The Journal of Laryngology & Otology
July 2004, Vol. **118,** pp. 573–575

Cervical necrotizing fasciitis with facial nerve paralysis

AHMED AL-AMMAR, M.D., F.K.S.U., SUHAIL MAQBOOL MIR, M.D.

Abstract

Necrotizing fasciitis (NF) is a very aggressive infection with associated high mortality. Risk factors of acquiring this infection may include diabetes mellitus, surgery, trauma, and infection. This infection necessitates prompt recognition and aggressive management in order to avoid its unfavourable outcomes. Associated nerve paralysis may indicate the involvement of deeper tissue.

The present report highlights a case of cervical NF that was complicated by facial nerve paralysis, a feature that has rarely been reported.

Key words: Fasciitis, Necrotizing; Facial Paralysis; Neck; Klebsiella Infections

Introduction

Necrotizing fasciitis (NF) is a rare infection, however there has been a growing interest recently associated with a worldwide increase in the incidence of this infection.[1] It has typically been described in the abdomen, perineum, and extremities.

The lower extremities are the most commonly affected sites in the body, while head and neck can be affected in about 10 per cent of patients.[2, 10] In more than 80 per cent of patients the infection is precipitated by an initiating injury, such as intravenous injection, operative sites or tooth infection.[3]

Necrotizing fasciitis is an aggressive infection with reported mortality of 28 per cent.[4, 5, 9, 10] Mortality could be correlated to extreme age (less than one year or over 60 years), intravenous drug use, cancer, renal insufficiency, involvement of trunk or perineal areas, and positive wound culture for beta-streptococci.[1, 2, 11]

A number of bacteria in isolation or polymicrobial infection can cause NF. Group A beta-haemolytic streptococci are the most closely linked to the disease though they may only cause a minority of the cases. Other causative bacteria include *Staphylococcus aureus, Escherichia coli, Bacteroides* sp., *Peptostreptococcus* sp., *Klebsiella* sp. and other serotypes of streptococci.[1,2,3,11,16]

Polymicrobial infection is more common, however, single bacterial species can be isolated in 29 per cent of culture positive wounds.[1, 12]

Prompt recognition of this infection and differentiation from other less aggressive cervical infection is vital in the management.[16]

The present report highlights a case of cervical NF that was complicated by facial nerve paralysis.

Case report

A 50-year-old Indian male, known to have insulin-dependent diabetes mellitus with poor control, chronic renal failure and hypertension, presented to the emergency room with left-sided painful diffuse neck swelling for one week.

He had noticed also loss of facial movement on the left side three days before presenting to us without prior medical or surgical treatment. The patient had been

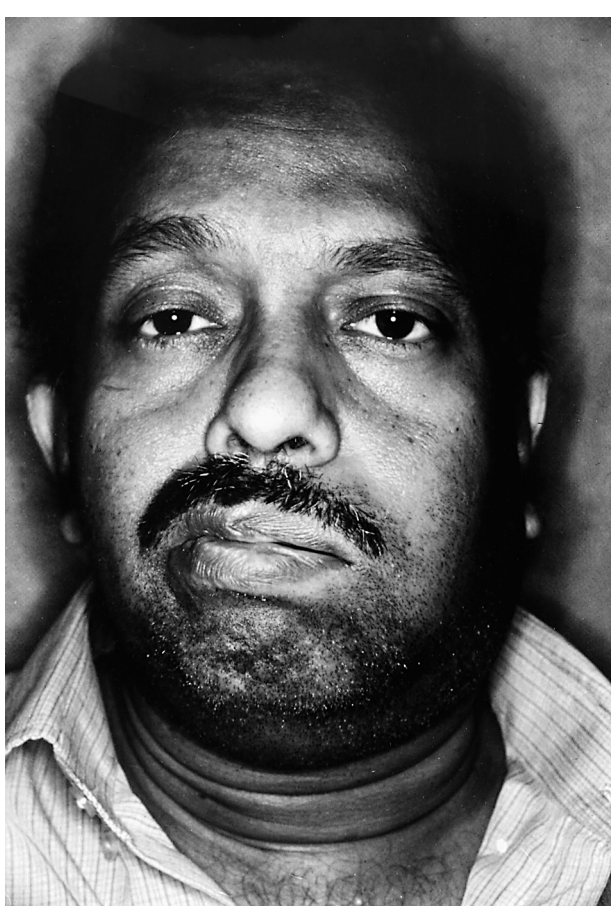

FIG. 1

Patient at initial presentation with left side neck swelling and left facial paralysis.

