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KLEBSIELLA PNEUMONIAE NECROTIZING FASCIITIS OF THE LOWER EXTREMITY IN A 7-MONTH-OLD MALE: A CASE REPORT

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ABSTRACT

Introduction: *Klebsiella pneumoniae* necrotizing fasciitis is an uncommon soft tissue infection characterized by rapidly progressing necrosis involving the skin, subcutaneous tissue, and fascia. This condition may result in gross morbidity and mortality if not treated in its early stages. In fact, the mortality rate of this condition is high,ranging from 25 to 35%. We present a case of 7-month-old male with *K. pneumoniae* necrotizing fasciitis of the lower extremity.

Case Illustration: A 7-month-old male presented with largeareas over both left and right inferior side of the lower limbs to the emergency department of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. Physical examination revealed elevated heart rate of 136 times per minute and increased body temperature of 38ºC. The large areas on both lower limbs were darkened, sloughed off,and very tender to palpation. A small area over the right hand was erythematous and sloughed off. Laboratory evaluation demonstrated decreased hemoglobin of 6.2 g/dL and elevated leukocyte of 28,850 g/dL. Blood cultures demonstrated that *K. pneumoniae* was present.

Discussion: NF is usually hard to diagnose during the initial period. The findings of NF can overlap with other soft tissue infections including cellulitis, abscess or even compartment syndrome. The clinical manifestations of NF start around a week after the initiating event, with induration and edema, followed by 24 to 48 hours later by erythema or purple discoloration and increasing local fever In the next 48 to 72 hours, the skin turns smooth, bright, and serous, orhemorrhagic blisters develop. If unproperly treated, necrosis develops,and by the fifth or sixth day, the lesion turns black with a necroticcrust.

Conclusions: *K. pneumoniae* necrotizing fasciitis is a rare but life-threatening disease. A high index of suspicion is required for early diagnosis and treatment of this condition.

Highlights:

1. Diagnosing necrotizing fasciitis (NF) was challenging because its symptoms may overlap with other soft tissue infections.
2. Necrotizing Fasciitis *K. Pneumoniae,* a Rare Life-threatening Case.

INTRODUCTION

Klebsiella pneumoniae necrotizing fasciitis (NF), characterized by rapidly progressing necrosis involving the skin, subcutaneous tissue, and fascia, is a severe and potentially life-threatening soft tissue infection. This condition is uncommon; however, it may result in gross morbidity and mortality if not treated in its early stages. Mortality associated with this condition is high, varying from 25 to 35%. Among patients surviving NF, extensive scarring and physical and psychosocial impairmtn may result in isolation and

profound psychological problems. NF most commonly affects lower extremities, accounting for approximately 50% of all cases.[1,2] We present a case of 7- month-old male with *K. pneumoniae* necrotizing fasciitis of the lower extremity.

CASE ILLUSTRATION

A 7-month-old male presented with presented with large areas over both left and right inferior side of the lower limbs to the emergency department of Dr. Soetomo General Academic Hospital, Surabaya, Indonesia. Initially, five months prior to admission, he developed reddish lesions with bullae in the gluteus area, which went larger as the time went by. One week before admission, he developed fever accompanied by diarrhea with frequency of eight times per day.

Physical examination revealed elevated heart rate of 136 times per minute and increased body temperature of 38ºC. Large areas over both left and right inferior side of the lower limbs were darkened, sloughed off, and very tender to palpation (Figure 1). A small area over the right hand was erythematous and sloughed off (Figure2).

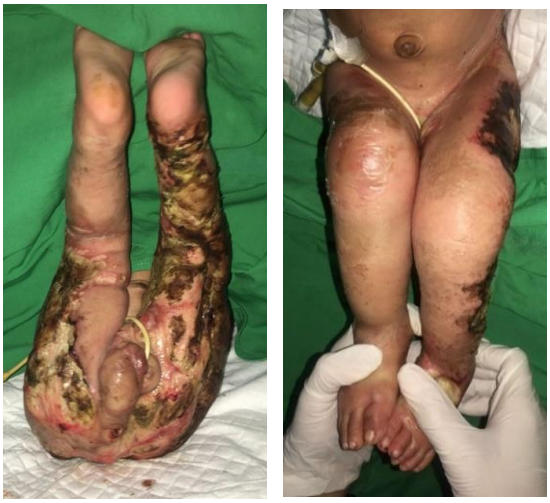

Figure 1. Inferior View of The Lower Limbs

Inferior view of the lower limbs demonstrated large areas of the skin that were darkened, slough off, and very tender to palpation

Laboratory evaluation demonstrated decreased hemoglobin of 6.2 g/dL and elevated leukocyte of 28.850 g/dL. Blood cultures demonstrated that *K. pneumoniae* was present. Based on clinical situation and laboratory examination results planned debridement and split thickness skin graft.

