Case Report

Clinical Features of Bullous and Pustular in Systemic Klebsiella Pneumoniae Infection in Immunocompetent Patients

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Abstract

K. pneumoniae is a rare cause of systemic infection but can lead to high mortality and poor prognosis in immunocompromised patients. However, reports of skin manifestations that occurrences in immunocompetent patients are rare. We are reported here A 33-year-old female presented with red patches accompanied by papules and blisters all over her body for one week, with previous complaints of fever and productive cough. Dermatological examination revealed multiple generalized pustules and bullae. Positive Nikolsky sign and Asboe-Hansen sign were observed. Blood and wound culture confirmed the presence of K. pneumoniae. The bullae regressed rapidly within five days after antibiotic therapy. The purpose of this case report is to enhance knowledge about cases of K. pneumoniae infection presenting clinically as generalized bullous and pustular lesions. Clinicians should consider systemic K. pneumoniae infection when evaluating patients with generalized bullous and pustular lesions.

Keywords: Klebsiella pneumoniae, bullous and pustular generalized, infection.

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Introduction

Skin manifestations resulting from systemic Klebsiella pneumoniae infections are rare occurrences. Several case reports have documented clinical manifestations of generalized pustules caused by K. pneumoniae in cases of liver abscess leading to sepsis and clinical manifestations of purpura fulminans in K. pneumoniae-induced bacteremia.[1] Most cases of K. pneumoniae infection are reported with skin and soft tissue infection symptoms, along with bacteremia, fever, shock, or focal gas formation.[2]

The occurrence of systemic K. pneumoniae infection with generalized bullous and pustular manifestations requires a comprehensive diagnostic approach. Bullous and pustular lesions have numerous differential diagnoses ranging from immune reactions to infections and have different management compared to common bullous diseases.[3] This case is reported with the aim of increasing knowledge regarding K. pneumoniae infections presenting clinically as generalized bullous and pustular lesions, in the hope of increasing clinicians' awareness in diagnosing and selecting appropriate therapy for patients with atypical clinical presentations.

Case Report

A 33-year-old woman presented with a complaint of red patches and blisters all over her body which appeared three weeks before admission. The red patches initially appeared on her back without any blisters. For one week, the red patches spread all over her body. Subsequently, within one week, fluid-filled blisters developed, initially clear but later becoming cloudy, and were easily ruptured, leaving painful sores. One week before skin complaints, the patient experienced fever,

cough, a runny nose, and intermittent headaches. She sought medical attention at a local health center and was prescribed amoxicillin, paracetamol, guaifenesin, and ambroxol. The fever improved after visiting the health center, but the patient continued to experience frequent headaches and coughing. The patient was then admitted to a hospital in Malang for two days before being referred to RSUD Dr. Saiful Anwar for further diagnosis and management.

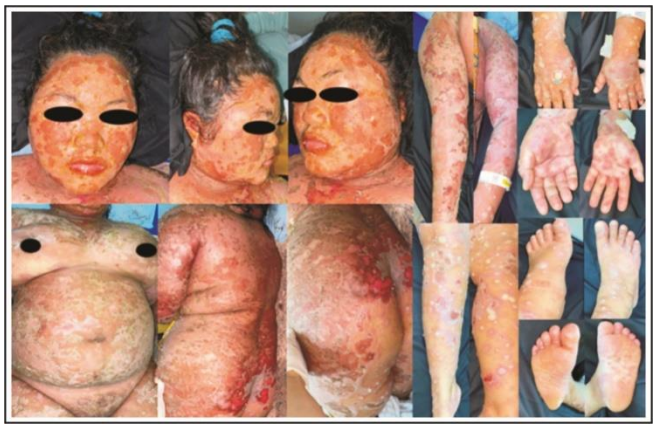

Figure 1: Dermatological features of the patient.

Upon physical examination, hyperemic conjunctiva with thick yellowish secretions was observed in both the left and right eyes. Pustules with erythematous bases, containing cloudy fluid, well-defined borders, irregular edges, and varying shapes and sizes, were found all over the body. Loose bullae with erythematous bases, containing cloudy fluid, well-defined borders, irregular edges, and varying shapes and sizes, were also present. Nikolsky sign was positive, as was Asboe Hansen sign. The extent of the lesions, based on the body surface area (BSA), was 76% for erythematous areas and 15% for pustules and bullae.

Microscopic examination of the pustules, using Gram staining, revealed the presence of polymer-phonuclear leukocytes (PMNs) with minimal cocci. In the skin erosions, Gram examination showed epithelial cells and PMNs without cocci. Tzanck testing did not reveal multinucleated giant cells or acantholysis.

Laboratory tests revealed leukocytosis (26,190/µL), eosinophilia (7.4%), lymphopenia (11.3%), elevated transaminases (ALT 204 U/L, AST 211 U/L), and mild hypoalbuminemia (2.8 g/L). Chest x-ray showed cardiomegaly but normal lung findings. Wound and blood culture results indicated a K. pneumoniae infection which was sensitive to ampicillin, gentamicin, ciprofloxacin, and cotrimoxazole.

