MEGA JOURNAL OF CASE REPORTS

Case Report

Compiled Date: November 27, 2023

Case Report of Cervical Necrotizing Fasciitis

Fedosieiev G*, Fuks V and Biterman A

Department of General Surgery, Carmel Medical Center, Haifa, Israel

***Corresponding author**: Georgii Fedosieiev, Surgery A, Carmel Medical Center, Michal street 7, Haifa, 3436212, Israel, Tel: 972537215367; E-mail: giorgipe@clalit.org.il

Abstract

Background: Necrotizing soft tissue infections (NSTIs) is a rare disease, which includes necrotizing fasciitis, necrotizing myositis and necrotizing cellulitis. The incidence of necrotizing fasciitis ranges from 0.3 to 15 cases per 100,000 populations with high mortality 40-76%. We discuss a man with a cervical necrotizing fasciitis.

Case report: A 62-year old man was admitted to ED with painful swelling, redness in posterior cervical region. The patient was diagnosed with cervical necrotizing fasciitis and operated in emergency setting.

Conclusions: NSTIs of head and neck an aggressive form of deep cervical space infection, which can lead to high mortality. Early aggressive surgical treatment with resuscitation and antibiotic therapy is corner stone of therapeutic success. Adjunct of VAC therapy made wound closure possible earlier in the course of healing.

