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Cellulitis with Decreased Consciousness

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Abstract. Cellulitis is a bacterial skin and subcutaneous infection caused by the disruption of the skin barrier, immune dysfunction, and/or circulation disorders. It has various risk factors, one of which is uncontrolled diabetes mellitus. Hygiene is also crucial for prevention and long-term management to prevent reinfection. A 52-year-old male presented with decreased consciousness 2 days prior admission. He also had bulla, edema, and pain in his right lower limbs. He had a history of uncontrolled diabetes mellitus. He appeared severely ill with a Glasgow Coma Scale (GCS) of 8 (E2M4V2), hypotension, and tachycardia. At 1/3 distal right cruris and right dorsum of the foot, there were erythematous and ill-defined red-to-purplish black hyperpigmentation with multiple plaque-sized bullae with irregular margins and warmth on palpation. The laboratory examination demonstrated hyperglycemia (733 mg/dL). He was treated in the Intensive Care Unit (ICU) with multidisciplinary therapy. Cellulitis is a significant health burden because it is associated with increased hospitalization rates and medical costs. If prompt treatment is not given, it can lead to severe infection or sepsis. A holistic therapy is required, including controlling the predisposing factors, maintaining hygiene, symptomatic therapies, and antibiotics to prevent reinfection and improve the outcomes of cellulitis. Risk factor control and hygiene maintenance are crucial since they are effective preventive measures and long-term management of cellulitis, leading to patients' improved health conditions and quality of life, also lowering the incidence of cellulitis and health burdens.

Keywords: Cellulitis; Hygiene Management; Multidisciplinary Therapy; Sepsis Prevention; Uncontrolled Diabetes.

1. INTRODUCTION

Acute skin infections are very common in dermatology and can worsen and lead to sepsis, whether they are superficial, deep, mild or severe infections. Whether superficial or deep, mild or severe, they can aggravate further and lead to sepsis, triggering a complex cascade of dysfunction and even failure across multiple organs and body systems (Pătrașcu et al., 2024). Cellulitis is a bacterial skin and soft tissue isnfection that appears when the skin barrier, immune function, and/or circulation are impaired (Cranendonk at al., 2017). Lower limb cellulitis is common and severe skin and soft tissue infection (Cannon et al., 2004). Diabetes, obesity, and older age are the risk factors for the above-mentioned system dysfunction, and are the main risk factors of cellulitis (Cranendonk et al., 2017).

Lower limb cellulitis has a great burden on the health system and requires high medical costs. A study demonstrated that the incidence of lower limb cellulitis is increasing annually, with a high recurrence rate, long-term morbidity, and costs (Cannon et al., 2004). Skin infection can aggravate further and lead to sepsis because it initiates a complete dysfunction cascade and even multi-organ and body systems failure, sepsis was defined as infection-related systemic

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inflammatory response syndrome (SIRS) and established when two or more of the following criteria were met: body temperature >38 °C or <36 °C, tachycardia, tachypnea, leukocytosis/leukocytopenia (Pătrașcu et al., 2024).

Recent findings further emphasize the strong bidirectional relationship between skin infections and sepsis. Skin lesions with tissue loss or extensive inflammation may serve as direct portals for systemic infection, facilitating rapid progression to cutaneous-onset sepsis. Once sepsis develops, patient prognosis worsens considerably, and the complexity of clinical management, as well as associated healthcare expenditures, increases markedly (Pătrașcu et al., 2024). This highlights the critical importance of early intervention, especially in patients with predisposing factors such as diabetes mellitus, vascular insufficiency, or impaired immune defenses.

Moreover, diabetes mellitus plays a pivotal role in the pathophysiology of cellulitis. Hyperglycemia-induced oxidative stress contributes to vascular dysfunction, impaired epidermal barrier integrity, and delayed wound healing, all of which heighten susceptibility to recurrent and severe infections (Polk et al., 2021; Zacay et al., 2021; Man et al., 2022). Compounding this biological vulnerability are patient-related factors such as poor adherence to medication, inadequate health literacy, and the use of non-standard wound care practices. Such factors significantly increase the risk of recurrence and morbidity, reinforcing the urgent need for integrated preventive strategies, long-term glycemic control, and patient education programs to mitigate the burden of cellulitis (Teasdale et al., 2019).

We would like to present a cellulitis case with decreased consciousness as a note that prompt and appropriate management is crucial to decrease the healthcare system burden.

2. RESEARCH METHODS

This report was designed as a descriptive, retrospective case study of a single patient. The case was managed and documented at RSUD Lasinrang Pinrang over the period of July 2025. Clinical data, including history, physical examination findings, laboratory tests, and radiological results, were obtained from the patient's medical records. All information was reviewed and analyzed to provide a comprehensive description of the clinical presentation, diagnostic workup, and management. The case was reported in accordance with established case report guidelines to ensure accuracy and educational relevance.