From the Department of Otolaryngology, King Saud University, Faculty of Medicine, Riyadh, Kingdom of Saudi Arabia.
Accepted for publication 8 March 2004.

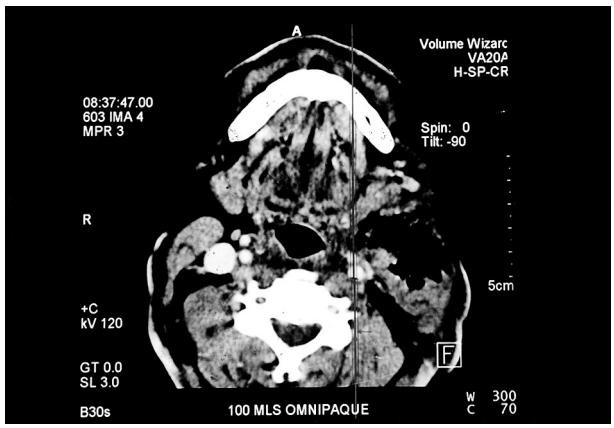

FIG. 2

CT scan showing a large air-containing cavity in the left side of the neck.

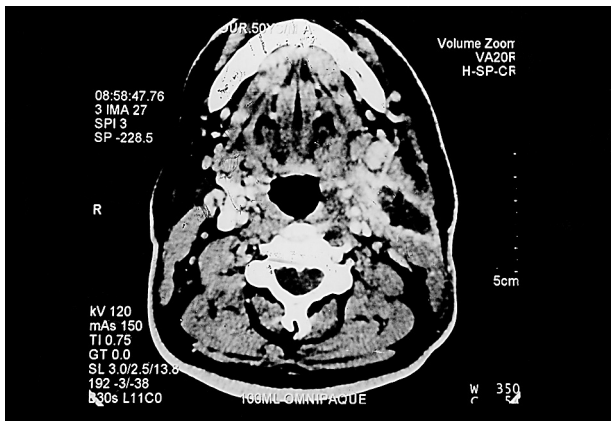

FIG. 3

Showing a localized cavity within the substance of the left sternocleidomastoid muscle.

prescribed amoxycillin/clavulanate in a private clinic.

On examination the patient was found to be in severe pain, afebrile and had no airway problems. Neck examination revealed a diffuse left-sided upper cervical swelling with overlying skin erythema, crepitation and severe tenderness on palpation. This was associated with left-sided complete lower motor facial nerve paralysis (Figure 1).

- **Necrotizing fasciitis is an aggressive infection with an associated high mortality**
- **There have been previous reports of such infections in the head and neck**
- **This paper highlights a case with associated facial nerve paralysis –which has only been reported previously in one patient**

Laboratory investigations revealed severe leukocytosis, with neutrophilia, high blood sugar and impaired renal function tests.

Computed tomography (CT) scan (Figure 2) of the neck and the parotid region was performed at the time. It revealed extensive inflammatory changes involving the left sternocleidomastoid muscle, left parotid gland and subcutaneous tissue. The lesion contained air-pockets.

The patient was admitted and started on intravenous clindamycin and cefazolin, however swelling, erythema and crepitation continued to progress rapidly to involve the posterior triangle of the neck, left cheek and anterior chest wall.

The patient was taken to the operating theatre next day for draining and debridement. Intra-operatively the authors used a transverse neck incision, and while dissecting subcutaneous air-filled spaces with scanty pus were found, similar spaces were found deeper to the sternocleidomastoid muscle and in parotid region. There was also thickening of the fascia and an area of necrotic tissue involving the sternocleidomastoid muscle with minimal bleeding after incision of the muscle.

Debridement involved all necrotic tissue, and air-filled spaces were opened and drained. Blunt dissection involved the parotid region with no attempt to dissect or decompress the facial nerve.

A drain was placed in the area, and the neck incision was closed loosely. The patient was taken to the intensive care unit for observation.

