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Necrotizing Fasciitis

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Necrotizing fasciitis is dangerous because of its sudden onset and rapid progression. It is often associated with high morbidity and mortality if not recognized early and treated correctly. Advanced age, trauma, diabetes, immunosuppression and chronic systemic diseases (for example, hypertension, atherosclerosis and renal failure) are predisposing factors. The etiology of necrotizing fasciitis is multiple and is often polymicrobial. Early diagnosis, broad-spectrum antibiotics and prompt and adequate surgical debridement are the keys to successful treatment. Primary wound closure and sometimes skin grafting are the final definite procedures. We present two patients with necrotizing fasciitis from two different causes. Both of them survived after correct treatment.

Key words: necrotizing fasciitis, Fournier's gangrene, necrotizing soft tissue infection

INTRODUCTION

In 1883, Fournier first described the rapidly progressive necrotizing infection of the scrotum now known as "Fournier's gangrene"[1,2]. In 1924, Meleney identified what we now term necrotizing fasciitis[1,3]. He later pointed out the significance of bacterial synergism in this infection[1,4]. Necrotizing fasciitis is a rapidly progressive soft tissue infection involving necrosis of the subcutaneous tissues, superficial and deep fascia, and sometimes the underlying muscles[5]. Advanced age, trauma, diabetes, immunosuppression and chronic systemic diseases (for example, hypertension, atherosclerosis and renal failure) are considered as predisposing factors[1]. Necrotizing fasciitis has multiple causes and multiple bacteria are often involved[1,6,7]. Early diagnosis, broad-spectrum antibiotics and prompt and adequate surgical debridement are required for successful treatment[1,5-7]. Primary wound closure and sometimes skin grafting are the final definite procedures. We present two patients with necrotizing fasciitis from two different causes: diabetes and hypertension. Both patients survived with appropriate treatment with broad-spectrum antibiotics and adequate surgical debridement.

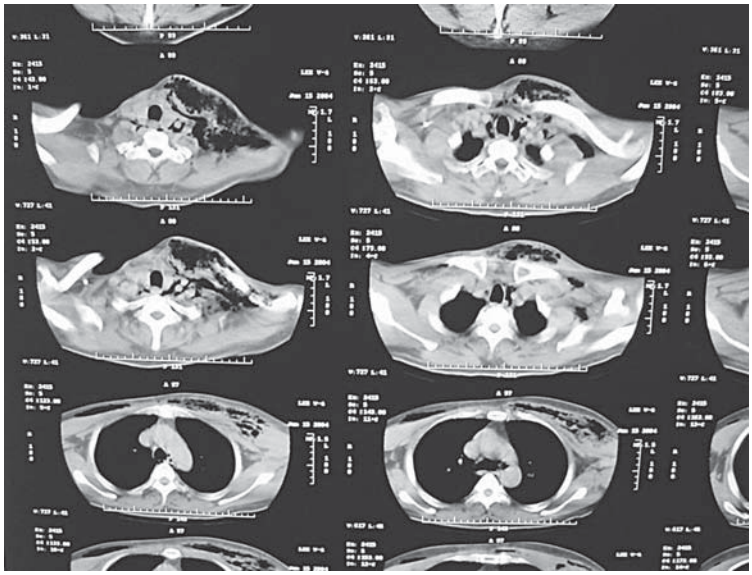

Fig. 1 The finding of CT shows gas formation in the left neck and anterior chest

CASE REPORTS

Case 1

A 48-year-old male patient with diabetes had symptoms of an upper respiratory infection for several days before developing redness and swelling of his neck. Chest X rays and computed tomography showed gas formation on the left side of the neck extending to the anterior chest (Fig. 1). Incision and drainage was performed by an otolaryngolo-

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Fig. 2 Cervical necrotizing fasciitis extends from the left neck to anterior chest and left axilla

Fig. 3 The appearance in one month postoperative follow-up

Fig 4. The picture shows Fournier's gangrene

Fig 5. The picture taken two weeks postoperatively

gist but his condition did not improve over the following days (Fig. 2). Progressive swelling, erythema, subcutaneous emphysema and tenderness extended downwards to the anterior chest and left axilla. Subjective symptoms of chest compression and respiratory distress became obvious. Discomfort was relieved by fasciotomy and adequate surgical debridement. Wound culture revealed *Klebsiella pneumonia and Proteus mirabilis*. Most wounds could be closed completely within a week, but a skin defect in a strip on the neck required a skin graft (Fig. 3). The patient did not show any significant limitation of neck movement during a subsequent six-month follow-up in the clinic.

