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Mini Review

Necrotizing Fasciitis in Children: A Review Article

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Abstract

Necrotizing fasciitis (NF) is a soft tissue infection with a capability of rapid progression if not treated promptly. It is an extremely rare infectious entity with a prevalance of 0.02% of all pediatric hospital cases [1]. Because of its rarity, correct diagnosis of this disease is usually not possible. In this review article it is aimed to critique the general characteristics of NF in children and the principles of management are discussed under the light of relevant literature.

Keywords: *Necrotizing Fasciitis; Children; Surgical Treatment*

Introduction

Necrotizing fasciitis (NF) is a progressive disease with extensive infection involving subcutaneous tissue and superficial fascia. If untreated promptly, the disease may lead to necrosis of the fascia and surrounding soft tissue and may end up with several catastrophies like septic shock, organ failure and even death [1]. Due to the rarity of this disease, attending pediatric surgeon may face diagnostic and therapeutic challanges during management of these children who are usually misdiagnosed as cellulitis.

It has been reported that the disease has aprevalance of 0.02% and in another report this entity has been observed in 0.08 per 100.000 children per year [2]. According to recent reports there is an increasing incidence of NF due to streptoccocus pyogenes [3-5].

There are several differences with regard to NF between children and adults. NF is commonly observed in immunosuppressed and diabetic adult patients on the other hand it frequently affects healthy children [2,6-11]. NF is commonly seen in an extremity while in children most lesions are seen in the trunk [2,6-11]. With regard to causative bacteria there are also major differences between adult and pediatric patients. Polymicrobial infection with anaerobic and aerobic microorganisms is commonly seen adult patients and these are namely *Clostridium, Proteus, E. coli, Bacteroides* and *Enterobacteriacea* [10-13]. Unlike adults NF is usually seen as a consequence of monomicrobial infection caused by *S. pyogenes* and occasionally due to *Staphylococcus aureus, Psudomonas, Escherichia coli, Vibrio* species [2,5,7,11,14]. As far as the mortality rate due to NF is concerned, the rate of deaths in adult patients with NF is higher with a cumulative rate of 35% (6% - 76%) than in children whose mortality rate was reported to be as low as 5.4% [15]. However mortality rate in neonates with NF is higher with a reported range of 36% - 88% [16-18].

In the pathogenesis of the disease, initiating factors reported in the literature include minor and major trauma, surgical wounds, varicella lesions, in neonates omphalitis, circumcision and placement of catheters and electrodes, inguinal hernia repair or umbilical vein catheterizations [2,3,6-11,19,20]. As said before, NF in children is usually misdiagnosed as soft tissue infection like cellulitis. Local early signs include edema, induration and erythema. If the disease is not treated promptly signs of advanced disease including vesiculation, ecchymosis, crepitation, anesthesia on the affected site can be observed. It is often stated that "pain out of proportion" is regarded as a typical clinical sign of NF [1]. It has been reported that children with high risk of developing NF are the patients with varicella who present 3 days after the outbreak of the disease with fever, tachycardia, elevated leukocyte and an erythematous, indurated lesion with severe pain [8]. If the disease is not treated promptly systemic signs and symptoms may develop and these are high fever, anxiety, altered mental status, leukocytosis, hypotension, shock and tachycardia [2,6-11,14,21]. The disease may end up with multiorgan dysfunction including decreased myocardial contractility, oliguria, acute respiratory distress syndrome, encephalopathy and symptoms of interstitial extravasation of fluids [2,6-11,21,22]. It has been suggested that the most important indicator for NF is rapid clinical deterioration towards sepitc shock [1].

Once NF is suspected early and extensive surgical debridement is the gold standard of definitive treatment. It is paramount to excise all necrotic and infected tissue in order to help control the progression of NF and ongoing release of bacterial toxins. Prompt treatment of these children is extremely important in order to limit morbidity and mortality. It has been reported that when operation was delayed by more than 24 hours twofold increase of mortality rate was observed [23]. Medical treatment including IV fluid and electrolyte infusions, systemic antibiotherapy, transfusions and dopamine infusions and IVIG in patients with soft tissue infections may also be reserved especially for patients with severe soft tissue infection and early diagnosis. Mediacal treatment has also been advocated for patients who have very unstable systemic signs requiring aggressive preoperative resuscitation therapy [24]. On the other hand it has been suggested that surgical intervention can also be delayed until necrotic wound margins are obvious while the patient is receiving extensive supportive therapy [25]. Nevertheless, in patients with early admission and cellulitis, prompt surgical debridement should be considered as soon as skin necrosis with certain margins develops. In patients who are admitted to the hospital rather late after the stabilization period including IV fluid and electrolyte infusions, systemic antibiotherapy, red blood cell transfusions, dopamine infusions and IVIG as necessary extensive debridement including all the necrotic tissue is a matter of necessity rather than of choice.

Conclusion

In conclusion, the first liners of medical providers need to be aware of the life theratening disease of NF. It should also be kept in mind that misdiagnosing NF as cellulitis is common and may delay the correct treatment. If NF is suspected early hospitalization, critical care support and aggressive and prompt surgical intervention is vitally important to limit morbidity and mortality in children with NF. Clinicians should keep in their minds the rare diagnosis of NF in pediatric patients and a prompt pediatric surgical consultation is recommended.

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