

Necrotizing fasciitis of the neck

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Abstract

Necrotizing fasciitis (N.F.) is a rare but serious infection of subcutaneous tissues and deep fascia with resulting skin gangrene and septicaemia. It is due to mixed anaerobic and aerobic organisms. It has been reported under a variety of synonyms.

We describe two cases of necrotizing fasciitis of the neck probably secondary to chronic dental infection, one was diagnosed early and the other late with very different outcomes. We highlight the importance of early and aggressive surgical treatment to complement parenteral antibiotics covering both aerobic and anaerobic organisms.

Introduction

Necrotizing fasciitis (N.F.) is a term coined forty years ago to describe a rare but potentially fatal condition which predominantly affects the tissues of the abdominal wall or the perineum following surgery or trauma (Wilson, 1952). It was first fully described during the American Civil War (Jones, 1871) and fifty years later in China it was linked to haemolytic streptococcus (Meleney, 1924). It seldom occurs in the neck, but when it does so it is usually secondary to dental infection. It has been described under various synonyms: streptococcal gangrene, hospital gangrene, gangrenous erysipelas, necrotizing erysipelas and Meleney's gangrene.

The predominant clinical features are extensive necrosis of the superficial fascia and widespread undermining of the adjacent soft tissues and systemic toxicity. It is now recognized that obligate anaerobes have an important role and most cases are mixed synergistic infections involving both aerobes and obligate anaerobes (Steel, 1987).

Adequate surgical debridement and removal of all necrotic and non-viable tissues is the primary treatment. Antibiotics covering both aerobes and anaerobes are adjuvant. Mortality rate is high, varying between 8.7 per cent and 30 per cent (Wilson, 1952; Rea and Wyrick, 1970).

Case reports

Case 1

A 49-year-old lady was transferred to the Otolaryngology Unit from the Renal Transplant Unit. She appeared to have a two weeks history of parotitis, two months after a successful renal transplant. She was immunosuppressed with cyclosporin and prednisolone.

Examination revealed a very sick lady with a temperature of 38.5°C and a tender woody swelling of both parotid regions and both sides of the neck. A right lower premolar tooth was almost destroyed with caries. Under general anaesthesia, the neck was explored via a collar incision through which a brown offensive fluid containing small bubbles was released from both sides of the neck. Corrugated drains were inserted into both sides (Fig. 1). High doses of intravenous penicillin and metronidazole were continued. Post-operatively, there was little improvement and the following week a further more extensive operation was carried out extending the incision on both sides and debriding green/black necrotic cervical fascia. She was then transported back to a High Dependency Unit and underwent daily debride-

ment of the neck under ketamine anaesthetic for six weeks. Slough and necrotic tissues were removed mainly from the right side of the neck, from the clavicle to the zygoma (Fig. 2).

There was a considerable loss of subcutaneous tissues including the sternocleidomastoid and most of the facial muscles under the right cheek. Three months later, she was discharged home with considerable weight loss and a marked cosmetic facial deformity.

Case 2

An 81-year-old non-diabetic lady was admitted into the Otolaryngology Unit with a two days history of sudden onset painful swelling of the left side of the neck, which was increasing in size. There was some odynophagia and she had a 'hot potato' voice.

On examination she was mildly pyrexial with some discomfort on swallowing and occasional drooling. There was no cyanosis nor stridor. A diffuse and extremely tender non-fluctuant



FIG. 1

Case 1, following the initial incision and drainage. Note the untreated, persistent swelling and discolouration in the face.

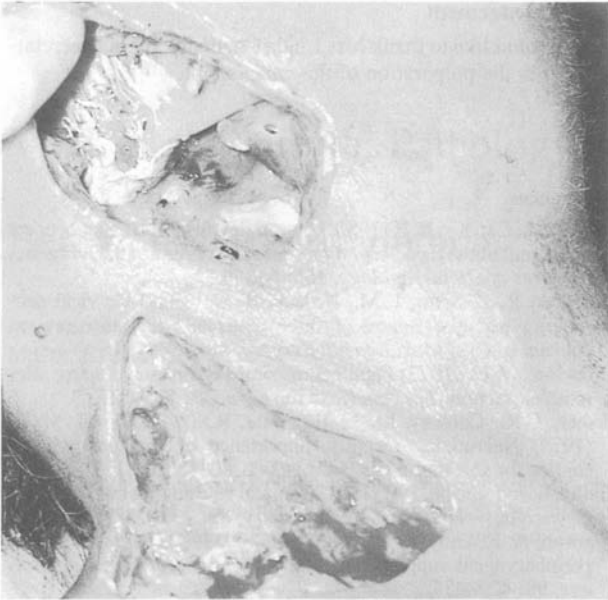


FIG. 2

Case 1, following multiple debridement under ketamine anaesthetic, both incision margins are widely undermined. The clavicle is exposed inferiorly, the zygoma was debrided through the upper incision.

neck swelling extended over both anterior triangles and to the left parotid region. The oral cavity and nasopharynx were normal. Indirect laryngoscopy showed supraglottic swelling with pooling of saliva. The floor of the mouth was tender. A lateral soft tissue neck X-ray showed a soft tissue mass in the supra-glottic region. Chest X-ray was normal, but an orthopantomogram showed a radio-lucent area at the root of a left lower pre-molar tooth (Fig. 3).

Full blood count and blood glucose were normal. Intravenous augmentin and fluids were started.

Four hours later after being admitted into the unit, her neck was explored through left sided 'lazy Y' incision, under general anaesthesia. An offensive brown liquid containing bubbles (so called 'Coca Cola' fluid) ran from beneath the platysma. The entire deep cervical fascia including the superficial part of sternomastoid muscle was necrotic and black/green in colour. The necrotic tissues were excised and swabs were sent for culture and sensitivity.

