Open Access Library Journal
2025, Volume 12, e12001
ISSN Online: 2333-9721
ISSN Print: 2333-9705

Cervicothoracic Extensive Odontogenic Necrotizing Fasciitis, a Serious Disease: Cases Reports

Romaric Beheton[1*], Arsene Coulibaly[2], Alexis Do Santos Zounon[3], Sylvie Arlette Bancole Pognon[3], Youness Farhane[4], Romaric Degan[5], Ulrich Bidossessi Vodouhe[3]

[1]Maxillofacial Surgery and Odontostomatology Department, National Teaching Hospital of Cotonou, Cotonou, Benin
[2]Maxillofacial Surgery Department, Regional Teaching Hospital of Ouahigouya, Ouahigouya, Burkina Faso
[3]Faculty of Health Sciences, University of Abomey-Calavi, Abomey-Calavi, Benin
[4]Faculty of Dental Medicine, Laval University, Québec City, Canada
[5]Radiology Department, Menontin Zone Hospital, Cotonou, Benin
Email: *behetonromaric@gmail.com

How to cite this paper: Beheton, R., Coulibaly, A., Do Santos Zounon, A., Bancole Pognon, S.A., Farhane, Y., Degan, R. and Vodouhe, U.B. (2025) Cervicothoracic Extensive Odontogenic Necrotizing Fasciitis, a Serious Disease: Cases Reports. *Open Access Library Journal*, **12**: e12001.
https://doi.org/10.4236/oalib.1112001

Received: July 24, 2024
Accepted: January 5, 2025
Published: January 8, 2025

Abstract

Background: Necrotizing fasciitis is a severe, rapidly progressing infection of soft tissues that spreads along fascial planes, characterized by extensive necrosis and intense systemic signs. While these conditions are rare in developed countries, they unfortunately remain prevalent in our developing nations. We present the follow-up of two cases of cervicothoracic necrotizing fasciitis. **Methods:** Two patients were followed for cervithoracic necrosis following cellulitis of dental origin. **Results:** The first case involved a 63-year-old, long-term corticosteroid-treated smoker, admitted for cervicothoracic inflammatory swelling, following dental pain. Explorations concluded with a diagnosis of necrotizing fasciitis, leading to surgical debridement and tooth extraction. The resulting tissue loss initially underwent honey-directed healing and subsequently a split-thickness skin graft. The patient's condition improved favorably. The second case was a 57-year-old poorly managed diabetic female presenting cervicothoracic inflammatory swelling due to dental issues, where necrotizing fasciitis was suspected. Surgical debridement, incision, drainage, and tooth extraction were performed. The resulting tissue loss underwent honey-directed healing with a positive outcome. **Conclusions:** Necrotizing fasciitis remains widespread, and involvement of the cervicothoracic regions can have a dramatic course. Despite limited resources, the complex management of these cases can yield satisfactory results.

Subject Areas

Dentistry

Keywords

Necrotizing Fasciitis, Cervicothoracic, Developing Countries, Honey Dressing, Case Report

1. Introduction

Necrotizing fasciitis is a fulminant infection of soft tissues that extends along fascial planes, leading to secondary venous and arterial thrombosis, followed by necrosis of the skin and adjacent tissues [1]. These are serious infections characterized by extensive necrosis and intense systemic signs, indicating a severe septic syndrome that can lead to a state of shock [2].

It was first described during the Civil War under the name "hospital gangrene." In 1924, Meleney identified hemolytic streptococcus as the causative agent, but it was not until 1952 that Wilson used the term "necrotizing cervical fasciitis," defined the pathogenesis, and discussed the possible involvement of mixed flora [3]. These are rare and deadly infections for one-third of patients. While they are not specific to the cervicofacial region, dental origin is found in two-thirds of cases in this location [2].

Necrotizing cervical fasciitis is a rare complication of dental infection that can lead to involvement of the neck, mediastinum, and thoracic wall [4]. Although this condition is rarely encountered in developed countries, it remains frequently seen in developing nations where access to quality care is still not a reality, both financially and geographically. Once the diagnosis of necrotizing fasciitis is suspected, intervention is justified [5]. The management is well-defined, relying on wide surgical excision of necrotic tissues combined with antibiotic therapy effective against Gram-negative bacilli and anaerobes [6].

This study aims to report two clinical cases of odontogenic cervicothoracic necrotizing fasciitis at the National Teaching Hospital in Cotonou, Benin, within a context of very limited resources.