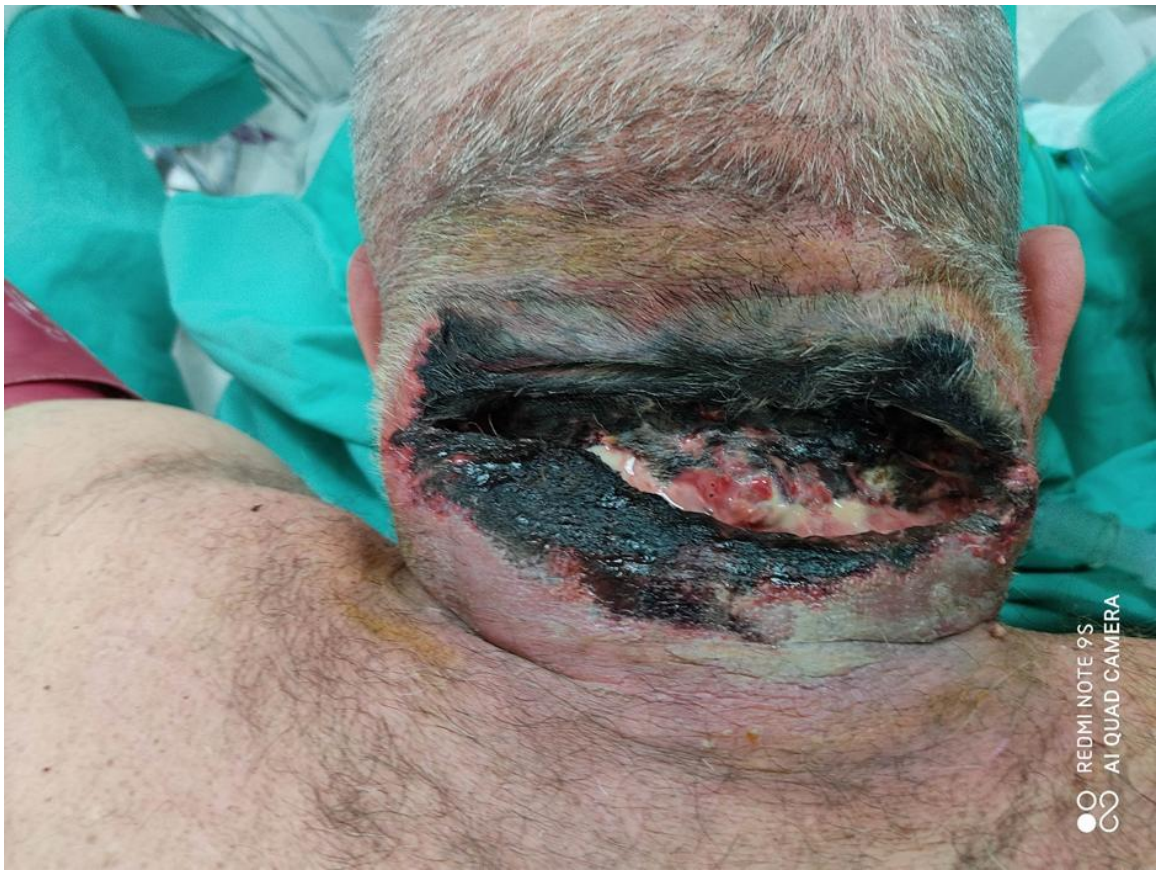
Background

Necrotizing Soft Tissue Infections (NSTIs) is a rare disease, which includes necrotizing fasciitis, necrotizing myositis and necrotizing cellulitis. The incidence of necrotizing fasciitis ranges from 0.3 to 15 cases per 100,000 populations **[1].** NSTIs has greater incidence rate in black, Hispanic and American Indians and lower rate among Asians **[2].** Due to strong blood supply, infection in the head and neck is exceedingly rare accounting for an estimated 1%-10% of cases **[3].** 2 per 1 000 000 population per year **[4].** NSTIs of head and neck an aggressive form of deep cervical space infection, which can lead to high mortality 40-76% **[5].** Necrotizing fasciitis was described by Wilson (1952) in a series of staphylococcal infections **[6].** Reported source of infection was odontogenic (47.04%), pharyngolaryngeal (28.34%),

tonsil/peritonsillar (6.07%), traumatic/iatrogenic/postoperative (4.86%), salivary gland (2.43%), skin (1.7%), or unknown (9.39%). Other rare etiologies included middle ear or mastoid, and esophageal cancer **[7-9].** Based on culture were proposed 2 clinical entities for necrotizing fasciitis; polymicrobial with aerobic and anaerobic bacteria (type 1) or streptococcus pyogenes alone or in combination with staphylococcus aureus **[10].** The most common organism of infection were: streptococcus (61.22%), staphylococcus (18.09% of patients) prevotella(10.87%), peptostreptococcus (8.78%), fusobacterium (5.22%) enterobacter (3.48%) klebsiella (3.47%) escherichia coli (3.04%) pseudomonas (2.87%), candida (2.43%). No specific microorganism growth was reported in 3.83% of cases **[11].**