Direct laryngoscopy revealed a grossly oedematous glottis with a simple polyp arising from left aryepiglottic fold. The polyp was excised and sent for histology. A naso-gastric tube was passed. A tracheostomy was performed to protect the airway and the neck was packed with hydrogen peroxide soaked ribbon gauze.

Culture of the neck swab grew *streptococcus melleni* and bac-



FIG. 3

Case 2, orthopantomogram shows decay in the remaining left lower pre-molar tooth.

teroid species, sensitive to penicillin, cephradine and metronidazole. The histology of the laryngeal polyp showed an inflammatory polyp.

The neck wound was dressed daily and superficially debrided by suction on the ward without anaesthetic. The neck was debrided twice under general anaesthesia at weekly intervals. Intravenous antibiotics were given via the naso-gastric tube after one week. She continued to improve, and the tracheostomy tube was removed after three weeks. At five weeks, the naso-gastric tube was removed (Fig. 4). Seven weeks after admission the wound had healed without any skin loss and the patient was discharged home where she lived alone. She was then finally reviewed after four months when the scar was well healed.

Discussion

Necrotizing fasciitis is a severe bacterial infection of the superficial fascia. If treatment is delayed, infection may spread to involve the subcutaneous fat, deep fascia, and even muscles, resulting in wide spread necrosis, undermining of the skin and secondary skin gangrene, which results in systemic toxicity. N.F. is most frequently associated with minor trauma, surgical procedures or self injection of drugs. It occurs more commonly in leg, arm, genitalia and abdomen (Meleney, 1924; Rea and Wyrick, 1970). N.F. is very rare in the head and neck region. There are only 24 cases of N.F. of the head and neck reported in the English literature (Balcerak *et al.*, 1988). Six of these 24 cases were due to dental infection, as in our cases. Other causes were facial trauma, peri-tonsillar abscess, sore throat, I.V. catheter and three cases were of unknown origin.

Patients of all age groups are susceptible, but most of them are under the age of 40 years, with no sex or race predilection. Patients involved are generally suffering from diabetes mellitus, arteriosclerosis (Rea and Wyrick, 1970; Stone and Martin, 1972). Our second case was immunosuppressed with cyclosporin and prednisolone after her renal transplant.

N.F. is a disease that must be identified clinically to avoid unnecessary morbidity and mortality. N.F. in its early stages can be misdiagnosed as a soft tissue infection, such as cellulitis or erysipelas. Rea and Wyrick (1970) reviewed their experience with 44 patients at Parkland Memorial Hospital in Dallas, Texas, and found the most common clinical features of N.F. were: subcutaneous and fascial necrosis 100 per cent, cellulitis 93 per cent,



FIG. 4

Case 2, note the three triangular skin flaps healing after the pack and the drain had been removed.

oedema 81 per cent, disorientation or apathy 41 per cent, skin discolouration 36 per cent and gangrene 34 per cent. The affected skin is red, hot, smooth, shiny, tense and tender. As the disease progresses the pathognomonic sign of N.F. is seen, namely dusky discolouration of the skin appearing as small purplish patches with irregular ill-defined borders. At the same time blisters or bullae will appear. The skin beneath the blisters becomes necrotic and bluish in colour (Wilson, 1952). This localized skin necrosis is secondary to thrombosis of the nutrient vessels passing through the involved fascia. The difference in clinical findings of our cases, probably reflects the time of presentation. There were disorientation, malaise and skin discolouration in the first case, whereas there were oedema and cellulitis in the second.

Until recently group A *streptococcus* and *staphylococcus aureus* were believed to be the primary pathogens. With the advanced sophisticated anaerobic culture technique, it is now recognized that obligate anaerobes have an important role and that the majority of cases represents mixed synergistic infection involving both aerobes and anaerobes (Steel, 1987). Our cases grew *streptococcus mellei* and bacteroid species, similar to other reports (Crowson, 1973; Roser *et al.*, 1977; Gallia and Johnson, 1981; Steel, 1987).

Radiological investigations were not used to diagnose or plan the treatment in either case, but a lateral soft tissue neck X-ray may show gas formation (Fisher *et al.*, 1979). Others have used CT scanning to determine the extent of the infection (Bahna and Canalis, 1980). Kao *et al.* (1988) have used Gallium 67 isotope scanning to delineate the extent of N.F. pre-operatively and in the post-operative follow-up.

The value of hyperbaric oxygen in treatment of N.F. is debatable (Tehrani and Ledingham, 1977), and it was not given to our patients. Tehrani and Ledingham advocated total excision of the involved skin with extensive debridement, and delayed grafting of the excised defatted skin. This is not applicable in the neck. A practical approach in the neck would be linear incision with debridement of all necrotic subcutaneous tissues. Appropriate antibiotics, however, are important for control of septicaemia and prevention of metastatic abscesses.

Other complications of cervical N.F. may be airway obstruction, septic shock, internal jugular venous thrombosis, carotid artery erosion, mediastinitis and cranial neuropathy. To avoid these potentially fatal complications, together with those suffered by case one, early diagnosis followed by early radical debridement would seem to be indicated by our experience contrasting the two reported cases. Tracheostomy should be performed, as in case two, if there is any potential threat to the airway (Johnson *et al.*, 1984).

In the reported 24 cases of N.F. of the head and neck, death occurred in seven patients (Balcerak *et al.*, 1988). Death occurring from necrotizing fasciitis is often due to overwhelming sepsis, renal failure, or multi-organ system failure.

Key words: Fasciitis necrotizing; Neck

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