Case Report

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Early diagnosis of post-varicella necrotising fasciitis: A medical and surgical emergency

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ABSTRACT

Necrotising fasciitis (NF) is an extremely rare complication of a rather common paediatric viral exanthem varicella. Delayed diagnosis and treatment can lead to significant morbidity and mortality. Laboratory risk indicator of NF score aids in early clinical diagnosis in suspected cases of post-varicella NF thus enabling timely intervention. Surgery delayed for more than 24 hours, is an independent risk factor for death. Surgical debridement with good antibiotic coverage is the definitive treatment for NF.

Key words: Laboratory risk indicator of necrotising fasciitis score, post-varicella necrotising fasciitis, surgical debridement

INTRODUCTION

Chickenpox is a highly infectious disease of childhood caused by varicella zoster. Two percentage of children with varicella develop complications, of which bacterial superinfection of skin is the most common complication (45%).[1] Necrotising fasciitis (NF) is a rare but potentially lethal complication of varicella, seen in <1% of the children, who develop bacterial skin superinfection.[2]

CASE REPORT

A 2-year-old boy diagnosed to have varicella was referred to our hospital with high spiking fever and cellulitis of the left upper arm. He was not responding to good antibiotic cover, since 3 days. The redness rapidly progressed to purplish black discoloration, which was increasing in size. At admission, on day 10 of illness, a small area in the lesion showed skin peeling. There was no past history of any major illnesses or hospitalisations. He was developmentally normal, adequately nourished and immunised. His elder brother and father recovered from varicella without complications.

On examination, the child was irritable and sick looking. Tachycardia and tachypnoea, with signs of early shock, were present. There was generalised oedema, healed varicella scars and a few scabs present all over the body. Local examination revealed a tender, warm oedematous left upper arm with a 3 cm × 4 cm purplish black discoloration, with skin peeling and serosanguinous discharge on the lateral aspect, 5 cm below the acromion process (below the insertion of the deltoid muscle). It extended posteriorly measuring 2 cm × 3 cm [Figure 1]. There were no intravenous puncture sites on the left upper limb. Left elbow and shoulder joint had a full range of movements. Systemic examination was normal.

In view of laboratory risk indicator of necrotising fasciitis (LRINEC) score being 7 [Table 1] and condition not improving on good antibiotic coverage, debridement and fasciotomy [Figure 2] was done on day 11 of illness. Minimal pus was drained and sent for culture and sensitivity, which showed no growth. Blood culture showed no growth. Secondary suturing was done on day 20 of illness [Figure 3] and patient

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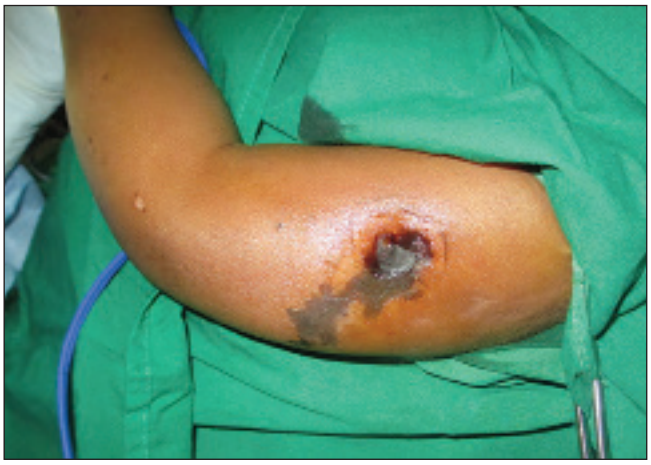

Figure 1: A 3 cm × 4 cm purplish black discoloration, with peeling of skin and serosanguinous discharge on the lateral aspect, 5 cm below the acromion process, below the insertion of the deltoid muscle, with extension posteriorly measuring 2 cm × 3 cm