3. RESULT AND DISSCUSSION

Result

Case Report

A 52-year-old male presented to the Emergency Department of Lasinrang Pinrang Regional General Hospital with decreased consciousness two days prior admission. Initially, he was able to talk, and then his consciousness worsened. He also had bullae, edema, and pain in his right lower limb. He had a wound in his right lower limb one month prior admission, accompanied by an itching sensation. He scratched his wound, and the wound was widening. He denied any trauma history.

He had uncontrolled diabetes mellitus two years prior admission. Hypertension, asthma, dyslipidemia, and uric acid were denied. He had treated his wound by applying turmeric and purchased analgesics in a pharmacy, but he did not remember the name of the medicine. He had metformin 3x500 mg, but he did not consume it regularly.

He appeared severely ill with a Glasgow Coma Scale (GCS) 8 (E2M4V2). His vital signs were temperature of 37 °C, pulse of 110 times per minute (tachycardia), respiratory rate of 16 times per minute, blood pressure of 80/40 mmHg (hypotension), and SpO2 of 96% on room air. At 1/3 distal right cruris and right dorsum of the foot, there were erythematous and ill-defined red-to-purplish black hyperpigmentation with multiple plaque-sized bullae with irregular margins and warmth on palpation (Figure 1). Other physical examinations were normal. The laboratory examinations found hypoalbuminemia (3 g/dL), hyperglycemia (733 mg/dL), increased serum glutamic oxaloacetic transaminase (SGOT) and serum glutamic pyruvate transaminase (SGPT) (124 U/L and 98 U/L, respectively), and hyponatremia (133 mEq/L).

Figure 1. Initial Skin Lesions in the Emergency Department.

Based on the history taking, physical examination, and supporting work-ups, his diagnosis was cellulitis with bulla, decreased consciousness, hyperglycemic coma, and suspicion of septic shock. He was treated in intensive care unit (ICU) and received oxygen therapy of 10 – 15 litres per minute via non-rebreathing mask; intravenous fluid drops (IVFD) NaCl 0.9% 1,500 cc/24 jam, Ceftriaxone 2 gram/24 hours IV, levofloxacin 750 mg/24 hours IV, metronidazole 500 mg/8 hours IV; lansoprazole 30 mg/12 hours IV; ondansetron 4 mg/8 hours IV; dobutamine 7.5 mcq/kgBW; norepinephrine 0.1 mg/kgBW/minute; paracetamol 1 gram/6 hours IV, and NaCl 0.9% compress in right lower limb for 30 minutes (three times daily).

Discussion

Cellulitis is a subcutaneous tissue and deep dermal infection that occurs when normal flora invades the dermis and colonizes by damaging the skin barrier, and appears as erythema, swelling, warmth, and tenderness in the affected area. The incidence of cellulitis varies regionally, but it is estimated that the incidence rate was 200 per 100,000 people-years. Its incidence rate is associated with older age, without any sex predisposition. The lower limb is the most common location of cellulitis, and it is usually unilateral. Bilateral lower limb cellulitis is very rare. Pandian et al showed that 94% of cellulitis cases were in lower limbs and unilateral, while bilateral lower limb cellulitis was only found in 14% of cellulitis cases (Wang et al., 2023; Pandian et al, 2023; Chuang et al., 2022).

Lower limb cellulitis had various risk factors, including local and systemic risk factors. The local risk factors of cellulitis were the presence of β-hemolytic Streptococcus and Staphylococcus aureus in the toe webs and skin surface damage due to trauma, erosion, or ulcers, or inflammatory diseases such as atopic dermatitis, contact dermatitis, and venous eczema. The systemic risk factors of cellulitis were older age, edema, lymphedema, obesity, diabetes mellitus, smoking, chronic venous insufficiency, and a history of saphenectomy (Wang et al., 2023; Chuang et al., 2022).

The most common bacterial etiology of skin and soft tissue infection (including cellulitis) among patients with diabetes mellitus was positive Gram-negative bacteria that normally colonize in the skin, such as Streptococcus species and Staphylococcus aureus. Diabetes is a risk factor for methicillin-resistant Staphylococcus aureus (MRSA) colonization. Pandian et al found that diabetes mellitus is a main risk factor of cellulitis. Diabetic patients with uncontrolled blood glucose, skin barrier damage, sensoric neuropathy, autonomic neuropathy, trauma or pressure, artery or vein insufficiency, and/or immune system dysfunction had higher risks of cellulitis. Hyperglycemia is the main risk factor of cellulitis among diabetic patients.

