Necrotizing Fasciitis in Neonates: an evidence-based case report

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Abstract

Background:

Neonatal necrotizing fasciitis (NF) is uncommon, but life-threatening infectious disease. This condition involves a fulminant infection course, where the prognosis is dependent on proper diagnosis and prompt treatment.

Case Report:

A 21-day-old baby girl was referred to Haji Adam Malik hospital with initial diagnosis of gangrene and staphylococcus scalding skin syndrome. Fever had occurred since 7 days old. At 8 days old, a blister with diffuse redness lesion was discovered on the lower right abdomen that would turn into bluish skin discoloration. For days, lesion spread to the back, accompanied by extensively peeling of skin. The working diagnosis was necrotizing fasciitis at the abdomen and back area, hypoalbuminemia, and neonatal sepsis. The patient was cared in an incubator with fluid resuscitation and maintenance were given through IVFD and enteral feeding. Antibiotics were administered to the patient and reviewed accordingly to blood culture and wound culture test results, including patient's condition. Patient also received wound care and a series of surgical debridement. Successful NF management involves early and prompt initiation of suitable antibiotics, hemodynamic support, repeated examinations and wound debridement, as well as aggressive nutritional support. One month after the surgical debridement, the patient was stable and had good wound recovery.

Conclusion:

Early diagnosis and management of NF is crucial and should be performed immediatedly for better outcome and prognosis.

Keywords: fasciitis; necrotizing; diagnosis; pediatrics

1. Background

Necrotizing fasciitis (NF) is a severe and rapidly progressing condition characterized by subcutaneous tissue and fascia infection, resulting in extensive fascial necrosis [1]. Group A Streptococcus, Staphylococcus aureus, Vibrio fulnicus, Clostridium perfringens, and Bacteroides fragilis are the common bacteria causing the infection [2]. The prevalence in children is approximately 0.08 per 100,000 children per year, with a mortality rate of 15%.3 NF involves a fulminant infection course in children, with abdominal wall being the most common infection site, followed by the thorax, back, scalp, and extremities [3].

This case aims to provide understanding of the diagnosis, management, and prognosis on neonatal NF involving a 21-day old baby girl. The disease prognosis is dependent on a proper diagnosis and prompt treatment. NF is often fatal in adults, but the fatality rate in children appears to be lower. The highly diverse clinical presentation has made diagnosis challenging, resulting in misdiagnosis and delay in treatment, especially with non-specific initial symptoms [4].

Diagnostic tool for NF has been introduced and known as Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score [5]. When NF is suspected, surgical debridement to excise subcutaneous necrotic tissue needs to be immediately performed. Delay in surgical debridement has been reported to increase the risk of mortality. Antibiotic therapy and supportive management are urgent following treatment on top of surgical debridement to ensure survival and better prognosis.

2. Case Report

A 21-day old baby girl (initial ACA) was admitted to the emergency room (ER) Haji Adam Ma-lik hospital on 6 March 2022 with a wide lesion from the right abdomen to the back. Patient was a referral from another hospital with diagnosis of gangrene and staphylococcus scalding skin syndrome. In the hospital, patient was given cefotaxime and gentamicin injection before being referred to Haji Adam Malik hospital.

The patient had been having fever since 7 days old, where fever was intermittent and could temporarily go down with paracetamol. At 8 days old, the parents discovered a blister with diffuse redness lesion on the lower right abdomen that would turn into bluish skin discol-oration. For days, lesion widened from the abdomen to the back. The condition was worsened and patient was weak at 10 days old. Patient's skin started to peel off wider and wider by the time patient was brought to the hospital.

At the time of admission, the patient was compos mentis with no fever (body tempera-ture was 36.2 oC. Patient body weight (BW) was 3300 gram, body length 48 cm, and head cir-cumference 35 cm (normocephalic). There is no abnormalities observed in the head, eyes, ears, nose, and neck. Heart rate and respiratory rate were normal at 148 beats/minute and 40 times/minute, no murmur, no ronchi, and stridor or wheezing observed.

There was a wide ulcer at the lower right abdomen area presented with necrosis, where the abdominal muscle was exposed (Figure 1). The patient's back area showed wide erosion with necrosis, which was extended from the abdomen area (Figure 2). Figure 3 shows the result of chest X-ray, where the interpretation showed no cardiomegaly, suspected congenital heart disease, and neonatal pneumonia.

