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Necrotizing fasciitis in children due to minor lesions

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ABSTRACT

Introduction: Necrotizing fasciitis is a soft tissue infection that can rapidly progress and end lethally if not treated early and radically. With an extremely low prevalence (0.02% of all pediatric in hospital cases), most physicians will probably only see very few cases during their career. Unlike adult patients, the majority of children affected by this disease are healthy individuals. There is no chronic disease and necrotizing fasciitis often arises from minor lesions.

Case presentation: We present two cases treated in our clinic within the past year. Our first case of necrotizing fasciitis was a 5 year old Caucasian male patient with a varicella lesion on the back. The second case, a 4 year old Caucasian male patient, presented after an insect bite at the lower limb. Both cases were triggered by a superinfection after scratching. We describe the clinical findings, difficulties in diagnosis, surgical therapy and outcome.

Conclusion: Rapid surgical treatment is necessary to reduce morbidity and mortality in cases of necrotizing fasciitis. Due to the rarity of the disease it is often misdiagnosed by physicians. We emphasize the importance of staying alert and to keep necrotizing fasciitis in mind.

1. Introduction

Necrotizing Fasciitis (NF) is a severe form of soft tissue infections, which rapidly spreads from subcutaneous tissue leading to necrosis of the fascia and the surrounding soft tissue [1]. It progresses fast and can lead to septic shock, organ failure and death if not diagnosed and treated early and radically. Treatment consists of fluid resuscitation, broad spectrum antibiotics and most importantly rigorous surgical debridement of infected and necrotic tissue. Delay of surgical therapy for more than 24 h doubles the mortality rate [2,3]. Due to the rarity of this disease with a prevalence of 0.02% in the pediatric population [4] NF is often misdiagnosed as cellulitis. This delays the correct diagnosis and increases the risk of a more fulminant course and a higher morbidity. Local early signs for NF are edema, induration and erythema. Skin necrosis is a late sign [5]. Early clinical findings are typical for septicemia: fever, severe pain, tachycardia and elevated white blood count. NF can be caused by a polymicrobial infection with aerobic and anaerobic organisms such as clostridium, proteus, *E. coli*, bacteroides and enterobacteriacea or by a single organism such as group A streptococci [6]. Unlike in adults, NF occurs most often in children that are previously healthy individuals [7]. Cases of NF in children have been reported due to minor lesions, e.g. after circumcision, umbilical vein catheterization [8,9], inguinal hernia repair [10,11] or secondary to varicella infection [5,12–14]. We present two cases of NF in children following minor lesions.

2. Case presentation

2.1. Case 1

The first case is a 5 year old Caucasian male patient that was suffering from varicella infection. 6 days after eruption of the first vesicles a painful superinfection of a lesion on the back (Fig. 1) was treated with local antibiotic ointment. When local infection signs increased the family returned to emergencies. Signs of septicemia were noted (39.3 °C, pulse rate 156/min) and the lesion on his lower back had increased in size (10 × 20 cm). There was crepitation, tender palpation and lymph nodes in his right axilla were swollen. Laboratory findings revealed elevated white blood cell count (WBC) (43,4 × 10^9/l) with a neutrophilia and C-reactive protein (CRP) 141 mg/l [<10 mg/l]. Renal function was normal. He had received all vaccinations according to the Swiss Vaccination Program.

An ultrasound was performed which revealed a thickening of

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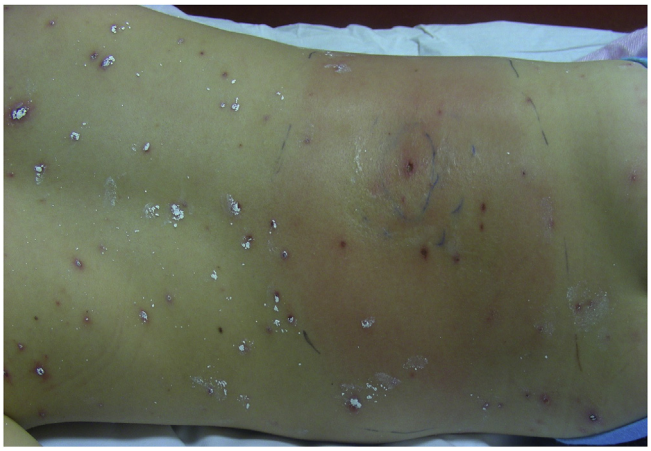

Fig. 1. Preoperative findings of necrotizing fasciitis following varicella infection on the back of a 5 year old boy.