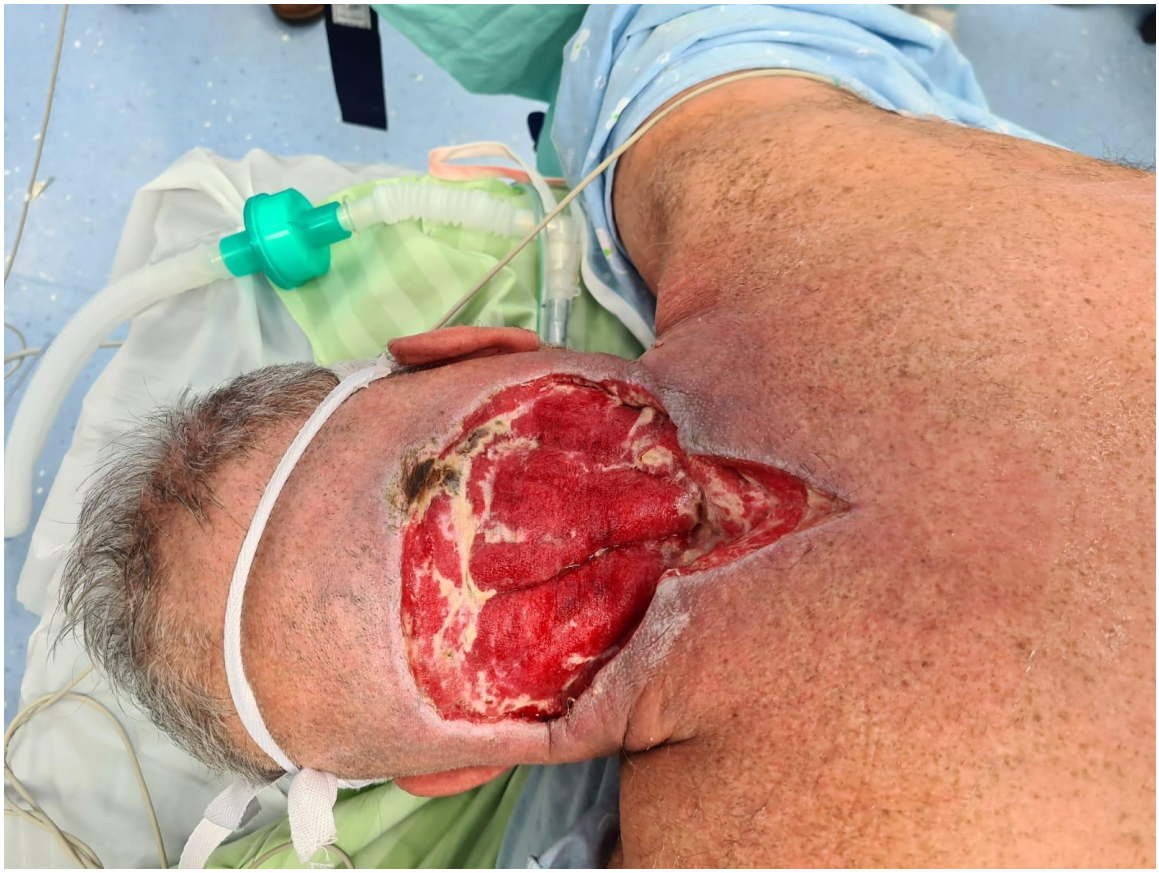
Case Presentation

A 62-year old man was admitted to ED with painful swelling, redness in posterior cervical region, dizziness, weakness and fewer 38. He was presented with 17-days history of swelling, reddish and pain in the back of his neck after a haircut. Patient did not seek medical help, decided to take care of him at home by antiseptics. His medical history wasn't remarkable. Physical examination was revealed abscess from the base of the scull to the upper border of the back. Patient was stable hemodynamically with tachycardia 132 per minute. Saturation was 94%. Laboratory findings were a White Blood Cell (WBC) of 36×10/L, neutrophil of 82%, Glucose 590 mg/dL, creatinine 1.4 mg/dL, urea 68 mg/dL, natrium 128 mEq/L, fibrinogen 980 mg/dL, INR 1.6. Hydration with one liter of normal saline, antibiotics, correction of hyperglycemia with insulin was prescribed and CT scan was done- from the occiput to the upper back demonstrates edema and a noticeable sieve of subcutaneous fat and swelling of soft tissues, without clear evidence of an organized collection. In additional blood tests: ABG-pH 7.3 lactic acid 1.7 mmol/L potassium 2.5 mmol/L. Hydration with normal saline was continued correction of hypokalemia was done. The patient was operated in emergency setting. During first operation huge necrotic process was identified with occipital in upper border and upper back in lower border. Lateral borders were posterior margins of sternocleidomastoids muscles. Fat necrosis and necrosis of superficial fascia was identified fascia of trapezius muscle was necrotic too. The amount of pus was not large. Necrectomies were done without muscle excision. Tissue samples for pathological investigation and for cultures were obtained. Multiple washing of the wound with saline and polydine performed. Wet dressings with polydine were placed. Due to hemodynamic instability during operation and needs for ventilator and hemodynamic support the patient was sent to intensive care unit. Two antibiotics were prescribed: cephalosporin's first generation and clindamycin. During POD 1 patient was instable hemodynamically, needs to ventilator support. In blood analyses WBC 40x10/L CRP 24. The second look after 24 hours was done: in the second surgery skin necrosis of superior and inferior flaps was identified, necrotizing fasciitis of trapezius muscle and necrotizing myositis of trapezius muscle was determined. Wide necrectomies were done with drainage of intermuscular spaces.