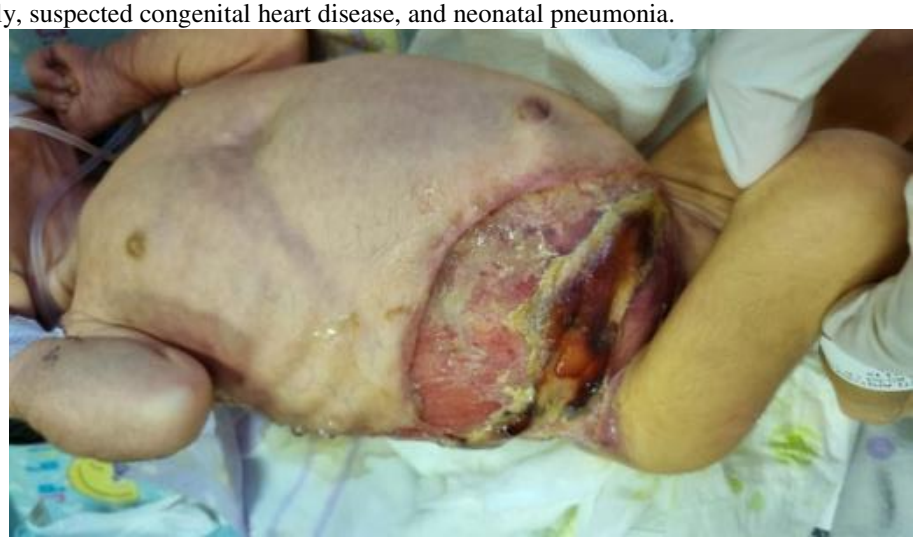

Figure 1. Patient's abdominal appearance: wide ulcer at the lower right abdomen area presented with necrosis

Figure 2. Patient's back appearance: wide erosion with necrosis, extended from the abdomen area.

Laboratory test results on admission (6 March 2022) were notable for anemia with hemoglobin (Hb) 10.0 g/dL (reference range 10.3-17.9 g/dL), low albumin of 2.8 g/dL (refer-ence range 3.5-5.0 g/dL), slightly elongated prothrombin time (PT) 20.5 seconds (reference 13.4 seconds) and Activated Partial Thromboplastin (APTT) 41.8 seconds (reference range 27-39 seconds), respectively. Renal function was also worsening with Ureum (Ur) 161 mg/dL (reference range 15-40 mg/dL) and Creatinine (Cr) 0.6 mg/dL (reference range 0.6-1.1 mg/dL). Chest X-ray showed an appearance of consolidation and enlarged pulmonary artery which made the radiologist to conclude suspected congenital heart disease and neonatal pneumonia (Figure 3).

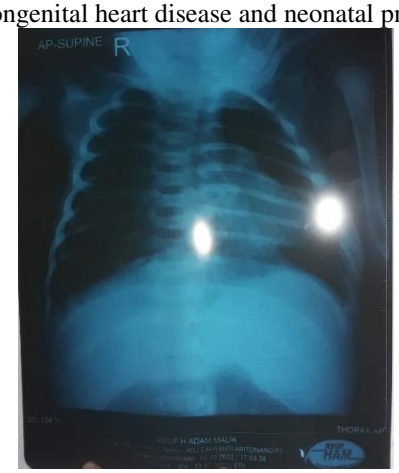

Figure 3. Chest X-ray of the patient. Interpretation: no cardiomegaly, suspected congenital heart disease, and neonatal pneumonia

Based on the observation and laboratory results, the working diagnosis was necrotizing fasciitis at the abdomen and back area, hypoalbuminemia, and neonatal sepsis. From 6 March 2022, the patient was placed in an incubator set at 36.5 °C – 37.5 °C skin temperature and required total fluid of 170 cc/BW/day which consist of IVFD D5% NaCl 0.225% (430 cc) + D40% (70 cc) + 10 meq KCl + 10 cc Ca Gluconate (2 cc/hour), enteral feeding 150 cc/BW/day via orogastric tube (OGT), including diet with breast or formula milk 27 – 28 cc/2 hours. The patient was given cefotaxime injection 110 mg/6 hours and gentamycin injection 10 mg/24 hours

for empirical antibiotic therapy. Albumin 20% was given 6 cc for 2 days to improve hypoalbuminemia. The wound was treated by a surgeon using gentamycin ointment.

Blood culture result on 7 March 2022 identified Staphylococcus epidermidis infection. The antibiotic sensitivity revealed higher sensitivity toward gentamycin, ciprofloxacin, levofloxacin, moxifloxacin, erythromycin, linezolid, vancomycin, tetracycline, tigecycline, nitrofurantoin, rifampicin, and resistant toward benzylpenicillin, oxacillin, clindamycin, trimethoprim/sulfamethoxazole, flomoxef, amoxicillin, ampicillin sulbactam, carbenicillin, ticarcillin, aziocillin, piperacillin. Wound culture result on 7 March 2022 identified Escherichia coli and Acinetobacter baumannii infection. The antibiotic sensitivity was higher toward piperacillin/tazobactam, ceftazidime, cefepime, meropenem, amikacin, tigecycline and nitrofurantoin, ampicillin/sulbactam, sulfa, combination of meropenem and amikacin. Consultation for the case was brought up to the Infection and Tropical Division, where cefotaxime and gentamycin injections were stopped and replaced by ampicillin/sulbactam injection 170 mg/8 hours.