2. Case Description and Results

2.1. Case 1

A 63-year-old patient, who is a smoker (11.25 pack-years of cigarettes) on long-term corticosteroid therapy (for sciatica treatment), presented with a painful high cervicothoracic swelling evolving for 14 days following odontalgia from the tooth 37. Examination revealed a conscious patient in a state of shock, with a painful, gangrenous, fluctuating swelling with areas of necrosis affecting the right anterolateral cervical and upper thoracic regions (**Figure 1(A)**); a decayed tooth 37 was observed. Cervicothoracic computed tomography noted abscessed collections in the submandibular, left parapharyngeal, and anterior mediastinal regions with significant subcutaneous emphysema dissecting deeply (**Figure 2**). The diagnosis of cervicothoracic necrotizing fasciitis was established.

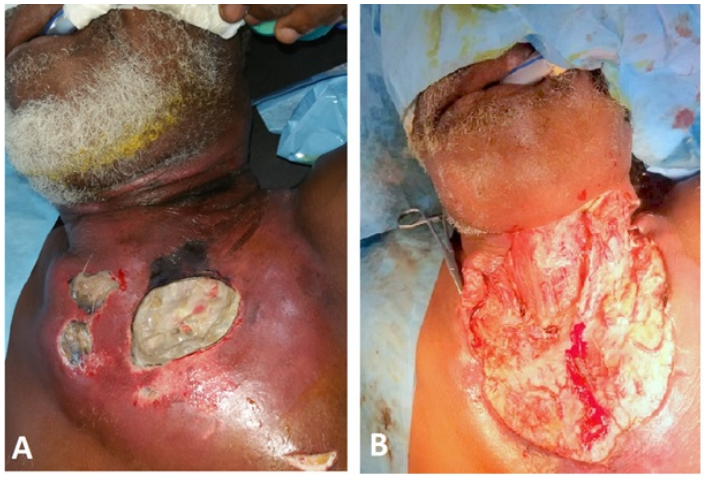

Figure 1. Patient image: (A) = View of the patient with cervicothoracic necrotizing fasciitis; (B) = Intraoperative view after surgical debridement causing loss of cervicothoracic cutaneous-muscular substance.

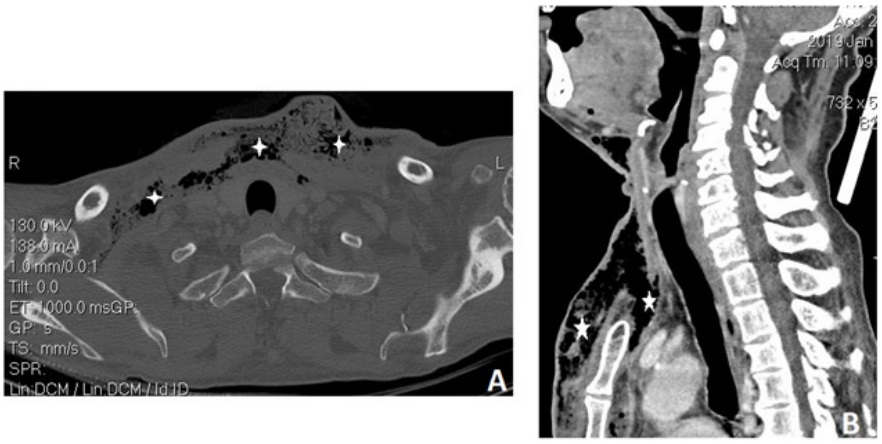

Figure 2. Cervicothoracic CT scan of the patient: (A) = Axial section passing through the cervical region showing air hypodensity indicating soft tissue emphysema; (B) = Sagittal section passing through the cervical and thoracic regions showing air hypodensity indicating emphysema of the pre- and retro-sternal soft tissues.

Surgical debridement with extraction of tooth 37 was performed under general anesthesia after resuscitation, resulting in a tissue loss of approximately 25 × 15 cm, involving the skin and superficial muscles, exposing the cervical muscles and the presternal region (**Figure 1(B)**). Pus culture isolated Escherichia coli sensitive to Fosfomycin and Gentamicin, and *Streptococcus sp* sensitive to Lincomycin.

Postoperative recovery was uneventful, and intravenous antibiotic therapy was adjusted (Lincomycin and Gentamicin), subsequently switched to oral Fosfomycin + Lincomycin, with physical therapy initiated. A soft cervical collar was applied, and local care continued until pus drainage ceased. Directed healing was achieved through natural honey dressings. Granulation was satisfactory on Day 45 (**Figure 3(A)**), and a split-thickness skin graft was performed with favorable progress (**Figure 3(B)**).