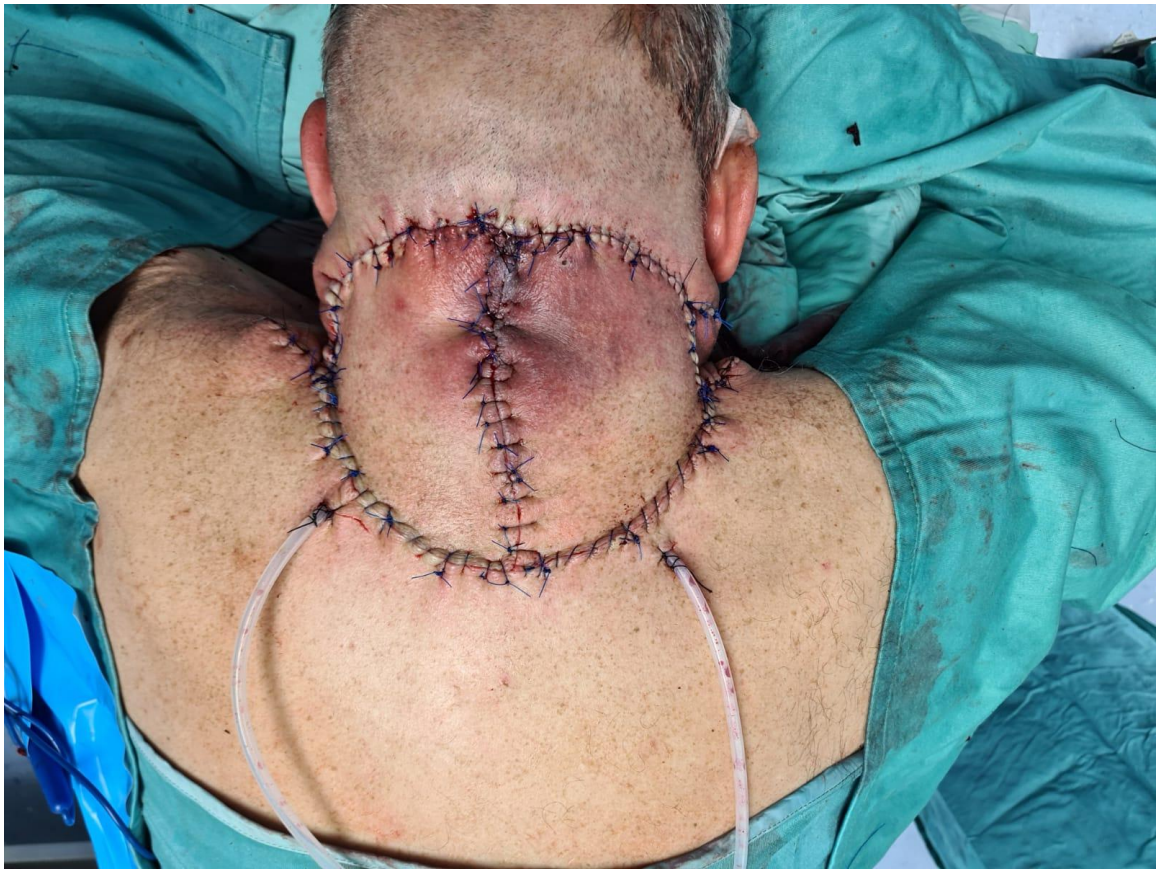


After second look surgery patient continued treatment into ICU. Positive wound and blood cultures were received for St. Aureus. Antibiotic treatment with first generation cephalosporins only was continued.

POD 3 third operation was performed. Deep fascia and muscle (trapezius) necrosis identified, necrectomies and multiple washing were done. Wet dressing with polydine were placed. During POD 3-6 patient condition has stabilized. Improving in leukocytosis -10x109/L, decline of CRP -4. In POD 6 patient was extubated and continued treatment in the general surgery ward. Was diagnosed with diabetes (HB A1C-10), undetected earlier. Defect on the posterior neck was 20x10 cm. No movement disorders or neurological deficit weren't identified. The wound cleared and in POD 10 VAC treatment was started.



Skin defect was closed with rotational flap on POD-20.



Discussion

Neck necrotizing soft tissue infections is a rare entity which incidence is 2 per 1 000 000 population per year [4] with high mortality 40-76% [5]. Historically the first case of neck necrotizing soft tissue infections was describe by Wilson (1952) in a series of staphylococcal infections [6]. Necrotizing soft tissue infections are divided bacteriologically into two groups: type 1 polymicrobial and type 2 monomicrobial. Aerobic and anaerobic bacteria cause Polymicrobial (type 1). The anaerobic species are: Bacteroides, Clostridium, or Peptostreptococcus in combination with Enterobacteriaceae (eg, Escherichia coli, Enterobacter, Klebsiella, and Proteus). Monomicrobial (type 2) caused by GAS (group A Streptococcus) or other beta-hemolytic streptococci. However also occur because of Staphylococcus aureus [12]. There are few known risk factors for necrotizing infections: penetrating trauma, laceration or blunt trauma (muscle strain, sprain, or contusion), skin penetration (varicella lesion, insect bite, injection drug use) mucosal injury (hemorrhoids, rectal fissures, episiotomy), Immunosuppression (diabetes, cirrhosis, neutropenia, HIV infection), malignancy, obesity, alcoholism.

