

## NECROTISING FASCIITIS OF THE SUBMANDIBULAR REGION

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### SUMMARY

Two cases of necrotizing fasciitis (NF) complicating different conditions of the maxillofacial region, treated at the Korle Bu Teaching Hospital are reported. These were managed by an early diagnosis, aggressive surgical exploration, fasciotomies and debridement of necrotic tissue. In addition, frequent irrigation within the fascial planes with eusol and saline solutions plus the administration of broad spectrum antibiotics ensured early containment of the spread of the infection. Our early recognition of the signs and symptoms of NF led to an early intervention resulting in minimal residual skin defects which even though were not skin-grafted healed satisfactorily.

**Keywords:** Necrotizing fasciitis (NF), submandibular region, fascia planes, crepitus, necrosis, debridement

### INTRODUCTION

Necrotizing fasciitis (NF) is a rapidly progressing soft tissue infection characterized by extensive necrosis of the subcutaneous fat and fascia, which should be treated as a serious medical emergency. Necrotizing soft tissue infections may be rapidly fatal because of toxin-induced circulatory collapse<sup>1</sup>. The most frequent organism implicated is the Group A Streptococcus (GAS)<sup>1,2,3</sup> although it may also occur as a poly-microbial infection complicating primary varicella infection in children<sup>1,4</sup>. Other particularly vulnerable groups include those with diabetes mellitus, intravenous drug abuse, and impaired immunity, but these infections can also occur in previously healthy adults<sup>3</sup>. Organisms such as *Serratia marcescens*, *Staphylococcus aureus* and *Pseudomonas spp* have been isolated from cases of NF<sup>2</sup>. The non-specific early clinical findings of NF leads to a delay in initial diagnosis. Several signs and symptoms including high fever after the first 48-72 hours, localized swelling, erythema, induration, hypotension, tachycardia, scar-

latiniform eruptions, and toxic or lethargic appearance should alert physician of possible superinfection of GAS.

This paper presents two cases of necrotizing fasciitis with different causes seen and managed at the Korle Bu Teaching Hospital (KBTH).

### CASE REPORTS

#### Case 1

A middle aged man was seen in the Medical Emergency Unit of KBTH with an acute swelling of the submandibular region of two days duration. The swelling had been caused by an acute periodontal abscess which had spread to the submandibular region leading to an extensive fluctuant swelling with crepitus on palpation. The vital signs were as follows: pyrexia with body temperature of 39°C, blood pressure of 150/90mmHg, pulse rate 96 bpm, and respiratory rate of 26/min. There was intra-oral pus discharge from the lower right premolar teeth. Needle aspiration of the submandibular swelling yielded mainly gas and scanty pus which was sent for culture and sensitivity testing. The results of haematological investigations were as follows: WBC  $6.8 \times 10^9/L$ , Neutrophil 5%, Lymphocytes 43% and ESR of 4.5mm/hr (Westergren) with other parameters within normal range.

The patient was started on intravenous fluids and crystalline penicillin 2 Mega units 6 hourly, and metronidazole 500mg eight hourly. For pain relief, he was placed on pethidine 50mg intra-muscularly 6 hourly for the first 24hours. Evidence of skin necrosis and sloughing of submandibular tissues occurred over the next 2-10 days following admission (Figure 1) which required frequent surgical debridement under local anaesthesia accompanied by copious irrigation with saline and eusol solutions. The offending second premolar tooth was also extracted. The results of bacterial culture revealed a mixed infection including Streptococcus

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spp and *Staphylococcus aureus* which were sensitive to the on-going antibiotic regimen.



**Figure 1** Extensive loss of submandibular tissue exposing necrosed tags of fascia tissues

Four weeks following admission the resultant submandibular wound had granulated well and ready for skin grafting (Figure 2). The patient refused further surgical treatment and allowed the wound to heal by secondary intention with surprisingly moderate scarring of the tissues involved.



**Figure 2** Clean granulated submandibular wound ready for grafting or closure by local flaps

### Case 2

A 23-year old housewife was admitted at the Medical Emergency Unit suffering from an acute fluctuant swelling with crepitus involving the submandibular region of 4 days duration. Her ordeal started when she attempted to drain a furuncle on the right submandibular region, which became extremely painful followed by gangrenous necrosis (black necrotic eschar) of the skin surrounding the site of the punctured furuncle. This was followed by an extensive fluctuant swelling with signs of crepitus on palpation accompanied by a

rapidly spreading collateral oedema extending towards the periorbital region (Figure 3). On further examination, she was found to be in distress with vital signs of: temperature (39°C), blood pressure 130/80mmHg, and pulse of 110 bpm. The haematological tests organized were unremarkable except a moderately raised lymphocytic count (48%).