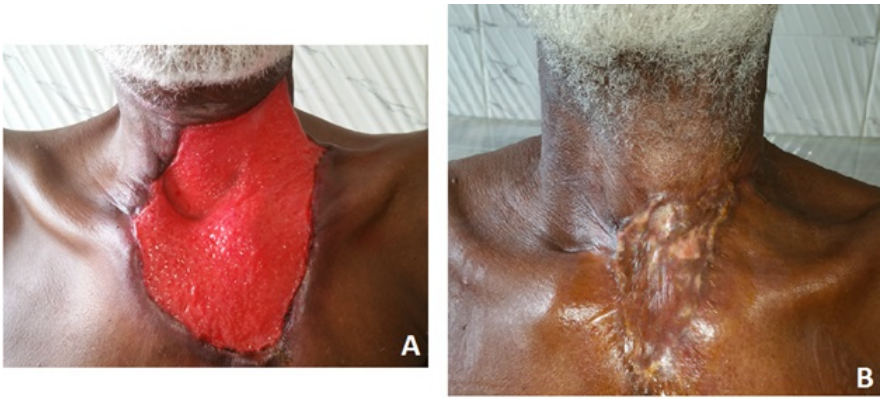

Figure 3. Postoperative images of the patient: (A) = Photograph of the patient showing good budding after healing directed with natural honey; (B) = Result after half-thickness skin grafting.

2.2. Case 2

A 57-year-old poorly managed diabetic female presented with a high cervicothoracic swelling and cervical necrosis evolving for 10 days following odontalgia from tooth 47. The patient had resorted to self-medication with Diclofenac 50 mg + Paracetamol 500 mg and Amoxicillin 500 mg. On examination, a conscious patient with stable hemodynamics exhibited a fluctuating swelling involving the right submandibular, submental, anterior cervical, and upper thoracic regions, with a wide area of anterior cervical necrosis. The diagnosis of high cervicothoracic necrotizing fasciitis was established. Removal of necrotic tissues, drainage of the upper thoracic collection by improvised drains (**Figure 4(A)**), and extraction of the causative tooth were performed.

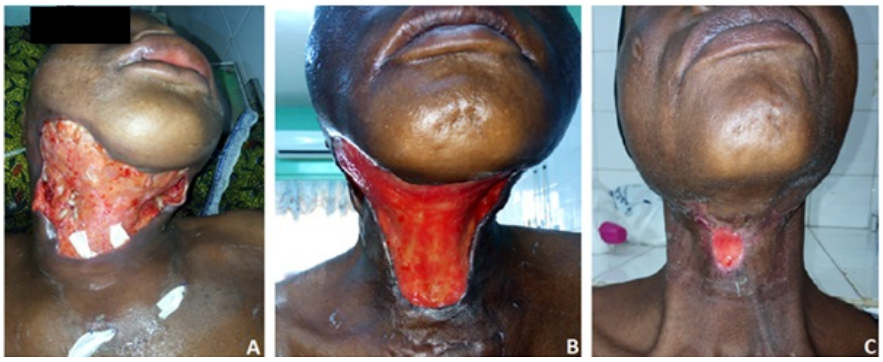

Figure 4. Patient image: (A) = Photograph of the patient showing the loss of substance after debridement and drainage incision; (B) = Effective budding after healing directed with natural honey; (C) = The final result with good re-epidermization.

Empirical triple antibiotic therapy (ceftriaxone + metronidazole + gentamicin), analgesia (Paracetamol + Tramadol), and insulin therapy were initiated. Due to financial constraints, pus culture could not be performed. Surgical debridement resulted in tissue loss involving bilateral submandibular, submental, and cervical regions (anterior, left, and right lateral). After pus drainage ceased, directed heal-

ing with natural honey dressings was initiated from Day 20 post-surgical debridement, leading to satisfactory granulation. Concurrently, oral opening physiotherapy and twice-daily Povidone iodine touch applications were instituted, resulting in reepithelialization at 3 months (**Figure 4(B)** and **Figure 4(C)**).

3. Discussion

These two clinical cases describe the management of odontogenic cervicothoracic necrotizing fasciitis, from diagnosis to recovery. Cervicothoracic necrotizing fasciitis remains a current issue in our context with significant morbidity, and its mortality rate varies from 19% to 40% according to studies [7]. An incidence of 18.33 cases per year of diffuse cellulitis with 21.8% necrotizing diffuse cellulitis and 14.5% mortality was recorded [8]. It is, therefore, a frequent and serious condition constituting a diagnostic and therapeutic emergency. Clinical diagnosis relies on the presence of odontalgia, the rapid development of extensive swelling with necrotic areas, and systemic signs of severe septic syndrome [2].