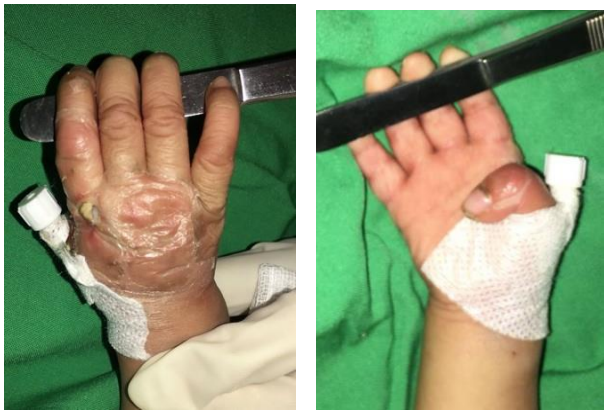

Figure 2. Erythematous and Sloughed Off on The Right Hand.

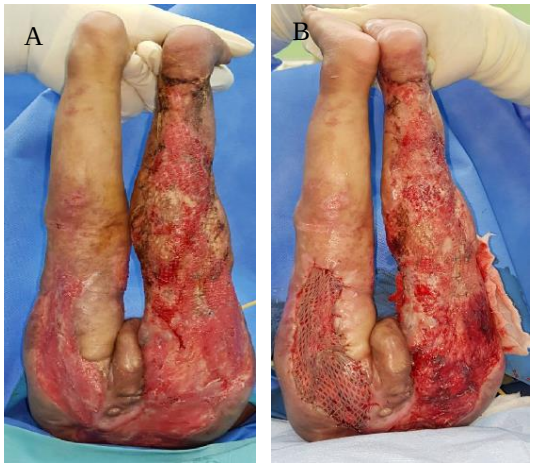

Figure 3. (A) Before skin graft inferior right femur, (B) after skin graft and debridement inferior both of femur

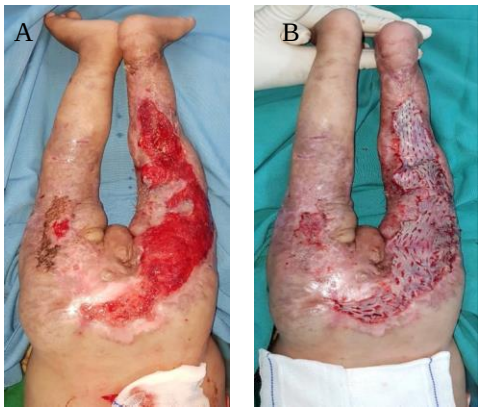

Figure 4. (A) after skin graft and debridement inferior both of femur (B) before skin graft inferior left femur.

DISCUSSION

NF is rapidly spreading soft tissue involving the deep fascial layers, which cause secondary necrosis leading to significant mortality, which is around 25-35%[3–5]. It is usually caused by the synergistic presence of various aerobic or anaerobic, gas producing or not, bacteria. Its progression is often fulminant, and it has been recognized for centuries. NF may appear in any anatomical region; multiple layers may be involved at times and, although the portal of entry is a rupture in the skin continuity, sometimes this cannot be found[6]. One of the most sites that NF frequently affects is lower extremities, accounting for 50% of cases. The most important predictor of mortality is a delay in diagnosis; thereby it is crucial to make prompt diagnosis[4]. Clinically, the findings of NF can overlap with other soft tissue infections including cellulitis, abscess or even compartment syndrome. However, pain out ofproportion to the degree of skin involvement and signs of systemic shock should alert the clinical to the possibility of NF[7–9].

NF is blood spread and quite often include postoperative infections, sttraumatic (i.e., perianal abscess). Despite careful monitoring, based on the initial pathological findings, the initial and aggressive treatment is the key to successful management, and often the final diagnosis of NSTI is confirmed in the operating theatre.Regardless of the clinical presentation, all patients need operative debridement, where repeated operations are often necessary. Therefore, the prognosis of NF depends on accurate and rapid diagnosis and early treatment[6].