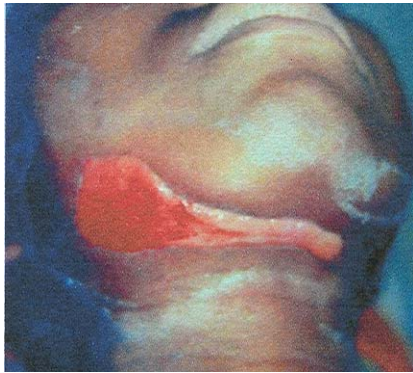


**Figure 3** A clinical photograph showing a rapidly spreading submandibular swelling which on aspiration contained pus and gas. Note the intact darkened overlying necrotic skin and the extensive collateral facial oedema

Intravenous antibiotics (Crystalline penicillin and metronidazole) and supportive therapy were initiated. A decision was made to drain the abscess under local anaesthesia which yielded 45ml of extremely offensive bubbly brownish pus. Over the next few days sloughing of the overlying skin occurred, leaving a surrounding undermined irregular skin flaps and attached grey necrotic submandibular fascia that required daily surgical debridements and irrigation with eusol and daline solutions. The culture of the pus obtained showed a scanty growth of mixed organisms including *Streptococcus spp*, *Staphylococcus aureus* and *Pseudomonas aeruginosa* which were sensitive to amoxicillin, metronidazole, gentamicin and clindamycin.

One week into the management and following good initial response to the intravenous crystalline penicillin and metronidazole, the regimen was maintained via oral route using 500mg amoxicillin and 400mg metronidazole tablets 8hourly for 14 days. Three weeks following admission, the decision was made to graft the residual clean and well-granulated would of 2.5 x 3.5cm are (Figure 4). The patient however refused to be subjected to further surgery. She was discharged home to continue daily dressings at the out-patient department resulting in complete healing of the submandibular

would with minimal hidden scar and no limitation to her neck movements.



**Figure 4** A photograph following sloughing of overlying skin and control of the advancing NF. The residual wound is ready for skin grafting

## DISCUSSION

Necrotizing fasciitis (NF) as a disease entity, has been described under different names including hospital gangrene, suppurative fasciitis, Meleney's gangrene, streptococcal gangrene and Fournier's gangrene. The condition which affects all ages has been under-diagnosed in the past but is now gradually gaining recognition. Few reports can be found in the literature involving the head and neck region and most of these follow an odontogenic or oro-pharyngeal infection<sup>6</sup> while in cases involving the face or scalp regions, trauma has been the predisposing factor<sup>7</sup>. Similarly, a simple periodontal infection and manipulation/pressing of a small furuncle resulted an extensive NF of the submandibular region in our patients. In the early stages of the disease, the signs and symptoms of NF are said to be non-specific with the skin presenting as red-hot, smooth, tense and tender without demarcation between the involved and normal skin<sup>8</sup>. Our patients presented at advanced stages where the signs of an acute expanding swelling with crepitus on palpation which although is suggestive of NF but not pathognomic led to our diagnoses of NF. The role of bacterial necrotoxins in advancing the spread of the disease with ensuing gangrenous necrosis along the fascial planes has been known<sup>1,6,7</sup>. The extensive involvement of the whole face in our patient (Figure 3) indicates the body's acute reactions to these toxins. The bacteria isolates obtained in our cases fall into the groups of organisms reported as primary pathogens<sup>3,6,7</sup>. Death from NF has been reported resulting from overwhelming sepsis, respiratory and multi-organ failure, with the reported mortality rate ranging

from 8% to 73%<sup>6,8,9</sup>. A delay in arriving at an accurate diagnosis and poor management, as well as other associated underlying systemic diseases to the high mortality attributed to NF<sup>6,7</sup>. With the increased incidence of HIV and AIDS cases where there is lowered immune resistance to minor infections, it is necessary to be on the look-out for signs of NF in infections involving skin and fascia planes.

A successful management of NF requires early accurate diagnosis, aggressive surgical debridement, high doses of intravenous broad-spectrum antibiotics and adequate fluid and nutritional support. The moderate loss of overlying skin in the cases presented resulted from the prompt diagnosis and aggressive debridement of the involved fascia. Although, the granulated exposed underlying tissues should have been grafted to reduce the possibility of scarring however our patients refused to give consent for further surgery and were ready to accept the possibility of living with the hidden moderate scars in the submandibular region.

In conclusion, the management of two cases of necrotizing fasciitis has been presented emphasizing the importance of early accurate diagnosis, aggressive surgical debridement of the necrotic fat and fascia within the tissue planes, adequate doses of broad-spectrum antibiotics and intravenous fluid support for a successful resolution of the disease. Failure to do this could result in gross morbidity that may require extensive rehabilitation including extensive skin grafts if the patient survives the ordeal or even death.

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