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Case Report

Necrotizing Fasciitis in Neonates Case Series

Saugat Ghosh*

Tripura Medical College and Dr. BRAM Teaching Hospital, India

Abstract

Introduction: Necrotizing Fasciitis (NF) is a rapidly progressing and life-threatening soft tissue infection, exceedingly rare but often fatal in neonates. This case series highlights the rarity, fulminant nature, and poor prognosis of neonatal NF by presenting four cases.

Case presentation: Four neonates, aged 12-16 days, presented with rapidly spreading, tender, erythematous, and indurated skin lesions on their backs, initially resembling burns. Systemic symptoms like fever, lethargy, and poor feeding were common. Despite empirical antibiotics, the lesions progressed to necrosis, often with bullae formation. Microbiological cultures revealed polymicrobial growth in three cases (*E. coli*, *Pseudomonas sp.*, *Klebsiella*, and MRSA) and monomicrobial growth of MRSA in one case, frequently exhibiting antibiotic resistance. Surgical debridement was performed in three cases. Despite aggressive management, two neonates succumbed to sepsis and multi-organ dysfunction. The other two neonates recovered after prolonged antibiotic therapy and wound care.

Discussion: These cases underscore the diagnostic challenges and rapid progression of NF in neonates. The consistent presentation after 10 days of birth, rapid lesion spread mimicking burns, and predilection for the back were notable features. Polymicrobial infection was frequent. Early recognition, aggressive broad-spectrum antibiotics, and timely surgical debridement are crucial for improving the poor prognosis associated with this condition.

More Information

***Address for correspondence:** Saugat Ghosh, Tripura Medical College and Dr. BRAM Teaching Hospital, India,
Email: ghoshsaugat6@gmail.com

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Introduction

Necrotizing Fasciitis (NF) is a life-threatening soft tissue infection that is characterized by rapid and fulminant progression. The incidence of NF in children is around 0.08 per 100,000 population [1]. This case series reports 4 cases of NF due to its rarity, fulminant nature, and poor prognosis.

Case presentation

4 term newborns with uneventful birth and postnatal history were admitted with necrotic skin areas on the back, looking like a burn, which developed aggressively over a period of 1-2 days. They were all delivered at the hospital, and all the babies were on breastfeeding. Along with the local lesion, there were multiple systemic features. Septic parameters were deranged in all. Multiple prolonged antibiotic therapies, surgical debridement, and thrice daily dressing were done in all the cases. The pus culture and blood culture revealed growth of highly pathogenic and resistant organisms. Despite aggressive antibiotic therapy and surgical debridement, 2 babies died, and 2 babies were discharged. The clinical features and management are described as under (Table 1, Figures 1-5).

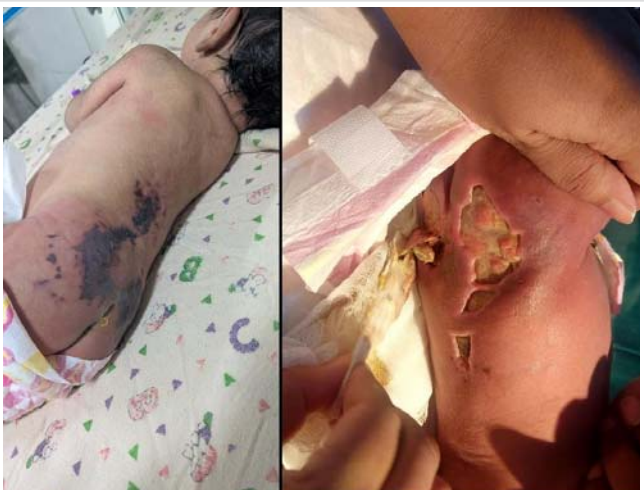

Figure 1: Case 1

Table 1:

