ECRONICON OPEN ACCESS

EC CLINICAL AND MEDICAL CASE REPORTS

Case Report

Necrotizing Fasciitis in Neonate Secondary to Beta Hemolytic Group A *Streptococcus* Treated with Split Thickness Skin Autograft

Ayaz Ur Rehman[1], Yusra Tariq[1], Rozina Iqbal[1], Manoj Kumar[2], Sohail Dogar[3] and Adnan Mirza[4]*

[1]*Resident, Department of Pediatric and Child Health, Aga Khan University Hospital, Karachi, Pakistan*

[2]*Clinical Instructor Pediatric Medicine and Fellow Neonatology, Aga Khan University Hospital, Karachi, Pakistan*

[3]*Assistant Professor, Department of Pediatric Surgery, Aga Khan University Hospital, Karachi, Pakistan*

[4]*Assistant Professor, Department of Neonatology, Aga Khan university Hospital, Karachi, Pakistan*

***Corresponding Author:** Adnan Mirza, Assistant Professor, Department of Neonatology, Aga Khan university Hospital, Karachi, Pakistan.

Received: March 09, 2023; **Published:** March 17, 2023

Abstract

Necrotizing fasciitis is life threatening and fulminant bacterial infection of skin, subcutaneous tissue, superficial fascia. Necrotizing Fasciitis are common in adult and the incidence of NF in pediatric population is very low. The most common organisms associated with necrotizing fasciitis are *Staphylococcus aureus* followed by Beta hemolytic group A *Streptococcus*. Early diagnosis and prompt serial surgical debridement is the most important component of management. Split thickness skin graft is required for healing of large raw area that does not heal by primary intention. This case report describes a previously healthy 28 days old neonate with necrotizing fasciitis secondary to Beta hemolytic group A *Streptococcus* and Candida Albicans treated with surgical wound debridement followed by split thickness skin autograft. This report highlights the importance of timely diagnosis and multidisciplinary surgical management of NF.

***Keywords**: Necrotizing Fasciitis; Group A Streptococci; Soft Tissue Infections; Neonatal Surgery; Autograft*

Introduction

Necrotizing fasciitis (NF) is fatal and rapidly progressing bacterial infection of subcutaneous tissue [1]. It is more common in adult as compare to pediatric population. The incidence of NF is high in immunocompromised adult and diabetic patient however most of infant who developed NF are healthy [2]. The most common organisms associated with NF in neonate are, *Staphylococcus aureus*, group A *Streptococci, Pseudomonas* and *Escherichia coli*. Prompt diagnosis and early surgical debridement decrease the mortality. Large raw area which does not heal by primary intention require split thickness skin graft. We report the case of 28 days old neonate with NF associated with group A *Streptococci* who underwent series of wound debridement followed by split thickness skin auto graft. In this case report, we discuss timely diagnosis and multidisciplinary surgical management of NF.

Case Report

28 days old full term neonate born via elective cesarean section without any complication underwent for circumcision on 18 day of life. Post circumcision he developed perineal rash followed by thigh swelling and abdominal distension. He was born at tertiary care