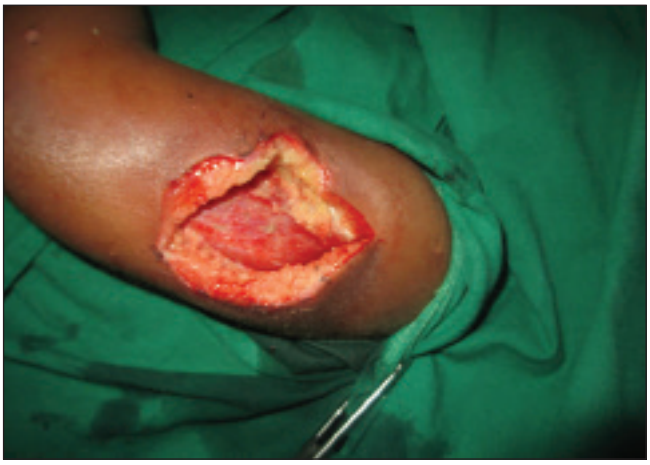

Figure 2: Necrotising fasciitis postsurgical debridement and fasciotomy

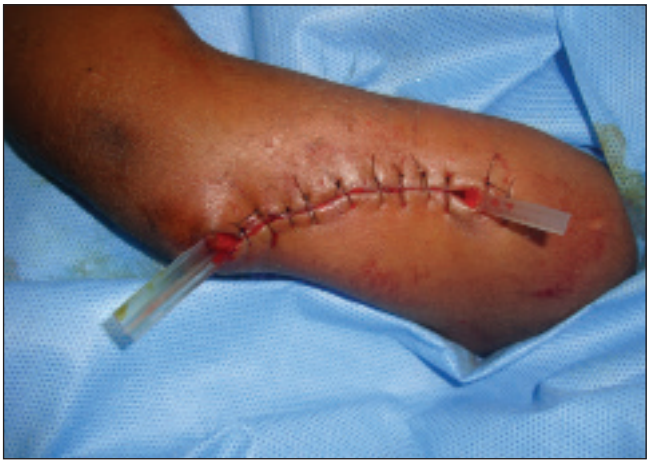

Figure 3: Wound postsecondary suturing on day 20

discharged on day 26. Minimal wound discharge was noted on follow-up, which healed with daily dressing and oral antibiotics.

Table 1: Lab investigations with laboratory risk indicator of necrotising fasciitis score were as follows

Lab test	Day 6	Day 8	Day 10	LRINEC score
Haemoglobin	10.1		8.2	2
Total count	15,800	25,000	28,100	2
Differential N/L*	N 82/L 12	N 32/L 60	N 35/L 50	
Platelets	180,000	135,000	141,000	
GRBS			193 mg/dl	1
Electrolyte (sodium/ potassium)	134/3		125/3.4	2
Blood urea	15		10	
Creatine			0.3	
ESR			54	
Total LRINEC score				7

*N: Neutrophil; L: Lymphocyte; LRINEC: Laboratory risk indicator of necrotising fasciitis; ESR: Erythrocyte sedimentation rate; GRBS: Glucose random blood sugar

DISCUSSION

Chicken pox is a common contagious infection of childhood. It usually resolves without complications. Secondary cases in children <5 years have a longer course, more morbidity and more chances of developing serious complications.[3] Bacterial skin superinfection, cerebellitis and pneumonia are the most common complications of chickenpox.[3]

NF is an aggressive soft tissue infection that tracks along the superficial plane. It affects all tissues between the skin and underlying muscle tissue involving the superficial fascia.[4] The overall incidence of NF due to various aetiologies in children is 0.08/100,000 children per year.[5]

NF occurs when there is a break in the skin, respiratory tract or genital tract with impaired immunity due to various reasons.[5] Bacterial superinfection of the varicella skin lesions is quite common, but progression to NF is seen in only 1% of these cases.[2] NF are of three types. Immunocompetent children who develop varicella get type 2 NF; that is monobacterial NF caused by invasive Group A beta haemolytic streptococci and sometimes by staphylococci. Bacteria invade subcutaneous tissue in NF and produce endotoxins and exotoxins which result in tissue ischemia, necrosis and systemic illness.

Initially, patient shows fever and cellulitis, which then over few hours rapidly progress to features suggestive of NF. These are severe pain disproportional to the extent of lesion followed by the development of anaesthesia at that site, and hard wooden feel of subcutaneous tissue beyond the area of the lesion. There may be systemic toxicity with or without altered mental status, skin

necrosis with or without crepitus and bullous lesions. Death and necrosis of the underlying subcutaneous tissue give it the purplish hue. The patient does not respond to good antibiotic therapy.