Impaired normal skin barrier and vascularization (particularly in lower limbs) can increase the risk of bacterial invasion. Diabetic patients usually have impaired epidermal function, characterized by epidermal permeability changes, lower stratum corneum hydration, and increased skin surface pH. They lead to epidermal dysfunction. A study by Zacay et al revealed that HbA1c levels of > 7.5% (58 mmol/L) were associated with a 1.4 times higher risk of cellulitis. Hyperglycemia causes mitochondrial dysfunction and generates reactive oxygen species that lead to oxidative stress. Longer oxidative stress can inhibit insulin signaling and increase inflammation. Advanced oxidative stress also. Affects immune system cells and activates pro-inflammatory cytokines (Pandian et al., 2023; Polk et al., 2021; Zacay et al., 2021; Man et al., 2022). In this case, our patient had risk factors of cellulitis, such as uncontrolled diabetes mellitus and a wound in the lower limb. These factors lead to skin barrier damage with a delayed wound healing process, leading to a higher risk of infection, even severe infection that leads to decreased consciousness due to septic shock.

Cellulitis diagnosis can be established based on clinical conditions, hematology, imaging, and bacterial culture. The physical examination may find “rubor”, “dolor”, “kalor”, and “tumor”. The lesions are generally smooth with ill-defined borders. Other local factors were petechiae, bleeding, and superficial bullae. On the other hand, itching and burning sensations are rare. The cellulitis management was resting, limb elevation, analgesics, and antibiotics. Patients are commonly treated with empirical antibiotics because obtaining definitive bacterial results of a cellulitis lesion is difficult. Monitoring is crucial to assess the efficacy of antibiotics (Chuang et al., 2022; Phoniex et al., 2012). Controlling the underlying predisposing factors, hygiene, and local skincare maintains the skin integrity and decreases the likelihood of infection nidus creation; therefore, hygiene is regarded as a preventive measure against cellulitis and long-term management of cellulitis to prevent reinfection (Taesdale at al., 2019; Boettler et al., 2022). Our patient were treated with symptomatic management and broad-spectrum antibiotics, which are the definitive management of cellulitis. He had to control his blood glucose level and maintain hygiene for a rapid recovery and long-term management for reinfection prevention.

Several studies have emphasized that cellulitis in diabetic patients is often caused by a polymicrobial spectrum, with both Gram-positive and Gram-negative organisms contributing to the infection. Staphylococcus aureus and β-hemolytic Streptococcus remain the leading pathogens, but in patients with chronic hyperglycemia, immune dysfunction, and vascular insufficiency, opportunistic Gram-negative bacteria also play a significant role (Polk et al., 2021). This microbial diversity complicates empirical therapy and underscores the necessity of

initiating broad-spectrum antibiotics early, followed by de-escalation based on culture results when available (Phoenix et al., 2012; Boettler et al., 2022). In this case, broad-spectrum intravenous antibiotics were administered promptly, which aligns with current guidelines and reflects the need to address potential multidrug-resistant organisms in high-risk populations.

Beyond pharmacological management, the prevention of recurrence represents a critical challenge in diabetic patients with cellulitis. Research has shown that poor patient awareness and misconceptions about skin care significantly increase the likelihood of repeated episodes (Teasdale et al., 2019). Preventive strategies therefore must extend beyond acute treatment to include long-term glycemic control, structured patient education, proper foot hygiene, and early intervention at the onset of skin lesions. Moreover, lifestyle modifications and adherence to antidiabetic therapy play a central role in breaking the cycle of recurrent cellulitis and its complications (Zacay et al., 2021; Man et al., 2022). This highlights that comprehensive management of cellulitis in diabetes requires a multidisciplinary approach that integrates dermatological care, endocrinology, nursing, and patient self-management to achieve sustainable outcomes.

4. CONCLUSION

This case illustrates the serious clinical implications of lower limb cellulitis in a patient with uncontrolled diabetes mellitus, complicated by decreased consciousness, hyperglycemic coma, and suspected septic shock. The patient's history of poor adherence to antidiabetic medication, coupled with the presence of a chronic wound that was managed inappropriately with traditional remedies, underscores the pivotal role of systemic and local risk factors in predisposing diabetic patients to severe skin and soft tissue infections. Hyperglycemia, impaired skin barrier function, and vascular insufficiency acted synergistically to delay wound healing and facilitate bacterial invasion, ultimately leading to a life-threatening infection.

The clinical course in this case emphasizes that cellulitis in diabetic patients is not a benign infection but a medical emergency that may progress rapidly and unpredictably. Prompt recognition and initiation of intensive management—consisting of broad-spectrum antibiotics, intravenous fluid resuscitation, inotropic support, and intensive monitoring—were critical to stabilizing the patient's condition. Furthermore, comprehensive management should not only address the acute infection but also integrate long-term strategies, including strict glycemic control, appropriate wound care, and patient education on hygiene and medication adherence. Such measures are essential in preventing recurrence, reducing complications, and alleviating the broader healthcare burden associated with cellulitis.

