

Lower-Limb Cellulitis with Concomitant Onychomycosis in an Older Adult with Poor Nutritional Status: A Case Report

Reggi First Trasia¹, Zenia Maulivia Fadila²

¹Departemen Parasitologi, Fakultas Kedokteran, Universitas Sultan Ageng Tirtayasa, Indonesia

²Fakultas Kedokteran, Universitas Mataram, Indonesia

Email: reggi.first@untirta.ac.id



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ABSTRAK

Cellulitis is an inflammation of the subcutaneous tissue, generally caused by a bacterial infection and often accompanied by pain that can disrupt activity and delay the healing process if not properly treated. Effective management of pain and inflammation is a crucial part of cellulitis management, through both pharmacological and non-pharmacological therapies. This article reports a case of cellulitis in a 68-year-old woman who complained of pain, swelling, redness, and fever in the right lower extremity, accompanied by ulcers and bullae. The patient's risk factors included advanced age, poor nutritional status, a history of wounds as a port of entry, and low socioeconomic status. Physical examination and supporting investigations revealed signs of acute inflammation, including leukocytosis and an elevated erythrocyte sedimentation rate. Management included injectable antibiotics, analgesics, leg elevation, bed rest, and cold compresses with 0.9% NaCl as a non-pharmacological therapy to reduce pain and edema. This case emphasizes the importance of a holistic approach to cellulitis management, including infection control, pain management, and addressing predisposing factors to support optimal healing.

Keywords: Cellulitis, Onychomycosis, Infection, Malnutrition, Geriatrics.

ABSTRAK

Selulitis adalah peradangan pada jaringan subkutan, umumnya disebabkan oleh infeksi bakteri dan sering disertai nyeri yang dapat mengganggu aktivitas dan menunda proses penyembuhan jika tidak diobati dengan benar. Penanganan nyeri dan peradangan yang efektif merupakan bagian penting dari manajemen selulitis, baik melalui terapi farmakologis maupun non-farmakologis. Artikel ini melaporkan kasus selulitis pada seorang wanita berusia 68 tahun yang mengeluhkan nyeri, bengkak, kemerahan, dan demam pada ekstremitas bawah kanan, disertai ulkus dan bula. Faktor risiko pasien meliputi usia lanjut, status gizi buruk, riwayat luka sebagai titik masuk infeksi, dan status sosial ekonomi rendah. Pemeriksaan fisik dan investigasi pendukung menunjukkan tanda-tanda peradangan akut, termasuk leukositosis dan peningkatan laju sedimentasi eritrosit. Penanganan meliputi antibiotik injeksi, analgesik, elevasi kaki, istirahat di tempat tidur, dan kompres dingin dengan NaCl 0,9% sebagai terapi non-farmakologis untuk mengurangi nyeri dan edema. Kasus ini menekankan pentingnya pendekatan holistik dalam penanganan selulitis, termasuk pengendalian infeksi, manajemen nyeri, dan penanganan faktor-faktor pemicu untuk mendukung penyembuhan yang optimal.

Kata kunci: Selulitis, Onikomikosis, Infeksi, Malnutrisi, Geriatri.

INTRODUCTION

Cellulitis is an acute bacterial infection affecting the skin and subcutaneous tissue, characterized by swelling, pain, and warmth in the affected area. This infection most often occurs in the lower extremities and causes significant discomfort (Joseph, 2021). Skin and tissue infections can prolong hospitalization, lead to various

complications, and increase morbidity, making treatment for this wound infection expensive and difficult. The impact of wound infections varies from person to person due to the type of wound and individual factors (Yunus, 2015).

According to data from the Global Burden of Disease (2019), the incidence of cellulitis is estimated to reach 42.9 million cases worldwide,

making it a leading cause of global disability. It is estimated that there are more than 150,000 cases of cellulitis in Indonesia each year, with a high prevalence in East Java (Institute for Health Metrics and Evaluation, 2019).

The wound inflammatory response provides a causal link between pain and infection when soft tissue responds to invading microorganisms, leading to the expression of enzymes and free radicals that cause tissue damage. Pain in patients with wounds is often underestimated. Pain is highly disruptive and distressing for anyone. Inadequate pain management can lead to a vicious cycle involving muscle tension, fatigue, anxiety, and depression, which can slow healing by suppressing the effectiveness of the immune system (Suryati, 2025).

Pain in patients with cellulitis not only disrupts daily activities but can also slow the healing process if not managed properly. Therefore, effective management of pain and inflammation is a crucial aspect of cellulitis treatment (Miller, 2022).

