CASE REPORT

Necrotising Fasciitis- A Rare But Life Threatening Complication of Odontogenic Infection: A Case Report

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ABSTRACT

Necrotizing Fasciitis (NF) of the head and neck is a rare, life-threatening, soft tissue infection rapidly involving superficial fat and fascia with necrosis of the overlying skin. Rapidly spreading necrosis often causes systemic sepsis, toxic shock syndrome and multi-organ failure. Necrotizing fasciitis of the neck is rare and commonly has a dental oro-pharyngeal origin. It is usually polymicrobial, odontogenic and occurs more frequently in immune-compromised patients. Because of the rarity of the disease, early diagnosis and early management is often delayed. We present an immune-compromised patient who developed NF of head and neck because of cariously destructed teeth. Because of vigorous teamwork he could be saved from the fatal disease but required extensive help due to steroid therapy for gout. Every clinician should be aware of such a disease, particularly in immune-compromised patients and necessitates earliest diagnosis and intervention to save their life.

KEYWORDS: Necrotising Fasciitis, Immuno-compromised State, Vaccum Assisted Closure

INTRODUCTION

Necrotising Fasciitis (NF) of the head and neck is a multimicrobial, soft tissue infection that spreads very quickly and is characterized by the formation of large necrotic lesions and gas, located in the subcutaneous tissue and superficial fascia. As the disease progresses, muscles and skin involvement develops, giving rise to myonecrosis, that pass through the infected fascia. Organisms spread from the subcutaneous tissue along the superficial and deep fascial planes, caused by bacterial enzymes and toxins. This deep infection causes thrombosis, ischemia, and tissue necrosis. Superficial nerves are damaged, producing the characteristic localized anesthesia. If the NF does not receive early surgical care, generalized toxicity occurs with multisystem organ failure.[1]

The term necrotizing fasciitis was firstly suggested by Wilson in 1952, although many terms have been used to describe this clinical entity such as hospital gangrene, nonclostridial gas gangrene, hemolytic streptococcal gangrene (Meleney's bacterial gangrene), necrotizing erysipelas, necrotizing cellulitis, Fournier's gangrene, necrotizing soft tissue infection etc.[2-7]

Immunocompromised patients are at an increased risk of developing necrotizing fasciitis (R. Moss et al, 1990). Various systemic diseases with immunosuppressive effects have

How to cite this article:
Singh DS, Mahindra U, Dadhich A, Saluja H. Necrotising Fasciitis- A Rare But Life Threatening Complication of Odontogenic Infection: A Case Report Int J Dent Med Res 2014;1(3):56-62.

been considered as pre-existing factors. These typically include diabetes mellitus, corticosteroid therapy, acute or chronic renal failure, arteriosclerosis, hypertension, hypothyroidism, anemia, HIV infection and malignancy.[8,9] Moreover, conditions causing impaired immunity have also been involved such as alcoholism, obesity, poor nutritional status, advanced age, drug abuse.[10, 11]

Necrotising fasciitis may affect any part of the body, however it most commonly affects the extremities, abdominal wall and the perineum. It is less common in head and neck because of high vascularity in the region.[12] Commonest cause of NF is dental Infection (Chan et al 1997) [13] where the process mainly affects the neck, followed closely by cases with trauma history, usually involving face infection.[7] Sometimes cervical NF may even induced by a common upper aerodigestive tract infection, like pharyngitis or tonsillitis.

NF has been reported as usually caused by group A beta-hemolytic streptococci and staphylococci. However, using more specialized culture techniques for anaerobic bacteria, it is thought today that this condition is actually the result of a synergistic combination of aerobic and anaerobic pathogens.[14]

These infections require an early diagnosis, aggressive surgical debridment and appropriate antibiotic therapy(.Klabacha et al, 1982), (Mohammedi et al ,1999).

Establishing the diagnosis of NF (as the most common type of NSTI) can be very much challenging. Clinical findings of NF may include edema, fever, severe pain, erythema, induration, crepitation, sloughing off of the skin, tenderness on palpation or a blistering and purulent collection, systemic toxicity (tachycardia and hypotension). Unfortunately, still the hallmark NF symptoms are intense pain and tenderness over the involved skin and underlying muscle.[4,14] Since NF is a surgical emergency and a life-threatening situation, the patient must be immediately admitted to an Intensive Care Unit, where intra-venous antibiotic therapy and immediate aggressive surgical debridement must be performed under appropriate anaesthesia.[6,14] The diagnosis is either confirmed by blood culture or aspiration of pus and necrotic tissue. But early surgical intervention is crucial. Antibiotic therapy should be started as soon as this condition i.e. NF is suspected. Initial treatment often includes a combination of intravenous antibiotics including penicillin, vancomycin, linezolid and clidamycin. Surgical exploration is mandatory if NF is suspected.

