

Necrotizing fasciitis of the neck and hand: A case report of two separate cases.

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Abstract

Necrotizing fasciitis (NF) is a rare and often fatal soft-tissue infection. Prompt diagnosis and immediate aggressive surgical debridement of all compromised tissues are critical to reducing morbidity and mortality in these rapidly progressive infections. NF death rate is very high (20-40%). Although it most commonly involves the groin, abdomen and extremities it may also occur in the head and neck. NF is mainly caused by group A beta-hemolytic Streptococcus. We report 2 cases and review the literature. Of 2 cases of NF one was uncontrolled diabetic patient 46 years male who presented with swelling posterior aspect of neck and other was female patient aged 35 years female who presented with blackish eschar on dorsum of right hand with swelling of forearm and was treated as cellulitis for 5 days.

Introduction

NF is a severe soft tissue infection that spreads quickly and is characterized by extensive necrosis of the deep and superficial fascia resulting in the devascularization and necrosis of associated tissues. This rare condition has a high mortality rate and poses diagnostic and management challenges to the clinician. It can rapidly

deteriorate into shock and sepsis, which may lead to multi-organ failure and an imminent life-threatening condition[1]. The high-risk conditions are diabetes mellitus, liver cirrhosis, alcoholism, hypertension, chronic renal insufficiency, immunocompromised status, being elderly, malnourishment, and malignancy[2]. The incidence of NF is estimated to be 0.3 to 15 cases per 100,000 population[3]. However, due to difficulty in diagnosis and underreporting, this is likely an underestimation[4] . Severe pain that is disproportionate to the degree of apparent injury is considered a classic symptom of NF, but patients with diabetic neuropathy may not experience the same level of pain as those without preexisting neuropathy[5,6,7]. This article describes successful treatment outcomes of 2 patients in Regional Hospital located in tribal district, Kinnaur of Himachal Pradesh with limited diagnostic and laboratory services.

Case presentation

Chief complaints

A 46-years male presented with a 10 days history of swelling posterior aspect neck along with fever and

pain in emergency department (ED) at Regional hospital Reckong Peo.

History of present illness and management

Patient took medications for swelling few days back from local hospital but swelling and pain increased along with erythema extending to nape of neck inferiorly and superiorly upto occipital region scalp. On examination swelling was approximately 12x8 cm shiny, erythematous, tender and restricted neck movements. Vitals of the patient were pulse 120/minute, blood pressure -110/70 mm Hg, temperature-98.4⁰F, spo2-92% and respiratory rate 24/minute.

Patient was admitted in surgery ward routine investigations were done and patient was given oxygen inhalation, intravenous fluid (IVF) i.e normal saline, intravenous (i.v) injection amoxyclav 1.2gm, i.v tramadol 100mg and diclofenac for pain relief. Although this patient had previous history of diabetes, he was not taking any medications and had high blood glucose and glycosylated hemoglobin at the time of admission. On routine investigation total leucocyte count was 20,000 mm³, random blood sugar-345mg/dl and CRP was raised, serum electrolytes, renal function and liver function tests were normal. Incision and drainage was planned and approximately 200 ml of frank pus drained, pus sent for pus culture and sensitivity. 10ml pus in falcon tube was sent for Cartridge Based Nuclieic Acid Amplification test (CB-NAAT) to rule out tuberculosis. Diagnosis of NF was confirmed as per clinical presentation. Medicine consultation was taken for glycaemic control and patient started on sliding scale regular insulin along with injection mixtard. Patient planned for debridement under general Anaesthesia and shifted to operation theater (OT) next day. Operative findings showed

extensive tissue loss along fascial planes extending superiorly upto occipital region scalp, laterally on both sides of neck and inferiorly upto upper aspect of back muscles. Debridement of dead tissues along with pus flakes and residual pus was done all necrotic tissue removed. Betadine wash along with hydrogen peroxide used for cleaning wounds. Patient was started on injection piperacillin –tazobactam 4.5 gm 8 hourly, injection clindamycin 600mg 12 hourly oxgen inhalation at 2L/minute, pain killers, injection pantoprazole and IVF D5% +6IU regular insulin at 100ml/hour for next 6 hours. Injection piperacillin –tazobactam 4.5 gm 8 hourly, injection clindamycin 600mg 12 hourly, tablet acefenac 100mg + seratiopeptidase continued for 5 days postoperatively. Histopathology of debrided tissue was consistent with NF showing extensive necrosis of entire thickness of skin, focally ulcerated epidermis with dermal neutrophilic abscess and subcutaneous adipose tissue panniculitis also seen. Physiotherapy consultation was taken and started. Serial debridement was done on third day by extending incisions superiorly, laterally and inferiorly on posterior aspect of neck. Based on the clinical findings and the results of the pus culture and histopathology of biopsy the patient was finally diagnosed with NF caused by *Staphylococcus aureus*. Vitals of patient were stable postoperatively and glycaemic control achieved throughout hospital admission. On 20th day wound improved and patient was sent for plastic surgery opinion at higher center for split skin grafting as wound was clean but large approximately 10 cmx12 cm involving whole of posterior aspect of neck. Patient was managed for 5 days by negative suction wound therapy at Medical college Shimla and discharged back to local hospital for

wound care and patient again reported us for further management of wound. Wound dressing was done with megaheal for 2 weeks and thereafter discharged with advice on alternate day dressing on out-patient department (OPD) basis. Patient was advised placentrex cream for healthy wound thereafter and ultimately wound healed over period of 3 months.