hospital where he received postnatal care for 48 hours. He does not have any history of intramuscular injection and trauma. The patient was initially managed by a general physician with supportive treatment in line of nappy rash but due to progression of symptoms (swelling around thigh and scrotal region, abdominal distension) patient presented to our tertiary care hospital where he was admitted for workup and further management. On arrival patient heart rate was 165 beats/minute and respiratory rate was 65 breaths/minute with saturation of 96% on room air. His blood pressure was 83/59 mmHg and he was afebrile. On examinations abdomen was distended with visible veins and erythema with purplish discoloration and swelling over left thigh (Figure 1). Laboratory workup revealed white blood count of 5.0 k/µL with a left shift 76% neutrophils, hemoglobin 11.0 g/dL, platelet count 175 K/µL, C-reactive protein 193 mg/L, hyponatremia of 127 meq/litre and deranged coagulation profile. Abdomen radiography findings were consistent with prominent bowel loops and bilateral subcutaneous edema in lower limbs. Computed tomography of the abdomen showed significant diffuse body wall oedema extending into scrotum and lower limbs without evidence of subcutaneous air. Baby was admitted in isolation room of the pediatric intensive care unit for multidisciplinary management. Strict infection control measures were taken to avoid nosocomial infection. Broad-spectrum antibiotics, Meropenem, vancomycin and clindamycin were started. Immediate interventions were carried out for cardiopulmonary stabilizations. BLCS reported Group A *Streptococcus* species which were pan sensitive. Infectious disease was consulted who advised to stop clindamycin and vancomycin after 3 days, to continue with meropenem and start colistin and amphotericin after sending fungal markers. In the routine physical assessment, we noted the progression of edema and extension purple discoloration with blistering from the thigh to mid of abdomen and the area of the back with the posterior buttock (Figure 2). Pediatric surgery was taken onboard bed side debridement was done and it was followed by daily chemical debridement with eusol solutions by using the sterile dressing technique. Blood and tissue CS revealed beta haemolytic group A *Streptococcus* and *Candida* respectively. Antibiotic and antifungal were optimized as per culture sensitivity. Baby was taken to OR for second session of wound debridement (Figure 3) after showing clinical improvement of previous debridement. Plastic surgery was consulted for skin graft. As he had large raw areas so the family was counseled regarding need of split thickness skin graft. After informed consent, he underwent for split thickness skin grafting for right thigh and the graft was harvest from left thigh and secured with vicryl 4.0 (Figure 4). Post grafting aseptic dressing was carried out by a plastic surgery physician and family was encouraged to participate in routine care and daily dressing. Patient wound start healing as shown in figure 4. Baby was treated with total 21 days of antibiotic (Meropenem) and antifungal (Fluconazole) for 3 weeks.