Diabetes is an important risk factor for necrotizing infection of head and neck region [13].

Clinically could be involvement of the epidermis, dermis, subcutaneous tissue, fascia, and muscle. Manifestations include: erythema (without sharp margins 72 %), edema (75 %), severe pain (out of

proportion to exam findings - 72 %), fever (60 %), crepitus (50 %) **[1].** Laboratory findings are usually nonspecific. It could be leukocytosis with left shift, acidosis, coagulopathy, hyponatremia, CRP elevation. Creatinine, lactate, Creatine Kinase (CK), aspartate Aminotransferase (AST) elevation. Elevated CK or AST suggest involving muscle or fascia **[1].**

Computed Tomography (CT) – the best imaging for necrotizing soft tissue infection. The most useful finding is presence of gas in soft tissues.

This finding is highly specific for NSTI. Additional findings may include fluid collections, tissue enhancement with intravenous contrast, and inflammatory changes of the fascia **[14].** Subcutaneous gas-pathognomonic for necrotizing fasciitis. This finding is detected in half of patients on plain radiographs and on the CT scan. Absence of gas cannot safely exclude the diagnosis. MRI provides better accuracy than CT, though not widely used, due to cost. Ultrasonography is a feasible option, providing useful information concerning the nature and extent of infection, especially when the diagnosis is unclear **[15,16].** Treatment of necrotizing fasciitis consists of medical and surgical components. Airway management, fluid resuscitation and antibiotic treatment at the time of diagnosis are required due to the rapidly progressive nature of these infections. Culture is not required before empiric antibiotic therapy because broad-spectrum coverage is usually mandatory, since most cases involve mixed flora of gram positive cocci and gram negative rods with or without anaerobes **[17].**

Special consideration for group A Streptococcus and Clostridium species should be taken.

The usual regimens include monotherapy agents: imipenem, meropenem, ertapenem, piperacillin/tazobactam, and tigecycline or drug-combination regimens: triple-drug therapy regimens, such as high-dose penicillin, high-dose clindamycin, and a fluoroquinolone or an aminoglycoside for coverage of gram-negative organisms. Vancomycin, daptomycin, or linezolid should be added until methicillin-resistant staphylococcal infection has been excluded. Clindamycin works by inhibiting of toxin production, which can be crucial for controlling the inflammatory response in patients with NSTI, with clostridial and streptococcal infections Antibiotics use continued until no further debridements are needed **[14].**

Surgical exploration is the appropriate approach for final diagnosis of necrotizing infection.

Surgical debridement should be done early on the course; survival is better among early surgical group (within 24 hours after admission) compared with delayed group, and survival is further increased with earlier surgical intervention (during first six hours) **[18].**

Intraoperative materials sent for Gram stain and culture.

Surgical treatment is aggressive debridement of visible necrosis until bleeding tissue is reached. Second look (inspection and debridement) procedures continued every 24-48 hours until necrotic tissue is no longer present **[19].** A new therapies have been reported: hyperbaric oxygen use for a decreased number of debridements and decreased mortality. Results from this strategy are contraversially, and no real epidemiologically based studies have been performed. Intravenous immune globulin uses if the NSTI is conducted with group A streptococcal infection among patients who have developed streptococcal toxic shock syndrome and in those with a high mortality risk (advanced age, hypotension, and bacteremia) **[14].**

The place of Vacuum-Assisted Closure of a Wound (VAC), as advanced wound-healing technique, has become increasingly popular for a wide variety of complicated wounds. Limited data of VAC use in cervical NSTI wounds provides superiority compared with conventional debridement and drainage **[20].** The place of VAC therapy is after debridement before reconstruction-to prepare the wound for plastic surgery.

Conclusion

NSTIs of head and neck an aggressive form of deep cervical space infection, which can lead to high mortality. Early aggressive surgical treatment with resuscitation and antibiotic therapy is corner stone of therapeutic success. Adjunct of VAC therapy made wound closure possible earlier in the course of healing.