Chief complaint of second patient:

Second patient was 35 years female who presented with blackish eschar on dorsum of right hand with pain and swelling of forearm and right hand. She was treated as cellulitis for 5 days at nearby hospital.

History of present illness and management

She gave history of trauma few days before she noticed pain and swelling with oedema right hand extending to right forearm upto elbow for which she was admitted in nearby hospital and managed conservatively with antibiotics, sumag application, limb elevation and painkillers. Within 6 days she noticed blackish discolouration on dorsum of right-hand swelling and pain also were not relieved despite medications for which she came to emergency department (ED) at regional hospital Reckong Peo. On local examination in ED prompt diagnosis of NF was made based on history and clinical findings (Figure1). Vitals of patient were stable. Routine investigations of patient showed elevated leucocyte count rest of the investigations were normal. She had no comorbidity and trauma could be precipitating factor for NF in this case. Prognosis explained regarding amputation as known complication due to delay. Patient was started on injection piperacillin –tazobactam 4.5 gm i.v 8 hourly, injection linezolid 600mg 12 i.v hourly, metronidazole 500mg i.v 8 hourly, oxygen inhalation at 2L/minute, pain killers, injection pantoprazole. Patient was shifted to OT eschar

removed and debridement of necrotic tissue done under total intravenous Anaesthesia. Operative findings showed necrosis along fascial planes extending to tendons upto wrist and metacarpophalangeal joints of hand. Debridement of dead tissues along fascial planes and all necrotic tissue was removed. Betadine wash along with hydrogen peroxide and normal saline was used for cleaning wounds. Postoperatively serial debridement done and antiseptic dressings done daily till patient wanted discharge against medical advice



Figure 1

Discussion

The predisposing factors for NF are diabetes mellitus, liver cirrhosis, alcoholism, hypertension, chronic renal insufficiency, malignant tumours, immunosuppressive therapy, and intramuscular injection of non-steroidal anti-inflammatory drugs [8]. Among them, type 2 diabetes is the most common potential medical condition. The following classifications are based on the underlying bacteria that initiated the cascade of injury [3,9].

According to the microorganism involved, four types of NF are classified [5]. Type I is the most common type (70%-90%) and is a mixed infection caused by Gram-positive cocci (Streptococcus and Staphylococcus), Gram-negative bacteria (Escherichia coli, Acinetobacter, Pseudomonas, and Klebsiella), and

anaerobic bacteria such as Clostridium and Bacteroides [10,11]. Type II NF is generally monomicrobial, usually caused by group A Streptococcus alone or in combination with Staphylococcus aureus [7,12]. Type III describes a specific infection caused by marine Vibrio vulnificus [8,13]. Type IV is caused by a fungal infection, with the most common species being Candida spp. or zygomycetes [13,14].

The pathophysiology characteristic of Type I and II NF is widespread. Diffuse damage to superficial tissue extends to the deep muscular plane and fascia, with certain unique features depending on the offending organism [15]. Due to its complex polymicrobiological profile, Type I NF is likely to be especially severe in older adults with existing comorbidities. The presence of both aerobic and anaerobic organisms causes extensive tissue necrosis and hemodynamic compromise. Many patients with NF present to the ED exhibiting signs and symptoms of an infection. Superficial findings may not be distinct beyond erythema and edema[3]. Clinicians must quickly recognize the distinction between cellulitis manageable with antimicrobial therapy and NF requiring surgical intervention. Delays in appropriate management of NF can have devastating consequences, including limb loss, organ damage, and a significantly increased risk of death [16]. Presentation can be further distorted by factors such as the use of nonsteroidal anti-inflammatory drugs, which can mask signs such as fever and classic symptoms of NF such as crescendo-like pain. In NF, the site of injury impacts the severity of clinical manifestations due to local bacterial flora and proximity to vital organs. For example, NF of the head and neck region are more likely to have

polymicrobial infection and progress to mediastinitis [3].

The most recent Infectious Disease Society of America guideline recommends either vancomycin or linezolid in combination with piperacillin-tazobactam, a carbapenem, or ceftriaxone-metronidazole. Clindamycin should also be included in empiric therapy due to its effect on toxins released by certain organisms, including *S. aureus* and GAS[16]. Penicillin plus clindamycin is recommended to treat documented GAS necrotizing infections[16]. As soon as the sampled specimen's microbiology is determined, the clinician can tailor therapy to the specific organism while utilizing local antibiograms in order to determine local resistance patterns. Additional medical management includes supportive measures such as aggressive intra venous fluid resuscitation and vasopressor support for septic shock.

Surgical management

Surgery is the gold standard treatment when NF is either suspected or diagnosed. Surgical exploration and debridement of the affected tissue should be performed promptly. Initial tissue findings may include discoloration, gross edema or ecchymosis, and signs of necrosis. Specimens for Gram stain and culture should be obtained during surgical exploration.

Within 24 hours of the initial debridement, the patient should return to surgery for subsequent debridement[4]. This should continue daily until the surgical team determines that all necrotic tissue has been removed and only healthy tissue remains[16]. Amputation may be required to manage the infection in severe cases involving the extremities. Discrete pus is generally absent, but surgical wounds often drain copious volumes of tissue fluid.

Consequently, patients may need aggressive fluid volume replacement after surgery[16].

Conclusion

NF, although not common, can cause notable rates of morbidity and mortality. Because of the lack of characteristic skin manifestations, it is important for physicians or surgeons to increase awareness of the early cutaneous findings in the course of the disease. Prompt diagnosis and early operative debridement with adequate antibiotics are vital. Interdisciplinary intensive care treatment is prerequisite for successful therapy.

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