	Case 1	Case 2	Case 3	Case 4
Age(days)	12	16	13	18
Weight(kg)	3.34	2.6	3.46	2.8
Sex	Girl	Boy	Boy	Female
Mode of delivery	LSCS*	NVD#	LSCS	LSCS
Complications during or after delivery	No	No	No	No
Clinical features	Febrile, lethargic, and not accepting feeds	fever, high-pitched cry, and poor feeding, oliguria	Fever, poor feeding	Fever, poor feeding
Duration of symptoms	24 hrs	48 hrs	1-2 days	24 hrs
Skin manifestation	Large area of tender, indurated, brownish-red necrotic area, looking like a burn, with 1 bulla in his back, which rapidly spread over the past 24 hours.	Extensive indurated, erythematous, tender, brownish-red area on the entire back, looking like a burn. There were multiple haemorrhagic bullae, which were oozing blood mixed with serous fluid.	Dirty-looking dark necrotic ulcer in the lumbosacral area measuring approximately 10 x 10 cm, with surrounding erythema and induration, with oozing of serous fluid	Localised red hard tender area measuring approximately 8 x 10 cm in the lower back
Other notable features	no	Down's phenotype. Irritable, hypotension, extensive sclerema, thrombocytopenia, Gastrointestinal bleed, haematuria, AKI## and DIC***	Differential diagnosis of infected meningomyelocele or burn was made. Ultrasonography of the local site was done, which revealed an intact spinal canal.	Seizure.
Total Leucocyte Count (cu mm)	26,500	25600	24000	21000
C.Reactive Protein (< 5 mg/dl)	85.7	35	36	53
Wound culture	*E.Coli* sensitive to only colistin	MRSA**	*Klebsiella* and MRSA. *Klebsiella* was pan-resistant and intermediately sensitive to Amikacin.	*Pseudomonas* and *E. coli*, which were sensitive to only cefepime and colistin
Blood culture	*Pseudomonas*, carbapenem resistant	sterile	*Pseudomonas*-carbapenem resistant	Sterile
Surgical debridement	Yes	Yes	Yes	Yes
Skin biopsy	Neutrophil infiltrates, fibrosis with unhealthy granulation tissue	Necrotic tissues	Necrotic tissues	Necrotic tissues
Duration of NICU stay	21 days	30 hours	14 days	23days
Outcome	expired	expired	discharged	Discharged

Abbreviations: LSCS*: Lower Segment Caesarean Section; NVD#: Normal Vaginal Delivery; MRSA**: Methicillin-resistant *Staphylococcus aureus;* AKI##: Acute Kidney Injury; DIC***: Disseminated Intravascular Coagulation

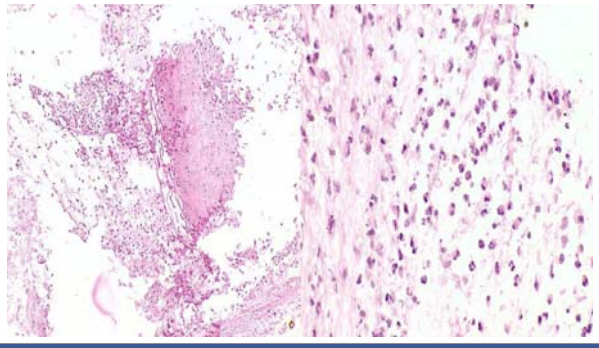

Figure 2: Skin biopsy case 1.