Case 2

A 60-year-old male patient with hypertension was admitted because of a traumatic intracranial hemorrhage. He developed fever and perineal redness 3 weeks after craniectomy and removal of the intracranial hemorrhage. The perineal erythema extended upwards and downwards to the bilateral inguinal areas and the buttocks respectively. His scrotum also swelled (Fig. 4). He had leucocytosis (WBC 17,660 cell/mL) with a left shift seen (segmented neutrophils 83%, band-forms 4%). The results of the wound culture showed Escherichia coli. He received a fasciotomy/fasciectomy with adequate surgical debridement. The wound was closed primarily (Fig. 5).

DISCUSSION

Necrotizing fasciitis is a serious, rapidly progressive infection extending along fascial planes, and involves the skin, subcutaneous tissues and underlying muscles[5]. Pre-

disposing factors include advanced age, trauma, diabetes, immunosuppression and chronic systemic diseases (for example, hypertension and atherosclerosis)[1,6,7]. It is often associated with high morbidity and mortality if not recognized early and treated correctly[1].

Early diagnosis and prompt and adequate surgical debridement are keys to successful treatment[1,5-7]. Besides the traditional infection signs (redness, swelling, local heat and tenderness), patients with the following signs should be highly suspected to have necrotizing fasciitis and should receive prompt fasciotomy or fasciectomy and adequate surgical debridement: marked edema extending beyond areas of erythema; bullae formation; crepitus; radiological evidence of gas within tissues; rapidly progressive infection; signs of early shock; and failure of medical treatment[1,8].

Necrotizing fasciitis has multiple etiologic factors, and its clinical manifestations vary according to the etiology and the area involved. Facial and cervical necrotizing fasciitis often has a dental or pharyngeal origin, with respiratory discomfort[5], as shown in Case 1. Meleney's synergistic gangrene usually occurs after thoracic or abdominal surgical procedures[1,9]. A series of abdominal necrotizing fasciitis cases resulting from dislodged percutaneous endoscopic gastrostomies has been reported[10]. The infection is often polymicrobial, and bacterial synergism may play a role[1,4,9]. *Streptococci, Staphylococci, Escherichia, Enterococci and Bacteroides species* are common pathogens[6]. Even infection with a fungus such as *Apophysomyces elegans* has also been reported to be responsible[11].

Prompt and adequate surgical debridement is important. If surgery is not done in a patient with necrotizing soft tissue infection, the mortality rate is high, approaching 100% in some series despite systemic antibiotic therapy[1]. However, fasciotomy alone is often not adequate for most situations. Adequate surgical debridement must be done until brisk bleeding occurs from adjacent overlying subcutaneous tissues and underlying muscles when they are involved. All the necrotic tissues must be removed to reduce bacterial load and facilitate recovery. The wound should be bluntly probed in all directions, especially in highly suspected areas such as any pockets or subcutaneous extensions of infected tissues[1,8]. The patients' clinical conditions should rapidly and greatly improve and the white cell count should gradually return to normal after adequate surgical debridement. In our hands, we leave wounds open after debridement and dress the wounds with normal saline-soaked gauze once or twice each day. Finally, we could close the wounds after about one week, but sometimes a skin graft is needed.

Necrotizing fasciitis is a serious, rapidly progressive infection associated with high morbidity and mortality. Even though many adjunctive treatments such as maggots, hyperbaric oxygen treatment, intravenous immunoglobulin and plasmapheresis have been reported to be helpful[12-14], early diagnosis, broad-spectrum antibiotics and prompt and adequate surgical debridement are the keys to successful treatment.

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