CASE REPORT

A 60 years old male patient was reffered to emergency department as an operated case of sub-mental and right sub-mandibular space infection 8-10 days back, as the patient experienced no relief from the treatment and the swelling kept on gradually increasing in size associated with pain and fever. There was trismus and breathlessness associated with it. Pateint's past history revealed that, was a known case of hypertension and gout since 5 years. On general examination, pulse: 98beats/min, BP: 118/94 mm of Hg, temperature: 100.2 degree fahrenheit.

Local Examination

Extraorally (Inspection) 1) A Wedge shaped non-healing wound over right side of neck, measuring approximately 8x4x3cm, with pale yellowish slough covering the base (Fig. No.1) 2) Swelling over sub-mental and Right Sub-mandibular region. Swelling from right infra-orbital rim till inferior border of mandible, from

lateral to ala of nose on right side till tragus of ear, Circumorbital oedema. Overlying skin inflamed, tensed. (Palpation) base of the wound was tender and bleed on probing (Fig No.2). Swelling was firm in consistency, tender and overlying temperature raised. Intraorally (Inspection) restricted mouth of 1.2cm. generalized severe attrition. Routine blood investigations revealed ESR:115mm/Hr, Total Leucocyte Count:17890/cumm, Packed Cell Volume:30.3%, Serum Creatinine: 1.5mg/dl, Serum Reactive Protein was positive. Patient was started with intravenous antibiotics immediately (Augmentin 1.2g and Metrogyl 100 cc and i.v infusion Paracetamol for hyperthermia). Patient was posted under general anaesthesia and incision and drainage was performed by giving sub-mental and right sub-mandibular incisions. Sub-mental, right sub-mandibular, sub-massetric and pterygo-mandibular spaces were explored. Thick yellowish foul smelling pus was drained. Pus collected was sent for antibiotic and pus culture sensitivity and necrosed tissue for biopsy. And the patient was shifted to ICU unit under observation.

Fig No.1: Showing Wedge shaped non-healing wound

Regular dressing was done, by exploring the spaces and irrigation with 5%Povidone iodine solution and hydrogen peroxide and 5% Povidone iodine soaked gauze pack dressing was packed in the wedge shaped wound twice a day.After 24 hours patient showed improvement with swelling and overall general condition,except the pus discharge (Fig No.3,4).

Fig No.2: Extra oral swelling

Fig No.3: Showing discharge of pus from the wound

Fig No.4: Showing incison line during dressings

There was a tunnel formed between the sub-mandibular space and the non-healing wedge shaped wound and pus started drooling from there itself. Antibiotic and pus culture sensitivity and tissue biopsy revealed

Necrotising Fascitiis and resistant to the i.v medications infused and sensitive to vancomycin and linezolid. Injection Linezolid 600 mg was started and great amount of improvement was seen with the pus discharge from both the incisions, but was continuing from the wedge shaped wound. Vaccum Assisted Closure (Closed Dressing Technique) type of dressing was performed for the wedge shaped non-healing wound. A stab incision was given approximately 1cm away from the edge of the wound on either side, followed by blunt dissection and connected with the wound. A no. 7 Infant feeding tube was inserted from either sides and placed in the wound. The tubes were secured and stabilized using Mersilk suture no. 3 and margins of the wound were freshened up and closure was done using 3-0 Mersilk suture (Fig No.5,6).

Fig No.5

Fig No.6

Fig No.5 & 6: Vaccum Assisted type of Wound closure technique used. Infant feeding tubes no.7 inserted from either side of the wound and suturing was done to achieve air tight closure.

Injection Linezolid was infused from one side of the infant feeding tube and aspirated from the opposite side after few hours and continued 3-4 times a day. This procedure was continued for a week and there was complete stoppage of pus discharge and healing of the wound was achieved with no gaping at the suture line after suture removal. Patient was discharged after a period of 20 days and recalled after a week for 2 months for follow-up with no complaint and satisfactory healing of the wound (Fig No.7,8).

Fig No.7

Fig No.8

Fig No.7,8: Showing uneventful healing of the wound and improvement in general condition of the patient.