Figure 4: Case 3

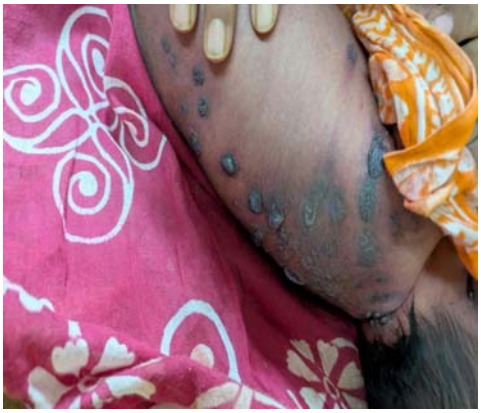

Figure 3: Case 2

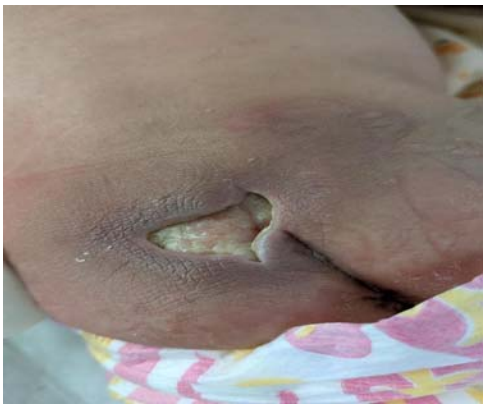

Figure 5: Case 4

Discussion

All 4 babies had 4 main common clinical features: 1st one is that all presented after 10 days of birth, 2nd one is the rapidity of progression, 3rd one is that the affected skin area appears burnt on examination, 4th is the location on the back, and except case number 2, all had polymicrobial resistant bacterial growth in culture. The progression of the lesions was so fast that within 18-24 hours, the skin turned from simple erythema to a purplish black burnt skin appearance. Within two to three days, the affected skin exhibits a shiny, smooth appearance with serous or haemorrhagic blisters, followed by necrosis, and very rarely, subcutaneous crepitus is found [2-4]. Weber, et al. Jin sato, et al. reported that the timing of progression to NF was 1–4 days on average [5,6]. The closest differential diagnosis is subcutaneous fat necrosis, but SCFN presents mostly in the 1st week of life with some birth complications, like asphyxia, respiratory distress, meconium aspiration, hypercalcemia, and skin biopsy is suggestive of panniculitis [7]. Back was the most frequent site of involvement followed by lower limb and abdomen [8]. Obu, et al. reported 2 cases with lesions in the chest [9]. The primary site of involvement of NF infections is the superficial fascia, and then there is thrombosis of perforating vessels of the skin and subcutaneous tissue, which results in extensive necrosis. Tissue ischemia prevents adequate delivery of antibiotics; therefore, antibiotic therapy alone is not sufficient and surgical debridement is mandatory. Type I NF infections are polymicrobial and caused by a combination of gram-positive, gram-negative, and/or anaerobic species. Type II infections are usually monomicrobial and caused by gram-positive organisms [10]. The common predisposing factors for NF in are omphalitis, balanitis f, et al. scalp monitoring, post-surgical complication, NEC, maternal mastitis, immunodeficiency, sepsis etc [7,11]. V L Krebs reported necrotizing fasciitis at the site of the venipuncture for the administration of hypertonic glucose solution [12]. Jin sato, et al. also investigated the immunological status but there was no abnormality [6]. So, the diagnosis is only confirmed through surgical exploration and detailed examination of the site. The management of NF includes broad spectrum antibiotic, haemodynamic support and urgent surgical removal of necrotic tissues along with proper nutrition support [3,8]. Administrating only antibiotics without surgical debridement was associated with a nearly 100% mortality rate. Another modality of treatment is negative pressure therapy. Zuloaga-Salcedo S, et al. [2] applied negative pressure therapy in three sessions of 72 hours each, with a gap of 24–48 hours in between. Therapy was started with a negative pressure of 50 mmHg and was increased gradually over 48 hours to a maximum of 100 mmHg. Dressings used in neonates including alginate, paraffin, honey, silver, solcoseryl, and iodine. Other treatment options include hyperbaric oxygen therapy, skin grafting, IVIG, and GCSF but the success is controversial. Prognosis of Necrotising fasciitis is poor with mortality upto 60% unless it is detected early and aggressive antibiotic therapy with surgical debridement is instituted promptly [7].

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