Patients are severely affected, exhibiting signs of sepsis. The pathogenesis of the disease begins with the liquefaction of subcutaneous tissues, fascial plane disintegration, followed by thrombosis, inflammatory cell infiltration (abscess formation), extension into deep cervical spaces, and arterial involvement. Although this disease can affect immunocompetent patients, immunocompromised individuals are more commonly exposed [2] [3].

Factors associated with our observations included advanced age, smoking, and long-term corticosteroid therapy for Observation 1. It included poorly controlled diabetes and the use of anti-inflammatory drugs for Observation 2. Indeed, anti-inflammatories are often associated with the severity and spread of dental cellulitis due to their mechanisms of action [9].

Self-medication with anti-inflammatories to relieve dental pain is common, noted in 67.7% of patients with cervicofacial cellulitis, with the street being the sole source of these medications [10]. However, the effects of these medications are diverse and may vary according to authors.

Early obtained computed tomography scans provide clinicians with the best chance of recognizing cervical necrotizing fasciitis. Gas bubbles may be visible in the neck around fascial planes and potentially around the carotid artery and jugular vein [11]. Unfortunately, access to computed tomography remains limited for many patients in our context. It was performed in one patient and allowed for a better assessment of the extent of the lesions and improved surgical planning.

Once the diagnosis of necrotizing fasciitis is established, the definitive treatment, which is surgical debridement, must be performed. The surgical principle is fasciotomy, which varies depending on the extent of the disease and the site of infection [12]. The success of the treatment depends on early diagnosis of necrotizing fasciitis followed by aggressive surgical excision, pus drainage, and debridement of necrotic fascia, subcutaneous tissue, and skin involved [3]. The surgical debridement procedure, crucial for prognosis, should anticipate rather than

follow the extension: it is a consequential action [2]. This surgical debridement can result in tissue loss affecting the skin, subcutaneous tissue, and even musculo-aponeurotic planes, which may require later reconstruction.

In addition to surgical treatment, broad-spectrum empirical antibiotics should be administered. Although choices vary from country to country, initial treatment should target the most commonly involved organisms, such as group A streptococci and anaerobes, and nowadays extended to Gram-negatives and Staphylococcus. Typically, the therapeutic regimen begins with triple therapy combining a beta-lactam, an aminoglycoside, and clindamycin or metronidazole [13].

After controlling the infectious process and pus drainage cessation, it is necessary to proceed with the reconstruction of the soft tissue loss caused by necrosis itself and/or during surgical debridement. Given the cervical involvement, treatment must restore function and create satisfactory aesthetics by providing a sufficient quantity and quality of healthy skin. Directed healing is decided when a loss of substance is non-suturable, and the underlying tissue is well vascularized, aiming to avoid certain complications such as retractile bands that are often very disabling. It relies on the process of natural spontaneous healing. The surgeon regularly monitors the wound's evolution and can intervene at all stages of healing [14]. The treatment of odontogenic cervicothoracic necrotizing fasciitis, a serious and potentially fatal disease, in an under-medicalized context is a real challenge. The primary objective is to save life and minimize functional and aesthetic sequelae. Through these two observations, we report satisfactory results despite the limited therapeutic means and methods. The limitation of the study is linked to the small number of cases studied. A study over a longer period with more cases could allow us to better appreciate the impact of our therapeutic approach. As soon as the collection was dried up, we used natural honey, which is available and very affordable for directed healing.

The use of honey, a natural and nutritious product, is effective in treating cutaneous losses of circumscribed or extensive infectious origin. Due to its properties, it reduces healing time, quickly leads to skin grafting, and relieves patients with a shortened hospital stay with very affordable costs. The healing progression was estimated at an average of 0.65 cm^2/day with a total healing time ranging from 2 to 8 weeks [15]. Reconstructive surgery for cutaneous loss of substance can involve complex single- or multi-tissue flap repair techniques, thus restoring both cosmetic and functional components as effectively as possible [16].

4. Conclusion

Serious and potentially fatal pathology, odontogenic cervicothoracic necrotizing fasciitis remains common in developing countries. Sequelae are possible although early treatment is undertaken due to the extensive necrosis almost present.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] De Tullio, D., Rossi, C., *et al.* (2010) Necrotizing Fasciitis: A Surgical Emergency. *Updates in Surgery*, **62**, 83-87. https://doi.org/10.1007/s13304-010-0019-6

[2] Parhiscar, A. and Har-El, G. (2001) Deep Neck Abscess: A Retrospective Review of 210 Cases. *Annals of Otology, Rhinology & Laryngology*, **110**, 1051-1054. https://doi.org/10.1177/000348940111001111