DISCUSSION

Cervical necrotizing fasciitis is an infection that rapidly progresses on the facial plane, even if cases are rare. According to literature, its mortality rate changes between 19% and 40%.[15]

The mandibular second and third molar teeth are the common reason behind odontogene-based infections. The fact that these teeth reach beneath the region where the mylohyoid muscle sticks to the mandibula enables infections caused by these teeth to reach the submandibular region. The infection may progress to the skull base and thorax and the mediastinum in the lower region.[16,17,18]

NF progresses rapidly with pain and increase in temperature. This infection causes necrosis in subcutaneous tissue as a result of intense lymphocytic infiltration, vascular occlusion, and tissue necrosis as it spreads among muscle layers. The skin becomes inflamed, shiny and edematous. As necrosis advances, the skin becomes dull and sensation less, after which it becomes dusky. Subcutaneous tissue is dull and suffers from edema, there is flix similar to melted butter and dishwater. In general, the infection in NF is multi microbial. The most common factor is *Streptococcals*. In the culture of our case, *Enterococcus species* was found. The disease progresses more rapidly in patients that are diabetes, have chronic kidney failure, have insufficient immune systems, and have undergone surgery, trauma and malignancy.

The causative organism may be a single agent, commonly Group A beta haemolytic streptococci or Staph Aureus or may be a polymicrobial infections. Polymicrobial infections are caused by mixed aerobic and anaerobic pathogens. Synergy between them contributes to the pathogenesis of polymicrobial fasciitis i.e. synergistic gangrene.

Necrotising fasciitis can be divided into 5 types:

- Necrotising fasciitis Type I – polymicrobial
- Necrotising fasciitis Type II - Grp A streptococcal.
- Clostridial myonecrosis - Gas gangrene.
- Fournier's gangrene.
- Le mierre' syndrome

Histology reveals obliterative endarteritis and thrombosis of the subcutaneous vessels. Other changes are necrotic superficial fascia and microbial colonization of the skin and fascia. Myonecrosis is rarely seen except in clostridial infections.

Necrotising fasciitis type I is caused by non Grp A streptococci and anaerobes and / or facultative anaerobes. Usually seen after trauma or surgery. There is involvement of subcutaneous fat and fascia with sparing of muscle. Gas formation is common.

Necrotising fasciitis type II is caused by Streptococcus pyogenus alone or with Staphylococcus. Usually associated with Streptococcal toxic shock syndrome. Predisposing factors are trauma, surgery or varicella infections.

Clostridial myonecrosis is characterised by its fulminant onset. The predominant features are muscle necrosis and gas production. The commonest causative organism is Clostridium perfringens.

Fournier's gangrene (J.A. Fournier, 1883) – necrotizing fasciitis of the scrotum

Lemierre's syndrome (A. Lemierre, 1936) - Oropharyngeal infection with secondary thrombophlebitis of the Internal Jugular Vein and frequent metastatic infections. Caused by Fusobacterium necrophorium.

These infections require a rapid diagnosis as mortality rates up to 76 % have been reported without early intervention. Mortality is higher in patients over 50 years of age, those with associated systemic illnesses like diabetes mellitus or peripheral vascular diseases, immune compromised state and when there is a delay in diagnosis. Pain out of proportion to other clinical findings is an important clue to the diagnosis of this condition. Treatment involves wide local surgical debridement

supported by intravenous antibiotics, with fluid and electrolyte replacements and other supportive treatment. Once culture results are obtained, antibiotic treatment should be modified to be effective on the effective organisms It is essential that all areas of necrotic tissue be debrided. (Dellinger,1981). Excision to the point of bleeding tissue is a useful guide for debridement. There are certain centres which advocate the use of hyperbaric oxygen for treating this condition.

The vacuum assisted closure (VAC) therapy was first reported in 1990s 19. It has revolutionized the clinical management of the wounds.[20-23] It has been successfully used in the setting of wounds complicated by burns, infection, poor circulation, exposed bone or artificial implants and dehiscence.[24,25,26] An open cell sponge is placed in the wound, sealed with an adherent drape, and attached to a tube through which subatmospheric pressure is applied.[27] It is reported that the negative pressure facilitates healing by improving the rate of angiogenesis, endothelial cells proliferation, the integrity of the capillary membrane, capillary blood flow, capillary caliber, and by decreasing localized edema by removal of interstitial fluid and bacterial burden within the wound.[28,29,30] This technique has also been shown to effectively stimulate healing by secondary intention.

CONCLUSION

NF is a rare but devastating infection of the fascia and subcutaneous tissue in case of head and neck. In view of the potentially catastrophic consequences of this life threatening infection, it would be prudent to include NF in the differential diagnosis, particularly in immune-compromised patients with unexplained pain and swelling. Early presentation and diagnosis, supportive measures, broad spectrum antibiotics prompt and aggressive surgical debridement and finally rehabilitation remains the cornerstone of good management.

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Source of Support: Nil
Conflict of Interest: Nil