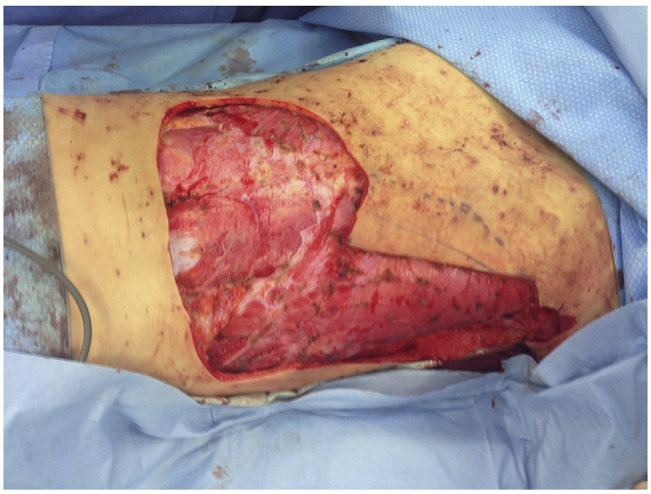

Fig. 2. Intraoperatively the entire necrotic fascia was debrided.

subcutaneous fat tissue without abscess formation. Considering the findings NF was suspected and the patient was debrided. The fascia of the latissimus dorsi appeared edematous with a grey-greenish color and was macroscopically highly suspicious for necrotizing fasciitis. Intraoperative fascial biopsies confirmed cocci-like bacteria typical for necrotizing fasciitis. The entire necrotic fascia was debrided until healthy margins were confirmed by biopsies (Fig. 2). After antiseptical irrigation a vacuum wound dressing was established. Postoperatively the patient was monitored on the pediatric intensive care unit. One blood conserve was transfused after a loss of 26 g/l, otherwise the patient stabilized rapidly and a second look 24 h later confirmed no further progression of the disease. Two dressing changes later, ten days after first presentation, a split thickness skin graft (STSG) closed the wound. Initial broad band antibiotic Amoxicillin/Clavulanic acid i.v. and Clindamycin i.v. could be changed to Penicillin 1G i.v. when final results of the tissue culture revealed penicillin sensitive streptococcus pyogenes. 16 days after admission these could be stopped and the patient was discharged with a normal WBC and CRP (Fig. 3). Blood culture from time of admission remained negative. Histology from the biopsies revealed a necrotizing process with acute inflammation and abundant gram positive cocci.

Subsequent follow-ups showed a complete recovery. Scars are being corrected by tissue expansion and excision of the STSG one year postoperatively.

2.2. Case 2

The second case of necrotizing fasciitis that presented in our clinic within the same year was a previously healthy 4 year old Caucasian male patient. He presented at the emergency department with high fever (40 °C) and a progressive redness and swelling at the right lower leg. He remembered being bitten by an insect, most probably a mosquito a few days earlier. The day before admission his pediatrician had started an antibiotic treatment with Amoxicillin/Clavulanic acid after blood test revealed an extremely elevated CRP (332 mg/l). At admission he presented with a septicemia (pulse 120/min, blood pressure 111/47 mmHg, respiratory rate of 28/min) and progression of local infectious findings, including now the whole lateral lower leg. His parents reported that he had received all vaccinations according to the recommended Swiss vaccination program. Laboratory findings showed a WBC of 10.58 × 10^9/l and CRP of 514 mg/l. An ultrasound was hyperdens in the subcuticular fat with hyperemia without collection. With a suspected diagnosis of cellulitis he was admitted to the ward and antibiotic treatment with Amoxicillin/Clavulanic acid i.v. was started. After four hours his clinical condition detoriated and he was presented to the surgeon on call. Necrotizing fasciitis was suspected and he was immediately taken to the operating room for surgical debridement. Antibiotic treatment was extended and intraoperative findings confirmed NF. A second look 24 h post primary intervention revealed a further small part of the fascia that appeared to be infected and this was resected accordingly. The following days the wound was regularly washed with Prontosan (polihexanid and betain). On the 3rd postoperative day a vacuum dressing was applied. Streptococcus pyogenes were isolated from culture and antibiotic treatment could be narrowed to Amoxicillin/Clavulanic acid and stopped at discharge. On day 12 the wound was closed by secondary closure and STSG. Laboratory findings normalized until discharge on the 15th postoperative day (Fig. 4).

The follow up visits showed a full recovery of gait. Scar corrections including STSG excision are considered for the future, but not essential.

3. Discussion

Necrotizing fasciitis is a dangerous and severe infection, in which early diagnosis and correct immediate treatment are of utmost importance to limit morbidity and mortality.

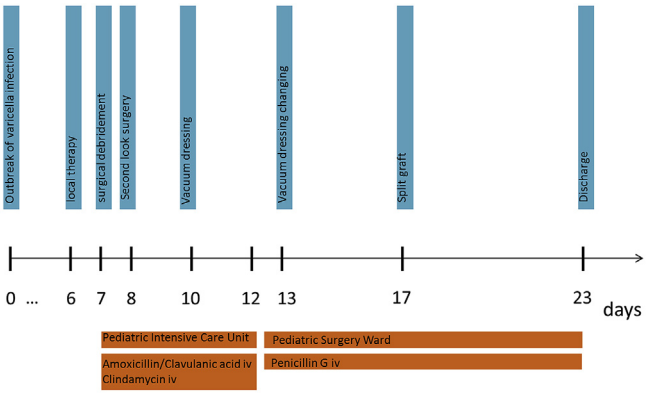

Fig. 3. Timeline of clinical course and treatment of case 1.