Int. J. Odontostomat.,
19(1):28-33, 2025.

Management of Cervicofacial Necrotizing Fasciitis of Peritonsillar Origin: A Case Report

Manejo de la Fascitis Necrotizante Cervicofacial de Origen Peritonsilar: Reporte de Caso

Pedro Tapia Contreras[123]; Gustavo Matus-Miranda[4]; Jessica Zeballos Cofré[1]; Melissa Carvajal Guzmán[5]; Florencia Jollán Peña[6] & Sofía Díaz Abarza[6]

TAPIA, C. P.; MATUS-MIRANDA, G.; ZEBALLOS, C. J.; CARVAJAL, G. M.; JOLLÁN, P. F. & DÍAZ, A. S. Management of cervicofacial necrotizing fasciitis of peritonsillar origin: A case report. *Int. J. Odontostomat., 19(1)*:28-33, 2025.

ABSTRACT: Necrotizing fasciitis (NF) is a rare, rapidly progressing, and severe infection of subcutaneous tissues and muscle fascia that can be fatal. It causes rapid tissue necrosis through pathogen-induced vasoconstriction and thrombosis. While commonly found in the torso, abdomen, and limbs, it rarely affects the head and neck. Effective treatment includes early diagnosis, surgery, antibiotics, and hyperbaric oxygen therapy, though mortality remains high. A 40-year-old man with a history of uncontrolled diabetes mellitus (DM) presented with increased volume, erythema, and cramps in the cervical and upper thoracic area. The main diagnosis was NF, requiring surgical debridement of the affected tissue. Despite therapeutic efforts, the patient succumbed to sepsis and multiple organ failure. NF is a life-threatening infection with a very low incidence but a high mortality rate. Cervical NF often arises from odontogenic infections and is associated with systemic factors like diabetes and obesity. Early diagnosis is challenging, but Computed tomography (CT) and the Laboratory risk indicator score for necrotizing fasciitis (LRINEC) score are essential. Effective treatment includes surgical debridement, broad-spectrum antibiotics, and hyperbaric oxygen therapy. NF remains a critical condition with high mortality, underscoring the need for early recognition and aggressive treatment strategies to improve patient outcomes.

KEY WORDS: case report, fasciitis, necrotizing, soft tissue infections, head, neck.

INTRODUCTION

Necrotizing fasciitis (NF) is a serious and rare disease (Böttger *et al*., 2022; Hua & Friedlander, 2023) characterized by a highly progressive and potentially fatal soft tissue infection that especially affects the subcutaneous tissues and muscle fascia (Wolf *et al*., 2010; Abdurrazaq *et al*., 2016; Balcı *et al*., 2018; Jin *et al*., 2021). Hippocrates was the first to recognize NF in 500 BC (Sahoo *et al*., 2022). He described the condition as causing "great falling off the flesh, tendons, and bones; and the defluxion that seated in the parts was not like pus, but a kind of putrefaction" (Gunaratne *et al*., 2018). The term "necrotizing fasciitis" was first used by Wilson in 1952 (Choi, 2015; Abdurrazaq *et al*., 2016; Gunaratne *et al*., 2018; Sahoo *et al*., 2022) when describing a series of staphylococcal infections (Gunaratne *et al*., 2018).

The etiopathogenesis of NF follows invasion and obstruction of blood vessels by pathogens, which, through their toxins and enzymes, produce vasoconstriction and thrombosis, facilitating the spread of the pathogen and causing necrosis of the subcutaneous tissue and fascia (Balcı *et al*., 2018). It has been reported that soft tissue necrosis can progress as fast as 1 in. an hour (Balcı *et al*., 2018).

