https://doi.org/10.5327/2525-5711.513
J. Oral Diagn 2026;11:e513

CASE REPORT

USE OF NEGATIVE PRESSURE WOUND THERAPY (NPWT) IN ODONTOGENIC CERVICAL NECROTIZING FASCIITIS (OCNF): A CASE REPORT

Diana Sofía Pedraza-Alonso[1],

Cristian Camilo Torres-Alvarez[1],

Andrés Felipe Fernández-Macías[1],

Juan Sebastián Pérez-Acosta[1],

Juan Pablo Rodríguez-Mora[1*]

ORCIDs:

DSPA: https://orcid.org/0009-0008-0440-9897

CCTA: https://orcid.org/0009-0000-5571-4121

AFFM: https://orcid.org/0009-0006-1106-9523

JSPA: https://orcid.org/0009-0004-2869-6481

JPRM: https://orcid.org/0009-0009-3198-1861

[1]School of Dentistry, Universidad Nacional de Colombia, Bogotá D.C. – Colombia

***Corresponding author:** Juan Pablo Rodríguez Mora, email: jrodriguezmor@unal.edu.co, School of Dentistry, Universidad Nacional de Colombia, Bogotá D.C. – Colombia*

Received on July 4th, 2026. Accepted on August 11th, 2026.

Abstract

Odontogenic cervical necrotizing fasciitis (OCNF) is a rare and potentially life-threatening condition that requires prompt diagnosis and management. We present the case of a 55-year-old woman under conditions of social neglect, with a history of morbid obesity and hypothyroidism, who presented with a 15-day history of cervical pain and swelling. Physical examination revealed extensive anterior cervical necrosis and a fetid odor, associated with a mandibular odontogenic source. Initial contrast-enhanced computed tomography showed subcutaneous emphysema, fluid collections with air foci, and extension into deep cervical spaces, as well as thrombosis of the internal jugular vein. Broad-spectrum intravenous antibiotic therapy and intensive care unit management were initiated, followed by aggressive surgical debridement, negative pressure wound therapy (NPWT), and surgical reconstruction, with a favorable outcome.

Keywords: cervical necrotizing fasciitis, negative pressure wound therapy, odontogenic infection, case report.

CLINICAL OF SIGNIFICANT STATEMENT

Odontogenic cervical necrotizing fasciitis demands early recognition and aggressive multidisciplinary management; integrating NPWT after infection control may enhance wound healing, reduce surgical burden, and improve functional and aesthetic outcomes in complex cervicofacial infections.

Introduction

Cervical necrotizing fasciitis (CNF) is a life-threatening polymicrobial infection, predominantly anaerobic, characterized by an aggressive course and high mortality (1-3). Approximately 47.04% of cases came from odontogenic sources, followed by pharyngeal, tonsillar, and traumatic causes (3). Systemic comorbidities such as diabetes mellitus, obesity, immunosuppression, chronic kidney disease, alcoholism, and malnutrition increase the risk and severity of the disease (1-3). This condition spreads rapidly along subcutaneous tissue and the superficial and deep cervical fascia, initially presenting with severe pain, erythema, and edema, and progressing to necrosis due to small-vessel thrombosis, blister formation, dysphagia, systemic signs of sepsis, and muscle involvement in advanced stages (1–3).

Contrast-enhanced computed tomography (cCT) is the gold standard imaging modality to confirm the diagnosis and delineate the anatomical extent, identifying pathognomonic gas foci and fluid collections in soft tissues and involvement of deep cervical spaces (1). Although diagnosis is primarily clinical and imaging-based, the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score may be used for risk stratification and should be integrated with surgical exploration and histopathological findings (1).

NPWT is a closed system that applies controlled subatmospheric pressure (−55 to −125 mmHg) to the wound bed, generating mechanical forces that promote a moist and protected microenvironment (4). In the 1990s, Morykwas et al. described NPWT mechanisms: enhanced granulation, reduced edema, and improved perfusion (4,5). It also promotes macrodeformation, mechanotransduction, angiogenesis, and lymphangiogenesis, partly mediated by hypoxia and overexpression of vascular endothelial growth factor (VEGF) (4). We present a case of OCFN managed with NPWT and local rotation flaps, with a favorable clinical outcome.

Case Report

A 55-year-old female under conditions of social neglect, with a history of morbid obesity (BMI: 42.5 kg/m²) and hypothyroidism on replacement therapy, presented to the emergency department with a 15-day history of progressive anterior neck pain and a sensation of local warmth. Upon admission, the patient was afebrile, with blood pressure of 91/66 mmHg, heart rate of 82 bpm, and oxygen saturation of 89%.

Physical examination revealed a marked deformity of the anterior cervical triangle, with extensive necrosis and two fistulous tracts with fetid purulent drainage (Figure 1). Intraoral examination identified multiple mandibular root remnants in the left hemiarch associated with purulent exudate, erythema, and edema. The patient reported prior self-medication with oral ampicillin/sulbactam (sultamicillin) for eight days without clinical improvement.

Figure 1. (A and B). Clinical image showing fistulous tracts with active purulent drainage and necrotic tissue in the anterior and lateral cervical regions.