Culture of a specimen obtained intra-operatively revealed a heavy growth of *Klebsiella aeruginosa* sensitive to many antimicrobial agents, including ceftriaxone and cefuroxime.

Histopathological examination of the tissue removed, revealed necrotic tissue with a moderate degree of acute and chronic inflammatory cell infiltration.

Based on the culture ceftriaxone was started along with clindamycin, however the patient showed little improvement.

Repeated CT scan (Figure 3) on the seventh post-operative day showed a marked improvement, with only a localized area of fluid collection within the substance of the sternocleidomastoid muscle.

Debridement was repeated to clean the localized necrotic area.

After the last intervention the patient continued to improve with intravenous antibiotics that were continued for three weeks, and oral cefuroxime for 10 days. The patient was followed up for 12 months, unfortunately, complete left facial paralysis had persisted.

Discussion

The diagnosis of NF is usually based on clinical presentation of severe pain, erythema and oedema of the involved site. It is usually confirmed by the intra-operative findings of extensive necrosis of the fascia and subcutaneous tissues.[1,2] Other manifestations may include fever, discoloration, crepitation, vesicle formation, and septic shock.[2,6,9,11] NF may occur in the setting of diabetes mellitus, surgery, trauma, or infection.[1,2,4,12,16] Rapid spread of the involved area can distinguish NF from mild cases of cellulitis.[2,16]

The spread of the organisms is from the subcutaneous tissues along the superficial and deep fascial planes, facilitated by bacterial enzymes and toxins. Surface proteins and toxins are important bacterial factors.[13,17]

Laboratory tests along with appropriate imaging techniques are essential to facilitate the diagnosis.

An appropriate radiological test has to be requested to evaluate air in the soft tissue and assess the extent of the disease. Standard radiographs are of little value unless free gas is depicted. B-mode and possibly colour Doppler ultrasonography, contrast-enhanced CT, may facilitate the diagnosis of NF.[7,8]

The patient should ideally be shifted to a surgical I.C.U and his haemodynamic parameters should be monitored. The medical care of the patient with NF may involve the administration of antibiotics, hyperbaric

https://doi.org/10.1258/0022215041615119 Published online by Cambridge University Press

oxygen, and/or intravenous immunoglobulin.[5,14]

Surgery at initial presentation is the recommended treatment for NF with wide debridement of all necrotic and poorly perfused tissue.[4,5,6,15,16]

Nerve involvement in cases of NF is rare. There is no clearly reported incidence of dysfunction of cranial nerves secondary to cervico-facial NF. However, affection of such nerves may reflect deeper tissue involvement.

The presence of facial nerve paralysis in necrotizing fasciitis involving the cervico-facial region has been reported once previously.[12] Interestingly the pathogen isolated in that case was *Klebsiella* too. *Klebsiella aeruginosa* belongs to the Enterobacteriacae tribe which ferments sugars e.g. glucose, fructose and produces gas.[18] The involvement of the facial nerve in the present patient could be due to direct involvement of the nerve fibres as it exits through the stylomastoid foramen or in the substance of the parotid gland.

The pathogenesis of facial nerve paralysis within the substance of the parotid gland has been discussed in many reports.[19,20] Kinking or stretching of the nerve, direct pressure on the nerve, or neurotoxic degeneration by local toxic factors from infection are seen as the most important contributors to neuronal dysfunction.

Although facial paralysis associated with a parotid mass is indicative of malignancy, clinicians should be aware that in certain cases a benign process might be the underlying cause.[21]

The patient has shown excellent recovery on subsequent follow up but the facial palsy is persisting strengthening the authors' belief that the nerve has undergone neurometmesis secondary to the inflammatory process.

The presented case to the best of the authors' knowledge is the fourth from this country, three cases of cervical NF having been reported earlier[15] and has been presented to emphasize the need for high clinical suspicion leading to an early diagnosis and proper aggressive surgical therapy as well as to highlight the susceptibility of neuronal tissue to this disease process.

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Address for correspondence:
Dr. Ahmed Y. Al-Ammar,
King Abulaziz University Hospital,
P.O Box 61419,
Riyadh 11565,
Saudi Arabia.

E-mail: ahmedalammar@hotmail.com

Dr A. Y. Al-Ammar takes responsibility for the integrity of the content of the paper.
Competing interest: None declared