NF is rare in children[10]. It is reported that NF occurs in 0.03% of all hospitalization causes[11] and 0.08 per 100,000 children per year[12]. NF is more common in middle-aged adults, without sex, race, or geographic predilections. In adults, the lower extremities are more frequently affected, followed by the trunk and head. In children, most lesions most lesions are reported in the trunk. However, in a retrospective study of 39 children with NF, the lower extremities constituted the most common affected area, which occurred in 17 (44%) subjects[10].

In this case, we report a rare case of a 7- month-old Indonesian male with NF caused by *K. pneumoniae*, which is a common causative pathogen in mono-microbial NF in Asia[13,14]. Some cases also have been documented in Europe and the USA, mainly in patients who had traveled to Asia or were of Asian descent[15–19]. The majority of cases described to date have been in Asians, raising the question of a genetic predisposition versus geographic strain acquisition[20].

Although we did not perform skin biopsy, the leg wound was suspected to be the primary site of infection. A systematic study of monomicrobial *K. pneumoniae* NF showed that the initial infectious site was often on the lower extremities[13]; however, no preceding local factor was identified in

half ofthe cases, and the infection showed a hematogenous spread, unlike the present case[13,17]. The preceding local injury was probably the result of minor trauma; however, it is still an assumption. Initiating factors reported in previous studies include minor injuries[21–25], surgical and traumatic wounds[24,26], and varicella[27]. In some cases, initiating factors cannot be identified[22,24,25].

Usually, NF is hard to diagnose in the early period. This is due to the lack of cutaneous findings. Although a large necrotic area shows bacterial aggressiveness and fast spread, it is a delayed manifestation[6]. NF is manifested by severe pain localized at the trauma site. However, this is disproportionate to the physical findings, as skin usually doesn't carry any infection signs. When skin is involved, it is red-bluish due to vascular thrombosis. Fluctuation, tenderness, and exudates, not necessarily malodorous or purulent, might exist and skin is warm to palpitation. Lymph node involvement may also be seen, except in diffuse-type inflammations such as clostridium gangrene[28]. In more progressed cases, large hemorrhagic bullae, skin necrosis, sensory and motor deficits are commonly presented[6]. In our case, the patient initially had reddish lesion with bullae.

Clinical manifestations of NF start around a week after the initiating event, with induration and edema, followed by 24 to 48 hours later by erythema or purple discoloration and increasing local fever. Pain is notable in the early stages, and sometimes crepitation exists. Tissue necrosis with nerve involvement causes hyposensitivity or anesthesia. In the next 48 to 72 hours, the skin turns smooth, bright, and serous, or hemorrhagic blisters develop. In unproperly treated, necrosis develops, and by the fifth or sixth day, the lesion turns black with a necrotic crust. Removal of the crust shows fascial tissues and a brown, grayish secretion. Subcutaneous cellular tissue is friable and easily removable[10].

Systematic clinical symptoms, such as hypotension, fever (temperature >38^{o}C), tachycardia,tachypnea, mental disturbance, tremor, and laboratory findings of marked increase in white blood cell count and metabolic acidosis are advanced indices of development of sepsis[6]. Systemic signs and symptoms are the results of toxic process and septicemia. A high fever is disproportionate in relation to the size of the cutaneous lesion. Consciousness disturbance correlates withthe severity of the process. Multiple organs and systems could be involved, and abscesses of the liver, lungs, spleen, brain, and pericardium may also develop[10].

Necrotizing fasciitis is an infection of the fascia that can be caused by both gram-positive bacteria, gram-negative and anaerobic bacteria in this case blood cultures demonstrated that *K. pneumoniae* was present. The symptoms are usually pain, erythema, bullae and necrosis, the diagnosisis mad by operative diagnosis in the form of a debridement biopsy. The principles management of Necrotizing Fascitis are operative (Debridement and Split Thickness Skin Graft), broad-spectrum antibiotics (Amikasin injection 2x50 mg) and oxygenation of infected tissue[10].

CONCLUSION

K. pneumoniae necrotizing fasciitis is a rare but life-threatening disease. A high index of suspicion is required for early diagnosisand treatment of this condition.

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CONFLICT OF INTEREST

There is no conflict of interest in this case report.

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AUTHORS CONTRIBUTION

All authors contributed to the idea, interpretation, methodology, manuscript writing, administration, and revision.

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