir among close contacts and improvement of hygiene practices in the boarding school environment.[1,6,7]

Conclusion

This case highlights scabies as an ectoparasitic infestation that may lead to clinically significant complications when not recognized and treated promptly. In this 14-year-old male boarding school student, the presence of nocturnal pruritus involving the interdigital spaces strongly suggested infestation by *Sarcoptes scabiei* var. *hominis*. Persistent scratching likely disrupted the epidermal barrier and facilitated secondary bacterial invasion, resulting in abscess formation of the fifth digit and interdigital spaces of the right foot. The successful outcome following surgical debridement, drainage, wound care, and pharmacological therapy emphasizes the importance of early diagnosis and integrated management of scabies complicated by secondary infection. From a parasitological perspective, this case reinforces that scabies should not be regarded merely as a benign pruritic dermatosis, but as a contagious ectoparasitic disease with potential for bacterial complications, particularly in crowded communal settings such as Islamic boarding schools. Effective management should therefore include treatment of the index patient, evaluation and treatment of close contacts, hygiene education, and environmental control measures to interrupt transmission and prevent recurrence.

References

Golant, A. K., & Levitt, J. O. (2012). Scabies: a review of diagnosis and management based on mite biology. *Pediatrics in review*, *33*(1), e1-e12.

Wahdini, S., & Sungkar, S. (2023). Aspek parasitologi Sarcoptes scabiei var. hominis: Parasitological aspects of Sarcoptes scabiei var. hominis. *Jurnal Entomologi Indonesia*, *20*(3), 275-275.

Arlian, L. G., & Morgan, M. S. (2017). A review of Sarcoptes scabiei: past, present and future. *Parasites & vectors*, *10*(1), 297.

Chouela, E., Abeldaño, A., Pellerano, G., & Hernández, M. I. (2002). Diagnosis and treatment of scabies: a practical guide. *American journal of clinical dermatology*, *3*(1), 9-18.

Chandler, D. J., & Fuller, L. C. (2019). A review of scabies: an infestation more than skin deep. *Dermatology*, *235*(2), 79-90.

Yulfi, H., Zulkhair, M. F., & Yosi, A. (2022). Scabies infection among boarding school students in Medan, Indonesia: Epidemiology, risk factors, and recommended prevention. *Tropical parasitology*, *12*(1), 34-40.

Nasrullah M, Nastiti A, Roosmini D. Risk factors of scabies incidence in Islamic boarding school in Eastern Java. *Jurnal Teknik Lingkungan*. 2023;29(2):91–100. doi:10.5614/j.tl.2023.29.2.2.

Brook, I. (1995). Microbiology of secondary bacterial infection in scabies lesions. *Journal of clinical microbiology*, *33*(8), 2139-2140.

Swe, P. M., Reynolds, S. L., & Fischer, K. (2014). Parasitic scabies mites and associated bacteria joining forces against host complement defence. *Parasite immunology*, *36*(11), 585-593.

Gunawan, H., Sugiri, U., Nurhasanah, K. M., & Suwarsa, O. (2018). Oral Clindamycin as Drug of Choice for Scabies Patients with Secondary Bacterial Infections in West Java, Indonesia. *American Journal of Infectious Diseases*, *14*(1), 45-50.

Stevens, D. L., Bisno, A. L., Chambers, H. F., Dellinger, E. P., Goldstein, E. J., Gorbach, S. L., ... & Wade, J. C. (2014). Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. *Clinical infectious diseases*, *59*(2), e10-e52.