Regarding its location, NF is most frequently recorded in the thorax, abdominal wall, limbs,

[1] Maxillofacial Surgeon, Department of Oral and Maxillofacial Surgery, Hospital Dr. Franco Ravera Zunino, Rancagua, Chile.
[2] Maxillofacial Surgeon, Red Salud Vitacura Clinic, Santiago, Chile.
[3]Cathedra of Maxillofacial Surgery and Traumatology, Universidad del Desarrollo, Santiago, Chile.
[4] Resident, Oral and Maxillofacial Surgery, Universidad de Chile, Santiago, Chile.
[5] Maxillofacial Surgeon, Universidad del Desarrollo, Santiago, Chile
[6] Dental Surgeon, Universidad del Desarrollo, Santiago, Chile.

Received: 2024-07-17 Accepted: 2024-10-13

perineum, and groin (Gunaratne *et al*., 2018; Chen *et al*., 2019; Jin *et al*., 2021). It is rare within the head and neck region (Abdurrazaq *et al*., 2016; Gunaratne *et al*., 2018; Chen *et al*., 2019; Jin *et al*., 2021), with an incidence of approximately 1 % – 10 % of all cases (Gunaratne *et al*., 2018; Böttger *et al*., 2022), This could be associated with the relatively high vascularity of the area (Abdurrazaq *et al*., 2016). Cervicofacial necrotizing fasciitis (CNF) is usually polymicrobial in nature with streptococcal predominance, patients usually present with underlying systemic factors such as uncontrolled diabetes mellitus and nutritional deficiencies (Abdurrazaq *et al*., 2016). CNF can develop from dental, sinus, peritonsillar, and salivary gland infection, including infection secondary to surgery, and superinfections from insect bites or trauma have also been described (Cortese *et al*., 2017). However, when CNF occurs, the most common cause is dental infections (Abdurrazaq *et al*., 2016; Cortese *et al*., 2017).

There are treatment guidelines for NF, which promote the early use of diagnostic tools, radiologic investigations such as multislice helical computed tomography (CT), acute surgical debridement, broad-spectrum antibiotics, immunoglobulin, and hyperbaric oxygen (HBO) therapy (Wolf *et al*., 2010). Despite major advances in critical care medicine, NF still has a very high mortality rate (Chen *et al*., 2019).

In view of the above, we present the case of a 40-year-old man diagnosed with NF, describing the diagnosis, clinical and imaging course, and therapeutic approach.

CASE REPORT

A 40-year-old man with a history of uncontrolled diabetes mellitus (DM) consulted the emergency department of the Hospital Dr. Franco Ravera Zunino, Rancagua, Chile. He had experienced tonsillar pain and respiratory distress that had evolved over one week. He was evaluated by different specialists. Maxillofacial physical examination revealed evidence of increased volume, erythema, and cramp in the cervical and upper thoracic area (Fig 1). Laboratory tests were requested, with the following notable results: glycosylated haemoglobin (HbA1c) 15 %; blood glucose 265 mg/dL; creatinine 3 mg/dL; haematocrit 30 %; leukocytes: 20 × 10^9 /L; C-reactive protein (CRP) 180 mg/dL; haemoglobin 13.2 g/dL; and sodium 129.8 mEq/L.

Despite the patient's renal failure, CT with contrast was authorised due to the high vital risk. Extensive subcutaneous emphysema was observed in the superficial and deep tissues of the neck, predominantly on the left side, extending towards the subcutaneous tissue of the upper thorax, pre-sternal area, and mediastinum (Fig 2). Empirical antibiotic treatment was initiated with 600 mg of clindamycin every 8 hours in conjunction with 2 g of ceftriaxone every 24 hours. He was hospitalised for medical and surgical management due to high suspicion of CNF of peritonsillar origin.