[3] Ord, R. and Coletti, D. (2009) Cervico-Facial Necrotizing Fasciitis. *Oral Disease*, **15**, 133-141. https://doi.org/10.1111/j.1601-0825.2008.01496.x

[4] Faisal, AQ., *et al.* (2009) Report of a Case of Cervicothoracic Necrotizing Fasciitis along with a Current Review of Reported Cases. *Journal of Oral and Maxillofacial Surgery*, **67**, 419-423. https://doi.org/10.1016/j.joms.2008.07.017

[5] Trevor, T., *et al.* (2010) Cervical Necrotizing Fasciitis Originating with a Periapical Infection. *JADA*, **141**, 861-866. https://doi.org/10.14219/jada.archive.2010.0284

[6] Frazee, B.W., Fee, C., Lynn, J., Wang, R., Bostrom, A., Hargis, C., *et al.* (2008) Community-Acquired Necrotizing Soft Tissue Infections: A Review of 122 Cases Presenting to a Single Emergency Department over 12 Years. *The Journal of Emergency Medicine*, **34**, 139-146. https://doi.org/10.1016/j.jemermed.2007.03.041

[7] Maria, A. and Rajnikanth, K. (2010) Cervical Necrotizing Fasciitis Caused by Dental Infection: A Review and Case Report. *National Journal of Maxillofacial Surgery*, **1**, 135-138. https://doi.org/10.4103/0975-5950.79215

[8] Vodouhe, U.B., Gouda, N., Zounon, A.D.S., Beheton, R., Afouda, S.L., Avakoudjo, F., *et al.* (2022) Diffuse Cervico-Facial Cellulitis: Epidemiological, Diagnostic and Therapeutic Aspects at the Teaching Hospital CNHU HKM of Cotonou. *International Journal of Otolaryngology and Head & Neck Surgery*, **11**, 266-276. https://doi.org/10.4236/ijohns.2022.115028

[9] Nicota, R., *et al.* (2013) Do Anti-Inflammatories Aggravate Facial Cellulitis of Dental Origin? *Revue de Stomatologie, de Chirurgie Maxillo-Faciale et de Chirurgie Orale*, **114**, 304-309.

[10] Salami, A., *et al.* (2017) Anti-Inflammatories Sold in the Street and Ontogenic Cervicofacial Cellulitis at Treichville University Hospital. *Revue Internationale du Collège d'Odonto-Stomatologie Africain et de Chirurgie Maxillo-Faciale*, **24**, 42-44. https://www.revues-ufhb-ci.org/?parcours=revues&desc=4&pari=332

[11] Becker, M., Zbären, P., Hermans, R., Becker, C.D., Marchal, F., Kurt, A.M., *et al.* (1997) Necrotizing Fasciitis of the Head and Neck: Role of CT in Diagnosis and Management. *Radiology*, **202**, 471-476. https://doi.org/10.1148/radiology.202.2.9015076

[12] Ali, A.H., Salahuddin, Z., Ismail, H., Mohd Sofi, A.I. and Mohamad, I. (2017) Debridement of Facial Necrotizing Fasciitis via Bicoronal Flap. *Egyptian Journal of Ear, Nose, Throat and Allied Sciences*, **18**, 287-289. https://doi.org/10.1016/j.ejenta.2017.07.003

[13] Cruz Toro, P., Callejo Castillo, À., Tornero Saltó, J., González Compta, X., Farré, A. and Maños, M. (2014) Cervical Necrotizing Fasciitis: Report of 6 Cases and Review of Literature. *European Annals of Otorhinolaryngology, Head and Neck Diseases*, **131**, 357-359. https://doi.org/10.1016/j.anorl.2013.08.006

[14] Bach, C., *et al.* (2011) Scars, Healing, Directed Healing, Dressings and Treatment of After-Effects. In: Bessède, J.-P., Ed., *Reconstructive Surgery of the Face and Neck*, Elsevier Masson, 51-54. https://www.em-consulte.com/article/700529/cicatrices-cicatrisation-cicatrisation-dirigee-pan

[15] Kadre, A., *et al.* (2016) The Use of Honey in Post-Infectious Skin Loss of Dental Origin. Annals of the Abdou Moumouni University.

[16] Albert, S., *et al.* (2011) Principles and Techniques for Repairing Skin Defects of the Face and Neck. Major Reconstructions: Pedicled Flaps and Micro Anastomosed Flaps. In: Bessède, J.-P., Ed., Reconstructive Surgery of the Face and Neck, Elsevier Masson, 108-156.
https://www.em-consulte.com/article/700500/principes-et-techniques-de-reparation-des-pertes-d