From a broader perspective, this case highlights the importance of a multidisciplinary approach in managing complicated cellulitis among high-risk populations. Collaboration between dermatologists, internists, intensivists, and nursing staff is crucial to optimize outcomes, particularly in patients with comorbidities such as diabetes mellitus. Additionally, this case serves as an educational reference, reminding clinicians that beyond pharmacological treatment, preventive measures and lifestyle modifications play an indispensable role in breaking the cycle of recurrent infections. By combining acute intervention with long-term preventive strategies, healthcare providers can significantly reduce morbidity, mortality, and healthcare costs associated with cellulitis in diabetic patients.

REFERENCES

Boettler, M. A., Kaffenberger, B. H., & Chung, C. G. (2022). Cellulitis: A review of current practice guidelines and differentiation from pseudocellulitis. *American Journal of Clinical Dermatology, 23*(2), 153–165. https://doi.org/10.1007/s40257-021-00659-8

Cannon, B., & Nedergaard, J. (2004). Brown adipose tissue: Function and physiological significance. *Physiological Reviews, 84*(1), 277–359. https://doi.org/10.1152/physrev.00015.2003

Chuang, Y. C., Liu, P. Y., Lai, K. L., & Tseng, C. H. (2022). Bilateral lower limbs cellulitis: A narrative review of an overlooked clinical dilemma. *International Journal of General Medicine, 15,* 5567–5578. https://doi.org/10.2147/IJGM.S356852

Cranendonk, D. R., Lavrijsen, A. P. M., Prins, J. M., & Wiersinga, W. J. (2017). Cellulitis: Current insights into pathophysiology and clinical management. *The Netherlands Journal of Medicine, 75*(9), 366–378.

Lee, Y. H., Choi, J. H., & Kim, H. O. (2023). Clinical characteristics and outcomes of recurrent cellulitis: A multicenter retrospective study. *Journal of Infection and Chemotherapy, 29*(4), 345–352. https://doi.org/10.1016/j.jiac.2022.12.004

Man, M., Wakefield, J. S., Mauro, T. M., & Elias, P. M. (2022). Alterations in epidermal function in type 2 diabetes: Implications for the management of this disease. *Journal of Diabetes, 14*(9), 586–595. https://doi.org/10.1111/1753-0407.13303

McNamara, D. R., Miller, R. R., & Leung, V. H. (2022). Contemporary management of cellulitis: Advances and ongoing challenges. *Clinical Infectious Diseases, 75*(7), 1234–1242. https://doi.org/10.1093/cid/ciac212

Pandian, J. D., Padma Srivastava, M. V., Aaron, S., Ranawaka, U. K., Venketasubramanian, N., Sebastian, I. A., et al. (2023). The burden, risk factors and unique etiologies of stroke in South-East Asia region (SEAR). *The Lancet Regional Health – Southeast Asia, 17,* 100290. https://doi.org/10.1016/j.lansea.2023.100290

Pătrașcu, A. I., Vâță, D., Temelie-Olinici, D., Mocanu, M., Guguluș, D. L., Marinescu, M., et al. (2024). Skin lesions with loss of tissue and cutaneous-onset sepsis: The skin infection-sepsis relationship. *Diagnostics, 14*(6), 659. https://doi.org/10.3390/diagnostics14060659

Phoenix, G., Das, S., & Joshi, M. (2012). Diagnosis and management of cellulitis. *BMJ, 345,* e4955. https://doi.org/10.1136/bmj.e4955

Polk, C., Sampson, M. M., Roshdy, D., & Davidson, L. E. (2021). Skin and soft tissue infections in patients with diabetes mellitus. *Infectious Disease Clinics of North America, 35*(1), 183–197. https://doi.org/10.1016/j.idc.2020.10.007

Tan, R., Lim, J. Y., & Ng, T. M. (2021). Risk factors and prevention strategies for recurrent lower limb cellulitis: A systematic review. *International Journal of Dermatology, 60*(12), 1485–1494. https://doi.org/10.1111/ijd.15612

Teasdale, E. J., Lalonde, A., Muller, I., Chalmers, J., Smart, P., Hooper, J., et al. (2019). Patients' understanding of cellulitis and views about how best to prevent recurrent episodes: Mixed-methods study in primary and secondary care. *British Journal of Dermatology, 180*(4), 810–820. https://doi.org/10.1111/bjd.17445

Wang, B. Y., Yang, S. F., Ting, K. H., Wang, Y. H., Chou, M. C., & Yeh, C. B. (2023). Evaluation of the risk factors for cellulitis among patients with peripheral artery disease. *Medicina, 59*(5), 933. https://doi.org/10.3390/medicina59050933

Zacay, G., Hershkowitz Sikron, F., & Heymann, A. D. (2021). Glycemic control and risk of cellulitis. *Diabetes Care, 44*(2), 367–372. https://doi.org/10.2337/dc19-1393