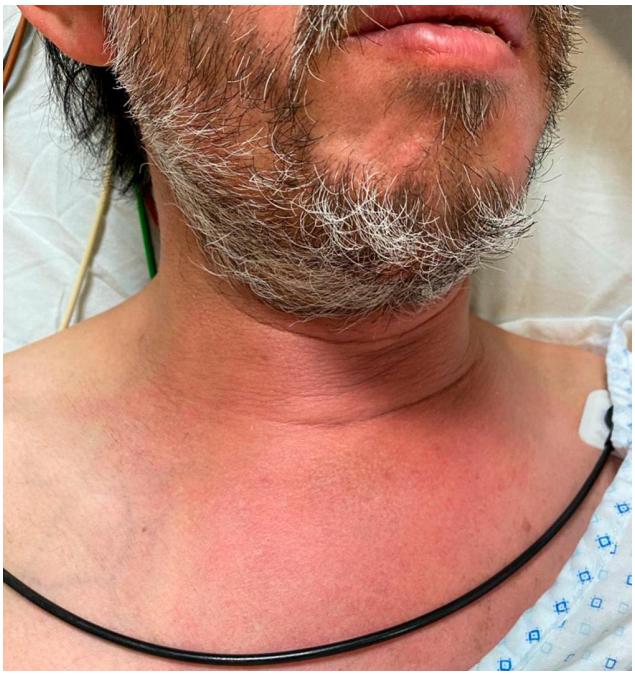

Figure 1. Maxillofacial physical examination: increased volume, erythema and cramps in the cervical and upper thoracic area are evidenced.

Surgical treatment in the hours following the diagnosis involved a multidisciplinary intervention. The maxillofacial surgery team (CMF) performed a bilateral cervicotomy and drained the cervical abscess. Necrosis of the platysma muscle and the underlying muscle planes was confirmed, in addition to dissection of cervical spaces and the floor of the mouth (Fig 3), from which current culture, anaerobes, and biopsies of bilateral muscle tissue were taken. A rapid biopsy was also taken to rule out mucormycosis infection. The general surgery team accessed the thoracic cavity for drainage as well as a sternotomy, which allowed them to observe the mobile and necrotic sternal manubrium (Fig 4). Finally, three Jackson Pratt drains were placed, and the tissue was closed.

In the immediate postoperative period in the intensive care unit (ICU), interdisciplinary treatment with the CMF, infectious diseases, head and neck surgery (HNS), internal medicine, and otorhinolaryngology teams was performed. Two days after the first surgery, a second surgery to wash and debride necrotic tissue was performed by the HNS team. However, on the fifth day of hospitalisation, the patient developed multiorgan failure due to septic shock, which led to his death.

The culture result was obtained after death, showing colonies of methicillin-resistant *Streptococcus* pyogenes, sensitive only to vancomycin.

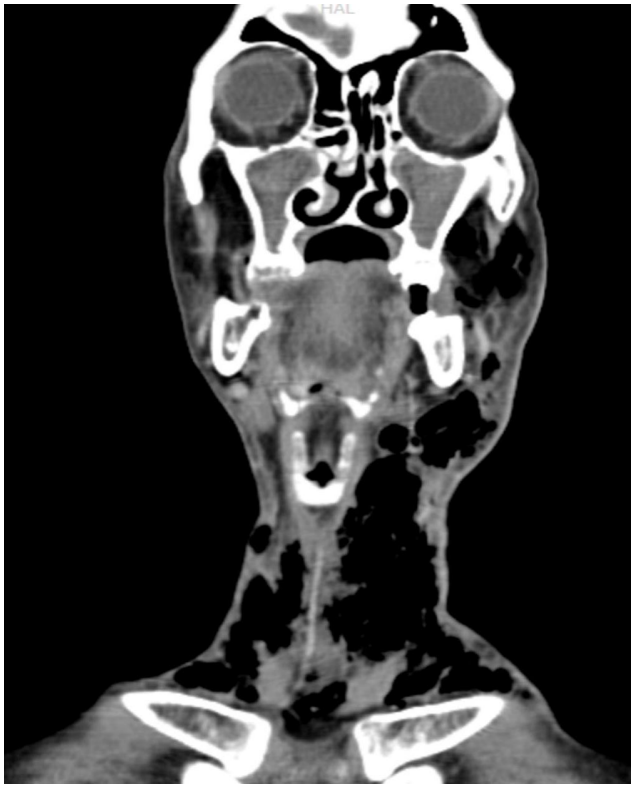

Fig. 2. CT with contrast. Coronal view: Extensive subcutaneous emphysema in superficial and deep tissues of the neck, predominantly on the left side, extending into the subcutaneous tissue of the upper thorax, presternal area and mediastinum.