The patient was admitted to the intensive care unit (ICU) for close monitoring, and empiric broad-spectrum intravenous antibiotic therapy with vancomycin (1 g IV cada 12 horas), piperacillin/tazobactam (4.5 g IV cada 6 horas), and clindamycin (600 mg IV cada 6 horas) was initiated. Laboratory studies showed leukocytes (10,870/µL), neutrophils 53.5%, hemoglobin 15.5 g/dL, hematocrit 48.3%, and mild thrombocytosis (411,000/µL), as well as hypochloremia (92 mEq/L) and mild hyponatremia (131 mEq/L), with preserved renal function.

cCT revealed extensive subcutaneous emphysema, multiple fluid collections with peripheral enhancement and internal gas foci in the left submandibular region, extending to laterocervical and perivascular spaces (Figure 2). In addition, floor of mouth involvement, narrowing of the laryngeal lumen, and left internal jugular vein thrombosis were observed. These clinical and

radiological features were highly suggestive of OCNF. However, a complete LRINEC score could not be definitively calculated due to the absence of C-reactive protein and serum glucose levels, which represents a limitation of the present case.

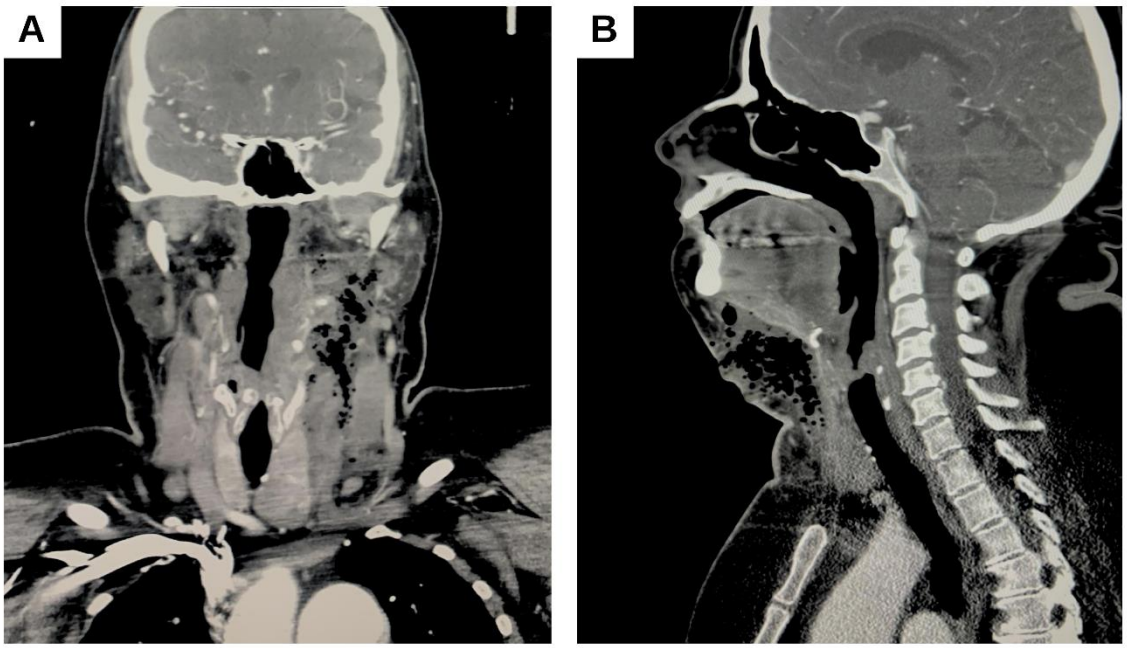

Figure 2. Contrast-enhanced cervical computed tomography (CT). (A) Coronal plane demonstrating emphysema within the lateral deep cervical spaces. (B) Sagittal plane showing extension of emphysema into the submandibular region with narrowing of the laryngeal airway, suggestive of impending airway compromise

Urgent surgical management under general anesthesia was performed. During the primary stage, the general surgery team performed drainage of collections and radical debridement of necrotic tissues until reaching viable planes. Involvement of the subcutaneous tissue and platysma muscle was noted, with the infection extending into the deep cervical spaces, including the pterygoid region and the cricothyroid area. The wound was irrigated copiously with saline (4,000 mL). In a second surgical stage, the oral and maxillofacial surgery team

performed multiple extractions of the mandibular root remnants. The debridement material was sent for culture; however, processing was unsuccessful, representing a limitation in the present case.

During the hospital course, the patient required multiple reinterventions for serial surgical debridement. Once the infectious process was controlled, NPWT at −45 mmHg was initiated for seven days. Dressing changes were performed every 24 hours, facilitating the formation of healthy granulation tissue. Subsequently, reconstruction was performed using local rotation flaps by the plastic surgery team.

The patient remained in the ICU for one month, requiring invasive mechanical ventilation, hemodynamic support with vasopressors and inotropes, continuous sedation and analgesia, and pharmacologic thromboprophylaxis. Urine and blood cultures were negative. Therefore, empiric antibiotic therapy was maintained until the end of the hospital stay. Parenteral nutrition was initiated during hospitalization.