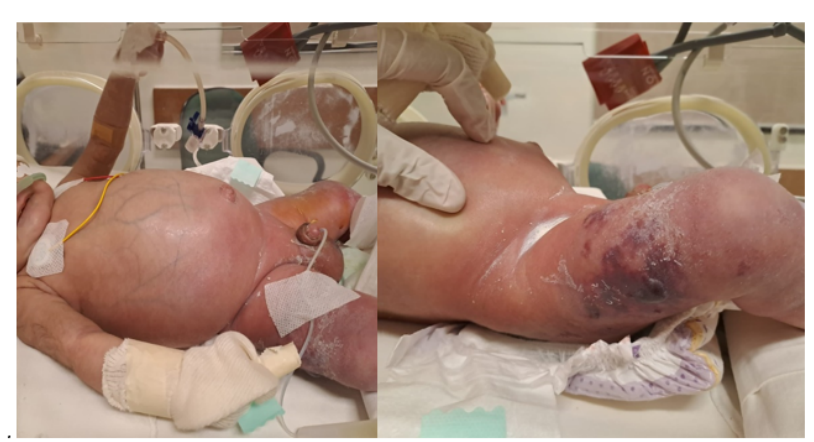

Figure 1: *Status of wound on first day of admission.*

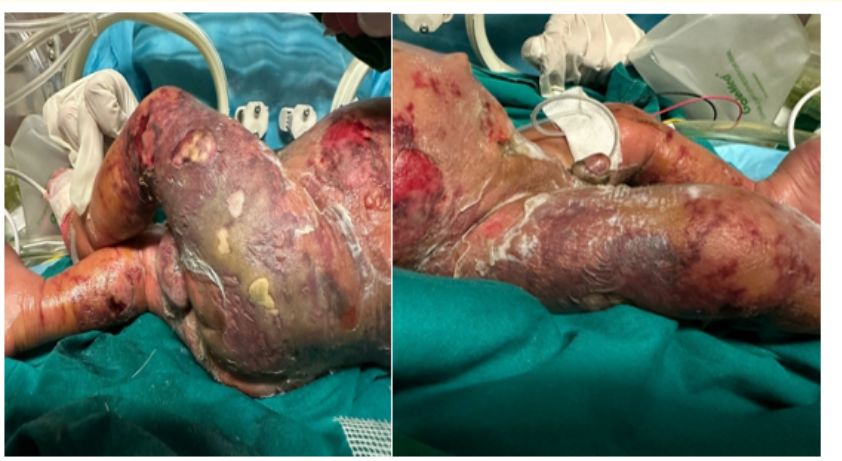

Figure 2: *Rapid progression of disease.*

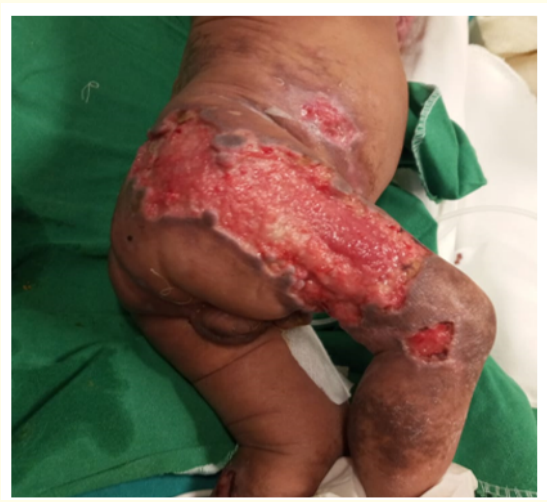

Figure 3: *After wound debridement.*

Finally, the babies was discharged in stable condition from hospital with parental involvement in dressing care and at the same time home health services were arranged for close follow up of wound at home (Figure 5).

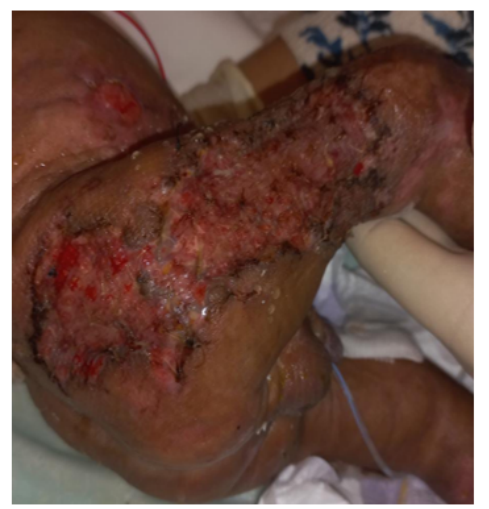

Figure 4: *Split thickness skin autograft.*

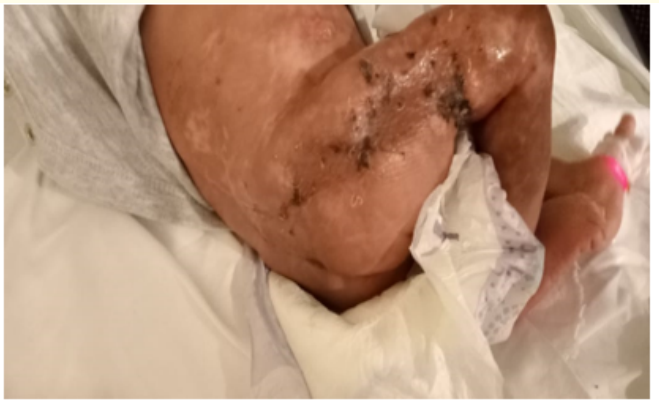

Figure 5: *Wound at the time of discharge.*

Discussions

Necrotizing fasciitis (NF) is defined as fulminant bacterial infection of subcutaneous tissue and superficial fascia. NF is rare in neonate and more common in adult with diabetes and immuno-compromised patient. NF may be primary (idiopathic) in which there is no causative agent identified or secondary in which there is underlying predisposing factors. Risk factor for development of NF in neonate includes omphalitis, circumcision, umbilical venous catheter insertion and necrotizing enterocolitis [3-5]. In our case circumcision was the leading point for development of NF. NF is either polymicrobial or monomicrobial and the most common organisms that are usually

associated with NF are *Staphylococcus aureus* [2,6], whereas other rare organisms includes *E. coli, Klebsiella, Citrobacter*, and *Pseudomonas* and fungi such as *Aspergillus* and *Candida albicans*. In our case study *Streptococcus* and *Candida albicans* contributed in the development of NF. Common Site of NF in neonates is trunk and neck unlike in adult where extremity and perineum is common site [2]. In our case report NF involved perineum, extremity and back area.