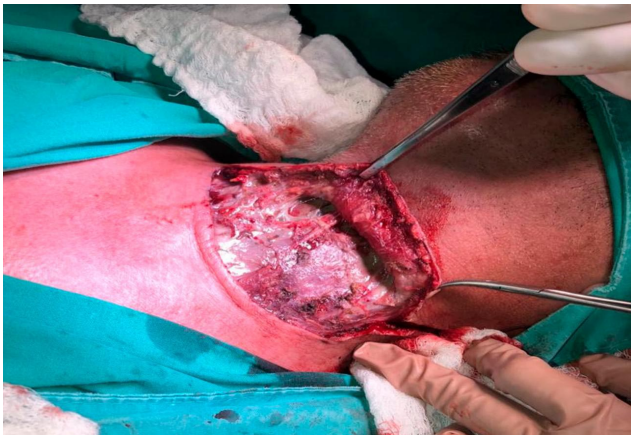

Fig. 3. Bilateral cervicotomy where necrosis of the platysma and underlying muscle planes is observed, in addition to dissection of the cervical spaces and the floor of the mouth.

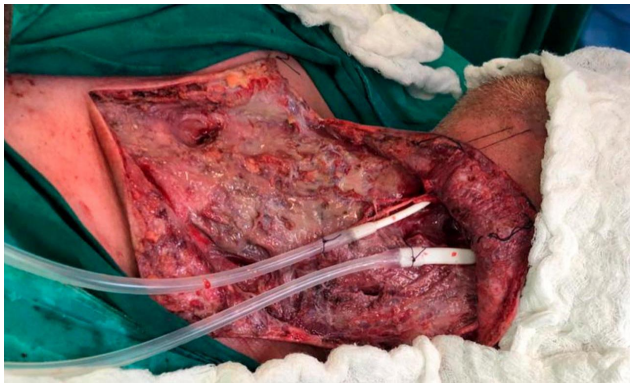

Fig. 4. Access to the thoracic cavity for drainage and sternotomy, where the mobile and necrotic sternal manubrium can be observed.

DISCUSSION

NF is a dangerous and rare disease with an incidence of 0.004 %–0.001 % (Jin *et al*., 2021), and it is often fatal (Gunaratne *et al*., 2018). The most frequent cause of cervical NF is odontogenic infections, followed by parapharyngeal interstitial and peritonsillar infections (Jin *et al*., 2021). Patients with this pathology usually present underlying predisposing factors (Abdurrazaq *et al*., 2016), including DM, alcoholism, cirrhosis, arteriosclerosis, HIV, corticosteroid therapy, chronic renal failure, malignancy, intravenous drug abuse, immunosuppression and obesity (Gunaratne *et al*., 2018), these last two being the most common (Hua & Friedlander, 2023). On the other hand, Abdurrazaq *et al*. (Abdurrazaq *et al*., 2016) reported that poor glycemic control is the most frequent predisposing systemic factor, implicated in 20 %–78 % of the reported cases, as presented in our report, in addition to renal failure. However, there are reports of NF in patients without immunosuppression (Abdurrazaq *et al*., 2016) and in young, healthy individuals without predisposing risk factors (Wolf *et al*., 2010; Hua & Friedlander, 2023).

NF is classified into three categories: type I, polymicrobial infections; type II, group A streptococcal infections, usually *S. pyogenes*, which was found predominantly colonizing the infection in the case

described in this article; and type III, gram-negative marine organisms, mainly *Vibrio vulnificans* (Hua & Friedlander, 2023). Jin *et al*. (Jin *et al*., 2021) stated that the pathogens of NF are mostly mixed bacterial infections, with Hemolytic *Streptococcus* A. and *Staphylococcus* spp. being the most common pathogens causing NF.