Histopathological examination of the perilesional area of pustules on the right hand revealed epidermal spongiosis with erosive changes and loss of the stratum corneum layer. There was spongiosis and exophytic neutrophilic debris in the epidermis. Conclusion of the biopsy was acute spongiotic dermatosis.

The patient was diagnosed with systemic K. pneumoniae infection with clinical features of generalized bullous and pustular lesions. The patient received IV methylprednisolone 62.5 mg-

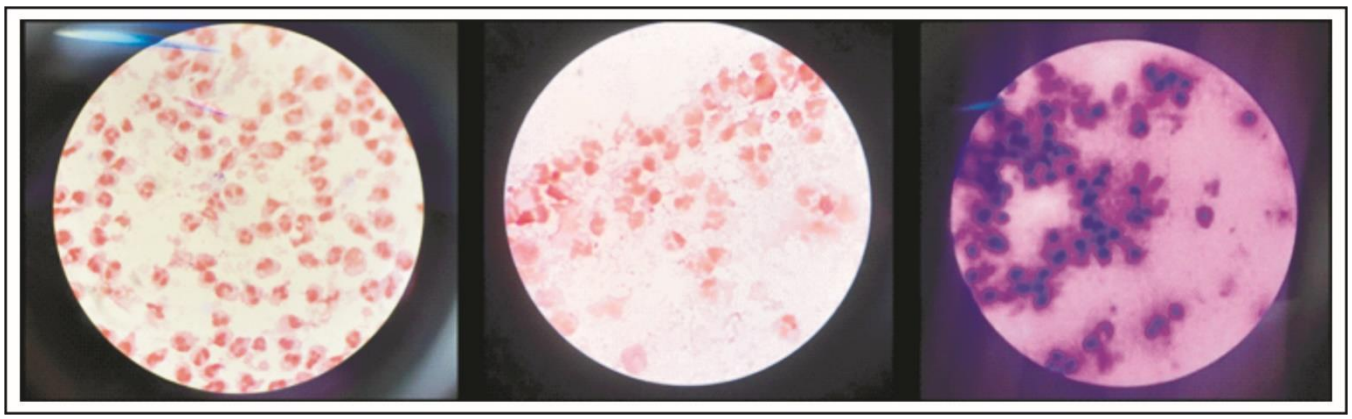

Figure 2: Gram and Tzanck microscopic examination.

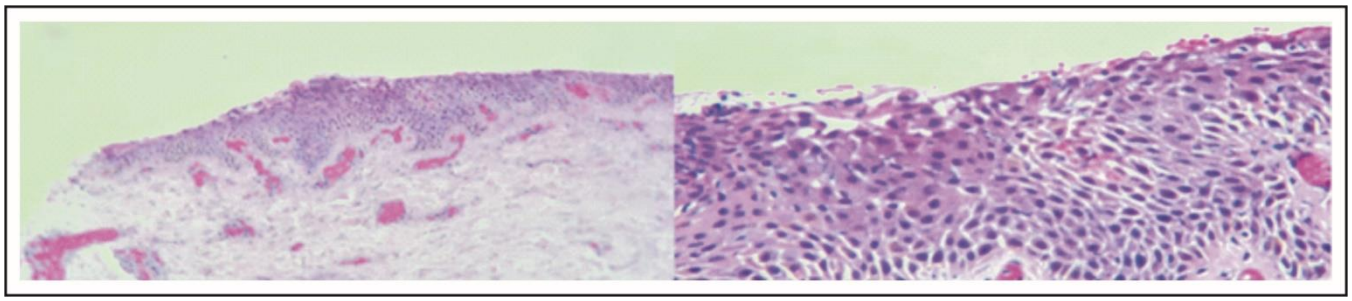

Figure 3: Histopathological examination showing (left) erythrocyte extravasation in the epidermis and dermis (H&E stain, original magnification 100x), and (right) loss of the stratum corneum layer, along with spongiosis and neutrophilic debris exophytosis in the epidermis. Dilated blood vessels with thrombus formation are observed in the dermis. (H&E stain, original magnification 400x).