The clinical course was ultimately favorable, with resolution of the infectious process and adequate wound closure. At the two-month follow-up, the patient presented with a mild limitation in cervical mobility as a functional sequela (Figure 3).

Figure 3. Clinical image of the cervical region for 2 months following surgical management and NPWT. Satisfactory wound closure and an acceptable aesthetic outcome are observed.

Discussion

OCNF management is complex and often constitutes a surgical emergency due to the potential for airway compromise. It requires prompt control of the infectious source, intensive care support, and early radical surgical debridement combined with broad-spectrum intravenous antibiotics (1–3). The Chinese consensus guidelines on necrotizing fasciitis recognize the Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score as an adjunctive tool for early risk stratification (1), with high scores being highly suggestive of the disease. However, a low score or the inability to calculate it due to missing parameters does not exclude the diagnosis. Furthermore, several clinically relevant limitations have been described that may affect its sensitivity, including anatomical location, patient comorbidities, the type of microorganism involved, renal function, and the presence of peripheral vascular disease (1). In

cervical infections, surgical exploration, histopathological examination, and computed tomography may provide greater diagnostic value than laboratory-based scoring systems (1).

Current international guidelines recommend broad-spectrum antibiotic regimens as initial empiric therapy: clindamycin + meropenem + vancomycin as first-line; piperacillin/tazobactam + vancomycin + clindamycin as second-line; and imipenem/cilastatin + vancomycin or ceftriaxone + clindamycin + vancomycin as third- and fourth-line alternatives (1). In the present case, a second-line regimen was selected based on institutional availability and was maintained, as both blood and urine cultures were negative. The continuation of broad-spectrum empiric antibiotic therapy was supported by the pathophysiology of OCNF and its high mortality. In this context, antimicrobial therapy should be maintained and adjusted according to the clinical course, without modification based on negative blood and urine culture results. Evidence recommends guiding antibiotic de-escalation based on cultures of necrotic tissue or exudate obtained during surgical debridement (1); however, in this case, it was not possible to obtain samples for culture, which constitutes a limitation.

Several adjunctive strategies, such as flaps, grafts, hyperbaric oxygen therapy, and NPWT, may be used to optimize wound healing and functional recovery (1, 5, 6). In our case, following control of the infectious focus and patient stabilization, NPWT was safely integrated into the management of OCNF, with benefits that potentially outweigh its limitations. Among its documented advantages, NPWT modulates the local inflammatory response by decreasing proinflammatory cytokines and promoting macrophage polarization toward a reparative (M2) phenotype (4). Although a reduction in bacterial load has been suggested, this effect remains controversial and continues to be a subject of debate in the literature (4).

Its application in the cervicofacial region remains less frequently documented due to difficulties in achieving an airtight seal on anatomically complex surfaces (5). In the present

case, NPWT did not pose any difficulty and served as a bridging strategy to optimize the surgical wound bed, enabling a less extensive reconstructive approach using local rotation flaps, with favorable functional and aesthetic outcomes, similar to those reported in a previous case (7). Nevertheless, NPWT may serve as a favorable environment for split-thickness skin grafting (8), or it can be used as monotherapy in conjunction with antibiotic therapy, without necessarily requiring reconstructive interventions, thereby achieving excellent outcomes (9). However, this largely depends on the extent of the defect, which may require additional procedures.

In this context, NPWT can reduce the complexity of such interventions, particularly due to its macrodeformation effect, which significantly decreases the size of the defect to be reconstructed, with the aim of preserving healthy tissue and promoting adequate wound healing. Indeed, Wang et al. (2025) have demonstrated reductions in the number of reinterventions, hospital stay, and treatment costs, as well as improvements in inflammatory markers and tissue repair factors (10).

Conclusion

OCNF is a highly complex and potentially life-threatening condition that requires early diagnosis and multidisciplinary management. Early and aggressive surgical debridement, along with broad-spectrum intravenous antibiotic therapy, remains the gold standard of care. NPWT is a cost-effective adjunctive strategy that optimizes healing, improves the wound bed, and may contribute to better functional and aesthetic outcomes when used after an effective control of the infectious process.

ACKNOWLEDGMENTS

The authors thank the clinical teams involved in the patient's care. Juan Pablo Rodríguez-Mora also acknowledges Laura Manuela Amaya-Rincón for her valuable comments during the manuscript preparation.

AUTHORS' CONTRIBUTIONS

DSPA: Conceptualization, Data curation, Writing – original draft. **CCTA:** Data curation, Investigation, Writing – original draft. **AFFM**: Data curation, Investigation, Writing – original draft. **JSPA:** Data curation, Investigation, Writing – original draft**. JPRM :** Data curation, Investigation, Writing – original draft, Writing – review & editing.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

Funding: This research received no external funding**.**

Competing interests: The authors have no relevant financial or non-financial interests to disclose.

Ethics approval: Ethical approval for this case report was not required in accordance with institutional and national guidelines. Written informed consent was obtained from the patient.

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