From 7 March 2022 to 10 March 2022, the patient's therapy was changed following the recommendation from the Infection and Tropical Division, such as ampicillin/sulbactam injection 170 mg/8 hours, Clindamycin 3 x 13 mg (pulvis), and albumin 20% 6cc for 2 days. PRC transfusion was given to maintain haemoglobin at 10 g/dL. The patient remained in the incubator care wiith fluid maintenance at 170 cc/BW/day. Wound care was carried out by a surgeon using gentamycin.

Blood tests on the fifth day of treatment showed improvement in kidney function with Ur of 64 and Cr 0.56, but hypoalbumin (Albumin 2.6 g/dL) and anemia (Hb 7.4 g/dL) were much worse. High procalcitonin (175.98, reference range <0.1) indicates severe sepsis in this patient. From 11 March 2022 to 15 March 2022, the patient remained in the incubator care with total fluid administration was maintained at 170 cc/BW/day. The patient received the following therapy of antibiotics meropenem injection 110 mg/8 hours and amikacin injection 30 mg/24 hours. Debridement was continued by a surgeon. After debridement, laboratory results showed improvement with normal Hb 13.4 g/dL (reference range 10.3-17.9), slightly elevated leukosit (15,630 /µL; reference range 5,000-19,000/µL) and albumin remained the same as previous result.

From 16 March 2022 to 20 March 2022, the patient remained in the incubator care and receiving total fluid administration was maintained at 170 cc/BW/day. The patient received the following antibiotics therapy such as meropenem injection 110 mg/8 hours and vancomycin injection 50 mg/24 hours. Debridement was continued by a surgeon. Figure 4 shows patient's back after debridement. Figure 5 shows the wound after one month post regular debridement.

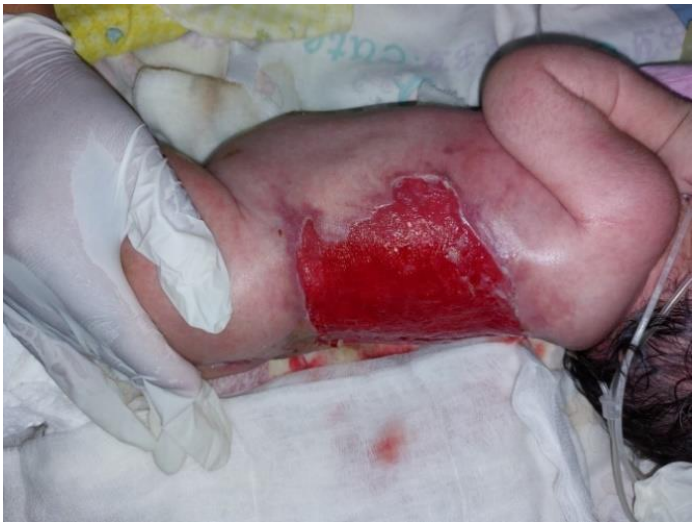

Figure 4. Picture of patient's back after debridement to excise subcutaneous necrotic tissue: wide erosion of subcutaneous tissue.

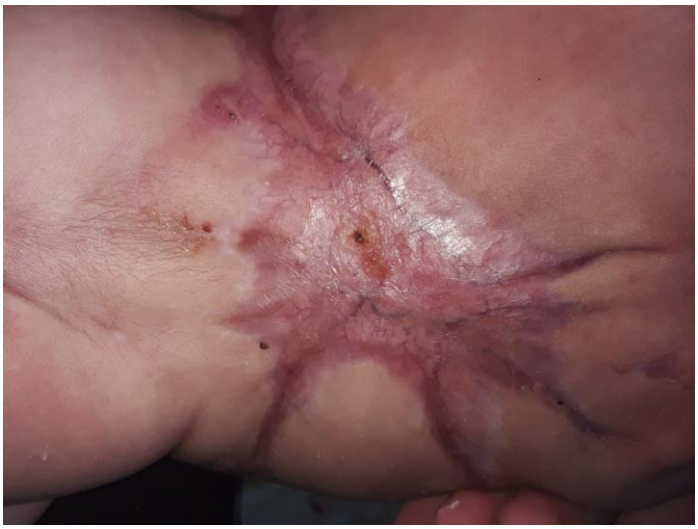

Figure 5. Picture of patient's back after one month post nectrotizing fascitiis debridement: wound healed become scarring tissue

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Appendix

A.1. Family and pregnancy history

The patient is a second child. No family member with the same disease history as the patient. The mother was pregnant at 25 years old and healthy during pregnancy. No history of fever, di-abetes, and hypertension during pregnancy. Antenatal care was routinely received from the public health center and the nutrition intake during pregnancy was adequate.

A.2. Birth history

The patient was born at term (36 weeks) via spontaneous delivery with birth weight 3600 gram, birth length 49 cm, and head circumference 37cm. The patient cried right after birth. She had normal muscle tone, acrocyanosis, and clear amniotic fluid. After resuscitation, the patient cried loudly and moved actively. Patient at 21-day old has not received any immunization since birth.