Early diagnosis and prompt surgical treatment along with antibiotic therapy offer best chance of survival. Delay in diagnosis and surgical treatment can lead to morbidity and mortality. The clinical manifestations of NF depend upon the disease process. It begins with a small induration followed by erythema or purple discoloration and then the area become black. In many cases it is very difficult to distinguish early phase of NF from less serious soft tissue infection such as cellulitis because of variable skin changes and nonspecific laboratory findings [7-9]. A clinician should keep high degree of suspicion for NF in patient who present with systemic signs of illness and with rapidly progressing cellulitis not responding to routine treatment. Laboratory risk indicator for necrotizing fasciitis (LRINEC Score) is a bedside tool having set of 6 parameters which can help clinician to determine if patient is likely to have NEC [10]. Ultrasonography, CT scan and MRI help in early diagnosis and they show the extension disease.

Treatment of NF is multidisciplinary which include neonatologist, pediatric surgeon, plastic surgeon and clinical nurse. The multidisciplinary management in our case study contributed in good clinical outcome. Early and aggressive surgical treatment along with good supportive care and IV antibiotic therapy are main component of treatment. Our patient went for serial wound debridement followed by daily dressing with eusol solution. Large raw area which does not heal by primary intention requires skin grafting. The traditional way for skin grafting in neonates is allograft due to limited donor area in neonate with loss of subcutaneous tissue. However, the chances of graft rejection are high in allograft versus autograft. In our case, to minimize the chance of rejection we harvest graft from patient left thigh. Other form of therapies such as hyperbaric oxygen and IVIG are not proven yet, further studies are required for it.

Conclusion

Necrotizing fasciitis is a rare fulminant bacterial infection of subcutaneous tissue in neonate. Any neonate who presents with systemic illness and rapidly progressive erythema or cellulitis, necrotizing fasciitis should be considered in the differential diagnosis. Good supportive care by multidisciplinary team, serial wound debridement followed by skin graft and coverage of infection with IV antibiotic and sterile dressing technique with regular follow up as outpatient results in better outcome.

Data Access Statement

All relevant data are presented in this paper.

Funding Statement

All authors declare that they have not received any financial support from any organization.

Ethical Compliance

Informed consent was obtained from the parents for the publication of this case report with no patient identifier.

Author Contributions

AR: Data acquisition, writing the manuscript; YT and RI: Abstract, Case Findings, MK: Final Revision of manuscript, SD: Final revision of manuscript, AM: Concept and design, interpretation of data, and final revision of the manuscript. All authors have read and approved the final manuscript.

Conflict of Interest Declaration

The authors have no conflict of interest to declare.

Bibliography

1. Marwah A., *et al*. "Neonatal necrotizing fasciitis". *International Journal of Medical Research and Health Sciences* 7.8 (2019): 3198-3199.
2. Nazir Z. "Necrotizing fasciitis in neonate". *Pediatric Surgery International* 21 (2005): 641-644.
3. Stewart D and Benitz W. "Committee on fetus and newborn. Umbilical cord care in the newborn infant". *Pediatrics* 138 (2016): e20162149.
4. Brook I. "Infectious complications of circumcision and their prevention". *European Urology Focus* 2 (2016): 453-459.
5. Casey DM., *et al*. "Necrotizing fasciitis: A case report of a premature infant with necrotizing enterocolitis". *The Journal of Pediatric Nursing: Nursing* 28 (2013): 486-491.
6. Pandey V., *et al*. "Neonatal necrotizing fasciitis man-aged conservatively: An experience from a tertiary centre". *Journal of Wound Care* 23 (2014): 270-273.
7. Elliott DC., *et al*. "Necrotizing soft tissue infections". *Annals of Surgery* 224 (1996): 672-683.
8. Hsieh T., *et al*. "Necrotizing fasciitis in children in eastern Ontario: a case-control study". *Canadian Medical Association Journal* 163 (2000): 393-396.
9. Hsieh WS., *et al*. "Neonatal necrotizing fasciitis: a report of three cases and review of the literature". *Pediatrics* 103.4 (1999).
10. Bechar J., *et al*. "Laboratory risk indicator for necrotizing fasciitis (LRINEC) score for the assessment of early necrotizing fasciitis: A systematic review of the literature". *The Annals of The Royal College of Surgeons of England* 99 (2017): 341-346.

Volume 6 Issue 4 April 2023