Pain can be managed with pharmacological and non-pharmacological therapies. Pain management for cellulitis can be achieved through pharmacological therapy using appropriate antibiotics, analgesics such as paracetamol and ibuprofen, and the addition of opioids if the pain is severe. Non-pharmacological interventions include elevation of the extremity, rest, and the application of a 0.9% NaCl cold compress to the painful area for 10-20 minutes to reduce edema and provide local anesthesia, along with regular pain assessments and education on relaxation techniques to support recovery (Rangel, 2023). Cold compress therapy with NaCl is a non-pharmacological method that has long been used to reduce inflammation and pain in dermatological conditions. This cold compress works by providing a cooling effect and reducing swelling and irritation in infected tissue (Nurlela, 2023).

Cold temperatures trigger vasoconstriction, reducing blood flow and the inflammatory response in the infected area. This effect is followed by reduced capillary permeability, which helps suppress edema formation and relieve pressure on pain receptors. Furthermore, cold exposure can slow the conduction of peripheral

nerve impulses, resulting in an analgesic effect in the form of numbness. The NaCl solution used is isotonic and stable in maintaining low temperatures, so it is safe for the skin and effective in providing a cooling effect (Schug, 2020).

The aim of this study is to illustrate the possible interaction between occupational trauma, impaired skin integrity, a nail condition suspected of onychomycosis, delayed treatment, and malnutrition in exacerbating lower extremity cellulitis in an elderly patient.

CASE PRESENTATION

The case report begins with a 68-year-old woman presenting with pain in her right leg for three days. She had been impaled by a piece of wood but did not seek treatment. Two days later, her right leg was swollen and red. She also developed a fever. She sought medical attention from a paramedic and was prescribed ointment, but her symptoms did not improve, leading to her referral to Ananda General Hospital.

Upon inspection, the patient's right leg was red from the knee to the instep. A pus-filled wound was visible below the knee. The patient also complained of changes in skin color and texture, becoming thick, brittle, and yellowish-brown. The patient had a history of blisters on her body and face in 2017 and was diagnosed with Stevens-Johnson Syndrome at the time. The patient had a history of drug allergies, but neither her family nor the patient knew what medications she was taking. She worked as a laborer, cutting and carrying wood. Her economic status was relatively low, leading her to pay little attention to her daily diet.

From the physical examination, the general condition was moderately ill, *compos mentis*, consciousness, blood pressure 110/70 mmHg, pulse 98 x/minute, respiration 20 x/minute, body temperature 38.4 C, oxygen saturation 98%, body weight 43 kg, with a body mass index of 18.3 (underweight). From the local status examination in the right pedis region, there were erythematous plaques, diffuse, with indistinct boundaries between the lesion and the surrounding skin, multiple, measuring approximately 20x10 cm, reddish in color and felt warm, indistinct boundaries in the right pedis and accompanied by edema. There were bullae (+) on the dorsum of the

pedis measuring approximately 2x2x1cm with clear boundaries, reddish in color. There were ulcers in the right pedis measuring approximately 2x 0.5x 0.5cm with a yellowish-white color, and also on the nails there were changes in color and shape of the nails, thickened, brittle and brownish-yellow.

RESULT AND DISCUSSION

In this case, the patient's nutritional status was poor, he was elderly, and there was also a history of previous wounds/port d'entrée in this patient, namely ulcers in the lower extremities. This is consistent with predisposing factors for cellulitis, namely poor nutritional status, personal hygiene, climate, underlying disease, advanced age, and decreased immunological function (Militaart, 2014). The main cause of cellulitis is bacteria, especially *Streptococcus pneumoniae*, *Haemophilus influenzae* type b, and *Staphylococcus aureus*. In recent years, the microbiological spectrum has changed with an increase in cases due to methicillin-resistant *Staphylococcus aureus* (MRSA). Other less common pathogens include *Streptococcus pyogenes*, *Moraxella catarrhalis*, and gram-negative bacteria. While in patients with compromised immunity, opportunistic infections by fungi and atypical bacteria should be considered (Hondrizal, 2025).

The patient complained of red, swollen, and painful swelling in the right leg, which felt warm, and had bullae and ulcers on the leg (Figure 1). The patient also complained of fever (38.4°C), pain, and weakness. This is consistent with the history of cellulitis, which can be identified from a history of previous injuries. Clinical symptoms of cellulitis include erythema with indistinct and rapidly expanding borders, pain, edema that feels warm, and in some cases, bullae or necrosis of the epidermal tissue. Systemic symptoms of cellulitis include fever, chills, and malaise (Wijaya, 2025).