In this child, we thought of NF, haemorrhagic varicella and purpura fulminans as a differential diagnosis. As the child was developmentally normal and previously immunocompetent, haemorrhagic varicella was ruled out. In purpura fulminans, there should be a history of palpable purpuric lesions becoming confluent, and leading to well-demarcated eschar with features of disseminated intravascular coagulation.[6] Nonsteroidal anti-inflammatory drugs (NSAID) use is associated with an increased incidence of NF. The patient did not use NSAIDs for pain.

At admission, a maximum of 30% of cases may be diagnosed accurately as NF.[7] NF is suspected in a child who is not responding to good antibiotic cover and supportive measures, for cellulitis. If left untreated the patient goes into sepsis, renal or respiratory failure with multiorgan dysfunction and death.[8] Seventy percent of post-varicella NF is caused by group Abeta haemolytic streptococci and is associated with 13.6% mortality.[5] Mortality is 100% if surgical debridement is not done.[7] NF involving the limbs have a better prognosis than those involving head and trunk.[8]

Clinically, NF is confirmed by passing a probe or gloved finger below the affected skin. If the skin separates from the underlying tissue, then NF is confirmed. This is called the finger/probe test.[8] Based on the change in laboratory parameters, as a diagnostic aid, LRINEC score was developed where.

- Haemoglobin level <11 mg/dl, is given score of 2.
- C-reactive protein >150, score of 4.
- Leukocyte count 15,000-25,000/dl, score of 1 and more than 25,000/dl, score of 2.
- Creatinine level >1.5 mg/dl, score of 2.
- Blood glucose >180 mg/dl, score of 1.
- Serum sodium <135 mg/dl, score of 2.

If the total score is <6 then <50% chance of it being NF, if the total score is 6-7 then 50-75% chance of NF and if the total score is more than 7 then >75% chance of NF. The LRINEC score has a positive predictive value of 92% and negative predictive value of 96%.[7,9]

Magnetic resonance imaging can confirm the presence and extent of NF but may delay surgical debridement. Delay in initiating treatment for NF may cause scar hypertrophy and multiple joint contractures which may need further revision surgeries. Hence, surgical debridement is not delayed for want of imaging studies.

The role of hyperbaric oxygen in the treatment of NF is controversial. High dose of intravenous immunoglobulin, granulocyte transfusion, granulocyte colony stimulating factor is some of the tried treatment modalities that have failed.[5]

CONCLUSION

NF should be suspected in post-varicella cellulitis, not responding to adequate antibiotic therapy. LRINEC score aids in early diagnosis, where imaging studies are pending. NF requires early and aggressive surgical debridement, to prevent muscle necrosis, limb dysfunction and death.[10]

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Clark P, Davidson D, Letts M, Lawton L, Jawadi A. Necrotizing fasciitis secondary to chickenpox infection in children. Can J Surg 2003;46:9-14.
2. Nirmala C, Madhusudan K, Venkateswara RJ, Satish K. Necrotising fasciitis in an infant secondary to varicella zoster infection. J Dr NTR Univ Health Sci 2013;2:55-7.
3. Kapse A. Chicken pox: Though seldom it could be a menacing malady even in healthy children. Paediatr Infect Dis 2009;1:154-60.
4. Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, *et al*. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America. Clin Infect Dis 2014;59: e10-52.
5. Purkait R, Samanta T, Basu B, Ganguly S. Unusual associations of necrotizing fascitis: A case series report from a tertiary care hospital. Indian J Dermatol 2010;55:399-401.
6. Chalmers E, Cooper P, Forman K, Grimley C, Khair K, Minford A, *et al*. Purpura fulminans: Recognition, diagnosis and management. Arch Dis Child 2011;96:1066-71.
7. Puvanendran R, Huey JC, Pasupathy S. Necrotizing fasciitis. Can Fam Physician 2009;55:981-7.
8. Sadasivan J, Maroju NK, Balasubramaniam A. Necrotizing fasciitis. Indian J Plast Surg 2013;46:472-8.
9. Wong CH, Khin LW, Heng KS, Tan KC, Low CO. The LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score: A tool for distinguishing necrotizing fasciitis from other soft tissue infections. Crit Care Med 2004;32:1535-41.
10. Claudia CS, Margareta IM, Sorina CD, Ionescu C. Necrotizing fasciitis with group A Streptococci and *Eggerthella lenta* as a complication of Varicella in a child — Case presentation. ARS Med Tomitana 2014;20:35-9.