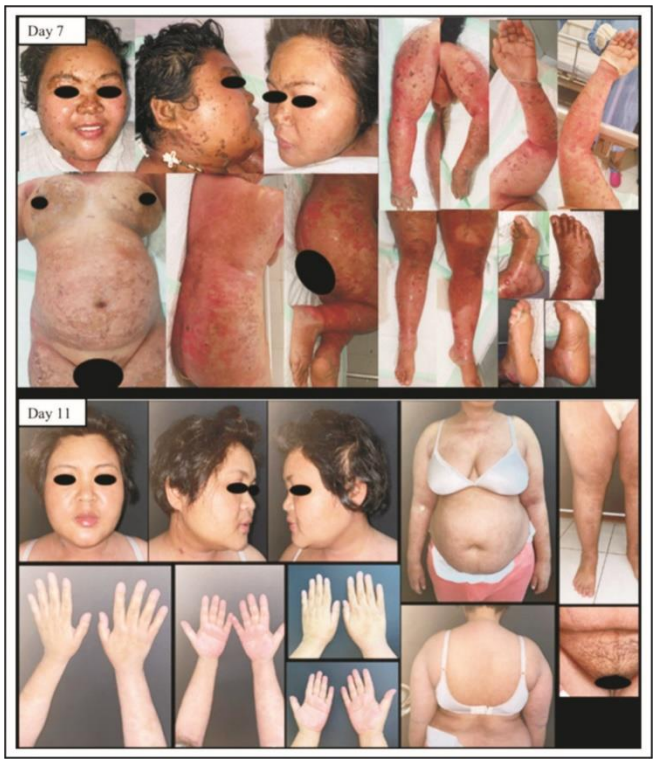

Figure 4: Dermatological assessment on day 7 and 10.

31.25 mg (~0.5-1 mg/kg body weight/day), IV gentamicin 3×80 mg. The patient was hospitalized for 6 days, and significant clinical improvement was observed, with the erythematous BSA reduced to 51%, and only 5% of BSA still had pustules and blisters.

Discussion

Klebsiella pneumoniae is one of bacterium from the Enterobacteriaceae family with gram- negative, capsulated, and nonmotile characteristics that usually attack the human mucosa of the oropharyngeal and gastrointestinal tracts. K. pneumoniae has several factors that cause this bacterium to cause infection and antibiotic resistance. Polysaccharide capsules are the most important virulence factor that causes bacteria to avoid opsonofagocytosis by the host organism. In addition, lipopolysaccharides lining the outer surface of gram-negative bacteria will release an inflammatory cascade in the host that is the main cause of sequelae in shock and sepsis. Not only that, K. pneumoniae also has fimbrae, siderophores, and rmpA genes, each of which functions to attach to host cells, take iron from host cells to multiply, and infect various organs.[1,4]

Clinical manifestations of Klebsiella infection on the skin rarely occur. In hospitalized patients, the bacterial colonization rate in the nasopharynx increases to 19%, 77% in the gastrointestinal tract, and 42% on the patient's hands.[5,6] K. pneumoniae can cause skin and soft tissue infections such as psoas muscle abscess, necrotizing fasciitis, deep neck infection, subcutaneous abscess with gas formation, purpura, and macula with central vesicles. Most reported cases of symptomatic skin and soft tissue infections are accompanied by bacteremia, fever, shock, or focal gas formation. Disseminated pustules and leukoclastic vasculitis often appear in meningococcal bacteremia but are rarely seen in patients with K. pneumoniae infection.[7,8]

A week before the appearance of the rash, the patient complained of fever, cough, a runny nose, and intermittent pain. The rash then appeared on the back and spread throughout the body within

one week. The rash was itchy with a Visual Analog Scale (VAS) score of 7/10. The red patches were subsequently accompanied by fluid-filled blisters. Cough, runny nose, and fever are indicative of respiratory tract infection. In this case, K. pneumoniae infection began in the respiratory tract as the initial site of infection, leading to sepsis with generalized bullous and pustular clinical features.

Laboratory examination of peripheral blood revealed leucocytosis, eosinophilia, lymphopenia, elevated transaminase enzymes, and mild hypoalbuminemia. Blood culture results indicated K. pneumoniae infection. Based on these findings, the clinical manifestations observed in the patient can be attributed to systemic K. pneumoniae infection.[9,10] Histopathological examination through a skin biopsy taken from the perilesional area of a bulla on the left hand concluded that there was evidence of acute spongiotic dermatosis with a predominant presence of neutrophilic debris in the epidermis. This result could rule out the possibility of a differential diagnosis of chronic vesiculobullous diseases. Further supportive histopathological examination, such as immunofluorescence (IF), was not performed because the patient's condition had improved, and it was not possible to obtain additional lesion samples from the patient's bulla area.[11,12]

Conclusion

We have reported a case of systemic K. pneumoniae infection with clinical manifestations of generalized pustules and bullae in a 33-year-old female. Although it is a rare occurrence, clinicians should consider K. pneumonia infection in the differential diagnosis of patients presenting with generalized pustular and bullous lesions following upper respiratory tract infection.

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Author's Contribution

NSL: Conceived, designed, edited the manuscript, given final approval of the version to be published, critical revisions.

HB: Manuscript writing, final approval of the version to be published, agree to be accountable for all aspect of the work.

APY: Manuscript writing, final approval of the version to be published, agree to be accountable for all aspect of the work.

DW: Manuscript writing, final approval of the version to be published.

NDPH: Manuscript writing, final approval of the version to be published.

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