Initially, CNF is rarely suspected due to its low incidence (Choi, 2015). Only 15 %–34 % of patients with NF have an accurate admitting diagnosis (Hua & Friedlander, 2023), because the signs and symptoms of NF in the early stages are virtually indistinguishable from those seen in abscesses and cellulitis, making a definitive diagnosis difficult (Choi, 2015; Hua & Friedlander, 2023). NF presents a constellation of findings that could help orient the diagnosis to NF, characterized by intense pain with a greater extension of the areas evidently affected, in addition to being disproportionate with respect to the examination (Hua & Friedlander, 2023). On the other hand, as the disease progresses, clinical signs become more identifiable (Hua & Friedlander, 2023). Findings include bullae, ecchymosis, skin and muscle necrosis, gas in the tissue identified as crepitus on physical examination and cutaneous anesthesia secondary to dermal necrosis; however, these occur in the minority of cases (7 %–44 %) (Hua & Friedlander, 2023).

There are several useful modalities to support the diagnosis, including laboratory evaluation, imaging evaluation, and surgical exploration (Hua & Friedlander, 2023). Wong *et al*., (Wong *et al*., 2004; Cortese *et al*., 2017; Gunaratne *et al*., 2018) proposed a laboratory risk indicator score for necrotizing fasciitis (LRINEC), which is based on leukocyte count, hemoglobin (Hb), sodium, glucose, serum creatinine, and Creactive protein (CRP) (Table I). The maximum score on this scale is 13 points; a score of ≥ 6 raises suspicion for NF and a score of ≥ 8 is strongly predictive of NF (Wong *et al*., 2004; Cortese *et al*., 2017; Balcı *et al*., 2018; Hua & Friedlander, 2023). We applied this scale to diagnose our patient; his score was 10 points, which correlates with a high suspicion of NF. However, this score based on laboratory parameters is the subject of controversy by some authors (Böttger *et al*., 2022).

Diagnostic imaging of CNF also plays a fundamental role in the diagnosis, planning of surgical debridement, evaluation of the response to treatment, and identification of disease progression (Gunaratne *et al*., 2018). Magnetic resonance imaging (MRI) has shown a sensitivity of 100 % and a specificity of 86 %, although there is a possibility that this test does not show early cases of fascial involvement of NF (Hua & Friedlander, 2023). Other authors have stated that when NF is suspected, it is essential to quickly perform a CT scan (Choi, 2015; Gunaratne *et al*., 2018). Choi *et al*. (Choi, 2015) wrote that CT is more sensitive than other imaging techniques because it shows inflammatory changes, such as edema and thickening of the fascia or abscesses. This view is similar to that of Jin *et al*. (Jin *et al*., 2021), who consider it essential to perform CT because it is one of the most reliable methods of diagnosis and follow-up. Regardless of the imaging modality chosen, gas in the tissues had been considered a hallmark of NF, Although gas accumulation is not a consistent finding (Choi ,2015), called the "bubble sign" (Jin *et al*., 2021). This sign was essential to diagnose the disease in our case. We observed extensive subcutaneous emphysema in superficial and deep tissues of the neck, predominantly on the left side, extending toward the subcutaneous tissue of the upper thorax, presternal area, and mediastinum.