Cellulitis is commonly associated with beta-hemolytic streptococci, while *Staphylococcus aureus* may be involved, particularly when cellulitis is associated with penetrating trauma, an open wound, purulence, or other specific risk factors. Written informed consent was obtained from the patient for the publication of this case report and accompanying clinical images. Ethical

approval was waived/not required for this single case report according to institutional policy. Written informed consent for publication was obtained from the patient.



Figure 1. Undefined erythematous plaque in a patient

The patient's nails showed changes in color and shape, thickening, brittleness, and a brownish-yellow color on the right and left toenails. This supported the diagnosis of onychomycosis, a general term for fungal nail infections that can cause discomfort, unsightly appearance, and sometimes pain (Figure 2). Onychomycosis often occurs in older patients and is associated with slowed nail growth, suboptimal immune status, reduced peripheral circulation, and decreased ability to care for nails (Wali, 2025).



Figure 2. Bullae on the dorsum of the pedis and erosion of the nail

Laboratory tests revealed an increase in the patient's leukocyte count and erythrocyte sedimentation rate (ESR) (Table 1). This indicates that the patient is experiencing acute inflammation, as both the leukocyte count and erythrocyte

sedimentation rate (ESR) are sensitive markers of inflammation. An increased leukocyte count (leukocytosis) is a sign of acute infection. An

elevated ESR indicates inflammation in the body (Dwiarta, 2025).

Table 1. Laboratory Examination on Cellulitis Patient

Examination	Day 1	Day 3	Normal Range
Hemoglobin	10.6 g/dL	9.6 g/dL	12.0-16,0
Lekosit	20300 /uL	17900 /uL	5000-12000
Eritrosit	3.7 juta/uL		4.10-5.30
Hematokrit	31.8 %	28.3%	40.0-48.0
LED	32 mm/jam	37 mm/jam	<20
SGOT	50 mg/dl		<31
SGPT	53 mg/dl		<31

The patient received ceftriaxone 1 g intravenously every 12 hours. Clinical response and the need for intravenous therapy were reassessed after 48 hours. Management in this case includes bed rest, leg elevation, NaCl compresses, ceftriaxone injections (2x1 gram) after meals, diphenhydramine injections (3x10 mg), and paracetamol (3x500 mg). After 72 hours of treatment, the patient became afebrile, pain decreased and the erythematous area no longer expanded. The leukocyte count decreased from 20,300/ μ L to 17,900/ μ L.

Compresses aim to reduce erythema and keep the ulcer moist but not wet. The oral antibiotic ceftriaxone was administered to this patient because the patient had severe symptoms and signs of systemic infection, such as fever. Antibiotics aim to eliminate the infecting germs and are administered intravenously or intramuscularly for a duration of 7 days. However, patients with cellulitis with severe infections typically receive treatment for 10 to 14 days or until the inflammation resolves. Other drug options include penicillin G, nafcillin, cefazolin, clindamycin, and vancomycin (Maulidina, 2025). Diabetes, obesity, and advanced age are major predisposing factors for cellulitis, along with nutritional status, personal hygiene, climate, underlying disease, and decreased immunologic function (including those caused by HIV/AIDS). This combination of risk factors is most frequently seen in hospitalized patients with cellulitis. Holistic cellulitis management is essential, encompassing support for immunity, circulation, and skin integrity (Indrayati, 2025).

Cellulitis is an inflammation of the subcutaneous tissue, commonly caused by bacteria, including

Staphylococcus aureus and/or *Streptococcus*. Risk factors in these patients include poor nutritional status, advanced age, and previous injuries. Based on the anamnesis and physical examination, there was reddish swelling and pain in the right leg, felt warm, and there were bullae and ulcers on the patient's feet, the nails of both patients looked yellowish and looked dry and in supporting examinations there was an increase in leukocytes and erythrocyte sedimentation rate, this indicates that the patient is experiencing an acute inflammatory process, so that this patient can be diagnosed with cellulitis and onychomycosis.

CONCLUSION

This case highlights the management of lower-limb cellulitis following penetrating trauma in an underweight older adult with toenail abnormalities suggestive of onychomycosis. Comprehensive assessment of the portal of entry, nutritional status, drug-allergy history, and predisposing skin or nail conditions is important. Microbiological confirmation of suspected onychomycosis and clear documentation of treatment response and follow-up are necessary to strengthen the clinical interpretation of this case.

This report has several limitations. Fungal confirmation of the nail abnormality was not performed, wound culture was unavailable, and nutritional status was assessed only using body mass index. Therefore, a causal relationship between the nail disorder, nutritional status, and cellulitis cannot be established.

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