References

1. Stevens DL, Bryant AE. Necrotizing Soft-Tissue Infections. N Engl J Med. 2017;377(23):2253.
2. Sepulveda A, Sastre N. Necrotizing fasciitis of the face and neck. Plast Reconstr Surg. 1998;102:814-7.
3. Lin C, Yeh FL, Lin JT, et al. Necrotizing fasciitis of the head and neck: an analysis of 47 cases. Plast Reconstr Surg. 2001;107:1684-93.
4. Wolf H, Rusan M, Lambertsen K, Ovesen T. Necrotizing fasciitis of the head and neck. Head Neck. 2010;32:1592-6.
5. Bahu, S, Shibuya, T, Meleca, RJ. Craniocervical necrotizing fasciitis: an 11-year experience. Otolaryngol Head Neck Surg. 2001;125(3):245-52.
6. Wilson B. Necrotizing fasciitis. Am Surg. 1952;18:416-31.
7. Chua HK, Segar CB, Krishnan R, Ho CK. Cervical necrotizing fasciitis consequent to mastoid infection. Med J Malaysia. 2002;57:104-7.
8. Shaariyah MM, Marina MB, MohdRazif MY, Mazita A, Primuharsa Putra SH. Necrotizing fasciitis of the head and neck: surgical outcomes in three cases. Malays J Med Sci. 2010;17:51-55.
9. Francque SM, Van Laer C, Struyf N, Vermeulen P, Corthouts B, Jorens PG. Perforating oesophageal carcinoma presenting as necrotizing fasciitis of the neck. Eur J Gastroenterol Hepatol. 2001;13:1261-4.
10. Giuliano A, Lewis F Jr, Hadley K, Blaisdell FW. Bacteriology of necrotizing fasciitis. Am J Surg. 1977;134:52-57.
11. Gunaratne DA, Tseros EA, Hasan Z, et al. Cervical necrotizing fasciitis: Systematic review and analysis of 1235 reported cases from the literature. Head Neck. 2018;40:2094.
12. AU Miller LG, Perdreau-Remington F, Rieg G, Mehdi S, Perlroth J, Bayer AS, et al. Necrotizing fasciitis caused by community-associated methicillin-resistant Staphylococcus aureus in Los Angeles. N Engl J Med. 2005;352(14):1445.

13. Wong CH, Chang HC, Pasupathy S, Khin LW, Tan JL, Low CO. Necrotizing fasciitis: clinical presentation, microbiology, and determinants of mortality. J Bone Joint Surg Am. 2003;85A(8):1454.
14. Anaya DA, Dellinger EP. Necrotizing soft-tissue infection: diagnosis and management. Clin Infect Dis. 2007;44(5):705.
15. Nagano N, Isomine S, Kato H, Sasaki Y, Takahashi M, Sakaida K, et al. Human fulminant gas gangrene caused by Clostridium chauvoei. J Clin Microbiol .2008;46:1545-7.
16. Ruiz-Tovar J, Córdoba L, Devesa JM. Prognostic factors in Fournier gangrene. Asian J Surg. 2012;35:37-41.
17. Rega AJ, Aziz SR, Ziccardi VB, et al. Microbiology and antibiotic sensitivities of head and neck space infections of odontogenic origin. J Oral Maxillofac Surg. 2006;64:1377-80.
18. Bucca K, Spencer R, Orford N, Cattigan C, Athan E, McDonald A. Early diagnosis and treatment of necrotizing fasciitis can improve survival: an observational intensive care unit cohort study. ANZ J Surg. 2013;83(5):365.
19. Sudarsky LA, Laschinger JC, Coppa GF, Spencer FC. Improved results from a standardized approach in treating patients with necrotizing fasciitis. Ann Surg. 1987;206(5):661.
20. Shu-jun C, Yu-xuan C, Jian-rui X, Xiao-zong W, Shuang-min C. Negative Pressure Wound Therapy in Necrotizing Fasciitis of the Head and Neck. J Oral Maxillofac Surg. 2019;77(1):87-92.

Citation of this Article

Fedosieiev G, Fuks V and Biterman A. Case Report of Cervical Necrotizing Fasciitis. Mega J Case Rep. 2023;6(11):2001-2008.

Copyright