

# Necrotizing fasciitis in nephritic syndrome: a case report

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**Abstract.** Necrotizing fasciitis is an infection of any layer of tissue compartment; it can be in the dermis, subcutaneous tissue, superficial fascia, deep fascia, or even muscle. Usually, necrotizing fasciitis is associated with necrotizing process caused by the single bacterial organism. The most common pathogen is group A *Streptococcus*. Delayed in the diagnosis and surgical treatment of necrotizing fasciitis will lead to increased tissue loss and high mortality risk. Here we report a case of necrotizing fasciitis which has a great outcome since the surgical exploration of tissue and debridement was done as soon as the patient is suspected of necrotizing fasciitis.

## 1. Introduction

According to CDC, necrotizing fasciitis is an infectious bacterial skin infection that spreads quickly and kills the body's soft tissue which is commonly caused by single bacteria including *group A Streptococcus*, *Klebsiella*, *Clostridium*, *E. coli*, *Staphylococcus aureus*, and *Aeromonas hydrophilia*. The other name for necrotizing fasciitis is "flesh-eating infection." [1] Necrotizing fasciitis has a quite high mortality rate; moreover, delayed treatment of necrotizing fasciitis may result in extensive loss of soft tissue which will result in limb loss. [2] Mortality of necrotizing fasciitis varies widely in the literature. The most recent study reported the mortality rate is around 25%. There are high incidences reported in various developed countries such as the UK with over 500 new cases each year, Canada with 90-200 cases each year, USA 4.3 over 100 000 population, and the maximum yearly incidence in Australia is 3.8 cases per 100 000 population. [3] The patient who has been suspicious to be diagnosed with necrotizing fasciitis should go under surgery as soon as possible for exploration diagnosis and debridement purpose. The main target is to establish diagnosis immediately and direct treatment to improve outcomes. [4]

Although the gold standard for diagnosing necrotizing fasciitis is surgery assessment, there is a scoring guideline according to Laboratory Risk Indicator Fasciitis (LRINEC) to quickly assess patients for the possibility of necrotizing fasciitis infection. [5]

**Table 1.** Laboratory risk for necrotizing fasciitis (LRINEC) scoring system.

Parameter	Value	Points
C-reactive Protein (mg/L)	<150	0
	>150	4

	<15	0
WBC (mm <sup>3</sup> )	15-25	1
	>25	2
	>13.5	0
Hemoglobin (g/dL)	11-13.5	1
	<11	2
Sodium (mEq/L)	>135	0
	<135	2
Creatinine (mg/dL)	<1.6	0
	>1.6	2
Glucose (mg/dL)	<180	0
	>180	1

An LRINEC score of >6 points should raise the suspicion of necrotizing fasciitis, whereas a score of >8 points is strongly predictive (92%).[8]

## 2. Case Report

A 1-year-8-month-old boy, with 10kg body weight, 82cm height, and upper arm circumference 15cm, came to the emergency department of Haji Adam Malik Hospital on 2<sup>nd</sup> October 2016. The patient presented with foul-smelling, wide, dark-colored lesions at upper until lower left leg area and intermittent fever for the past seven days. At first, the lesions seemed to be pinkish macula with the diameter of 2-4cm, but it turned darker and started to form bullae in 2-day-time. The patient also complained difficulties to move his leg due to pain and swollen for the past four days. The patient's mom denied if there was a traumatic event lately.

The patient's mother told us that his whole body was swollen since the past seven days, and was getting better when he was admitted. He used to have such condition due to nephritic syndrome diagnosed two months ago which was being treated with prednisone until he was admitted this time. Since then, his urine looked cloudy. Otherwise, there was no complaint in passing urine and defecating.

From the physical examination, the lesion first described as an erosion with a necrotic border with the diameter of 20cm on the medial thigh and bullae of 15cm wide on mid-calf of the left leg. After a few days, the erosion progressed into an ulcer on the medial thigh and revealed thigh subcutis and tendon. Then, it started to spread upward to suprapubic area. The bullae on mid-calf then ruptured with a new same lesion discovered on metatarsal area. The patient looked toxic but still alert on arrival. Vital signs were on a normal basis. The other significant findings were palpebral edema, stomatitis, enlarged stomach with smiley umbilical and shifting dullness. As what the patient said, the scrotal looked enlarged with positive transillumination test.



**Figure 1.** Overall condition when the patient first arrived (permission was given by parents).



**Figure 2.** Patient's left leg after seven days of hospitalization (permission was given by parents).

Blood tests were conducted which revealed hyponatremia slightly (110mEq/L), increased Procalcitonin (4.35ng/ml) and decreased albumin (1.1g/dl). We performed culture from necrotic lesion drainage, and it revealed *Klebsiella pneumonia* sensitive with Amikacin, Doxycycline, Gentamicin, Levofloxacin, Tobramycin.

There was an improvement in patient condition after serial surgery debridement continued with a skin graft from the right leg on deep lesions and IV Amikacin for 14 days. Prednisone was given with tapering off doses. Eventually, the patient was discharged after the lesions healed.



**Figure 3.** Subcutis of the left thigh was revealed after the first surgery debridement which confirmed our diagnosed with necrotizing fasciitis (permission was given by parents).



**Figure 4.** Left thigh condition in pediatric polyclinic for follow up after discharge (permission was given by parents).



**Figure 5.** Left calf condition in pediatric polyclinic for follow up after discharge (permission was given by parents).

### 3. Discussion

Several immunological factors such as low serum immunoglobulin G concentrations, factor B and Factor I in the alternative pathway components, transferrin, depressed T-cell function, and physiological factors such as fluid collection in cavities and dilution of local humoral defenses by edema may play a major role in the susceptibility of these nephrotic syndrome patient to infections.[6]

As we can see in this patient, the lesions happened about seven days before admission. The laboratory examination on admission showed an increased Procalcitonin 4.35ng/ml ( $>1$ ng/mL) which showed the presence of bacterially infected sepsis condition.[7] In such condition, an urgent management should be taken.[8]

The management strategy then was done with the exploration of the suspicious source of systemic infections. Although these patient's LRINEC (laboratory risk indicator for necrotizing fasciitis) score was 2, which meant to be low-risk necrotizing fasciitis, exploration of the tissues in the operating room should be established as soon as possible followed by surgical debridement. The point was to definitely establish the diagnosis and improve the outcomes.[4] The patient showed a very good outcome which can be seen from the Procalcitonin dropping from 4.35ng/mL (the day of admission) to 0.36ng/mL (discharged).

Beside surgical debridement, it was then given antibiotics to eradicate the bacteria. In this case, the culture from the necrotic lesion revealed to be *K. pneumonia* which was sensitive to Amikacin, Doxycycline, Gentamicin, Levofloxacin, Tobramycin. From the hospital's study done by Daniel Ng in North America, the organism that was found in this patient (*K.pneumonia*) accounted for 17% of monomicrobial necrotizing fasciitis cases as compared to 22% due to *S. aureus* and 18% due to group A *Streptococcus*.[9]

### 4. Conclusion

Necrotizing fasciitis is a progressive tissue involvement infection which is prone to be fallen into sepsis condition. Delayed in the diagnosis and surgical treatment of necrotizing fasciitis will lead to increased tissue loss and high mortality risk.

## References

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