Table I. Laboratory risk indicator for necrotizing fasciitis score (LRINEC)

LRINEC SCORE	Value	Score
C-reactive protein (mg/l)		
	<150	0
	>150	4
Hemoglobin (g/dL)		
	>13,5	0
	11-13,5	1
	>11	2
Total Leucocyte count (cells/uL)		
	<15.000	0
	15.000-25.000	1
	>25.000	2
Creatitin (mg/dL)		
	<1,6	0
	>1,6	1
Serum Sodium (mmol/L)		
	>135	0
	<135	2
Blood Glucose Level (mg/dL)		
	<180	0
	>180	1

Treatment of NF consists of empirical antibiotic therapy, which should include coverage against gram-positive, gram-negative, and anaerobic bacteria, such as vancomycin or linezolid plus piperacillin-tazobactam (Hua & Friedlander, 2023). In addition, as presented in this case report, possible methicillin-resistant *Staphylococcus* aureus (MRSA) infection should be considered and appropriate treatment initiated (Hua &

Friedlander, 2023). However, the mainstay of treatment for NF is radical surgical debridement and drainage (Balcı *et al*., 2018; Gunaratne *et al*., 2018; Chen *et al*. 2019; Hua & Friedlander, 2023). Several studies have shown that the only significant parameter for a satisfactory outcome is an early and wide surgical debridement; the benefit is attributed to the removal of necrotizing tissue, decreasing the amount of bacteria present, and consequently slowing down the biochemical mechanisms of the disease (Wolf *et al*., 2010). Wolf *et al*. (Wolf *et al*., 2010) and Gunaratne *et al*. (Gunaratne *et al*., 2018) reported that the addition of intravenous immunoglobulin reduces mortality in patients with severe group A streptococcal infections by inhibiting the activity of superantigen-related exotoxins secreted, reversal of the hyperproliferation of T-cells and downregulation of the production of tumor necrosis factor. Furthermore, HBO improves the prognosis of patients with this disease, reducing mortality, the duration of hospitalization, and the number of surgical debridements required (Wolf *et al*., 2010; Gunaratne *et al*., 2018). In one study, multimodal treatment significantly reduced the mortality rate from 75 % to 0% (Wolf *et al*., 2010)

NF maintains a high mortality rate (21.9%-30 %) (Abdurrazaq *et al*. 2016) despite the use of antibiotics and the promotion of intensive care (Chen *et al*., 2019). Mortality reduction depends on early diagnosis and prompt aggressive treatment (Choi, 2015) because once patients manifest signs of shock, mortality exceeds 50% (Hua & Friedlander 2023). However, Jin *et al*. (Jin *et al*., 2021) reported that although the mortality rate of NF is relatively high, there is almost no recurrence of NF after it is cured.

CONCLUSION

Necrotizing fasciitis (NF) is a rare but life-threatening infection with a high mortality rate, often exacerbated by underlying systemic conditions. Early recognition and aggressive management, including prompt surgical debridement, broad-spectrum antibiotics, and supportive therapies like hyperbaric oxygen, are crucial for improving patient outcomes. Despite advances in treatment, the disease's rapid progression and high fatality underscore the need for heightened clinical vigilance and multidisciplinary care. Continued research is essential to refine diagnostic criteria and treatment protocols to reduce mortality and enhance the effectiveness of NF management strategies.

TAPIA, C. P.; MATUS-MIRANDA, G.; ZEBALLOS, C. J.; CARVAJAL, G. M.; JOLLÁN, P. F. & DÍAZ, A. S. Manejo de la fascitis necrotizante cervicofacial de origen peritonsilar. Reporte de caso. *Int. J. Odontostomat., 19(1)*:28-33, 2025.

RESUMEN: La fascitis necrosante (FN) es una infección rara, de rápida progresión y grave de los tejidos subcutáneos y la fascia muscular que puede ser fatal. Causa necrosis tisular rápida a través de la vasoconstricción y trombosis inducidas por patógenos. Aunque se encuentra comúnmente en el torso, abdomen y membros, rara vez afecta la cabeza y el cuello. El tratamiento efectivo incluye un diagnóstico temprano, cirugía, antibióticos y terapia de oxígeno hiperbárico, aunque la mortalidad sigue siendo alta. Un hombre de 40 años con antecedentes de diabetes mellitus (DM) no controlada se presentó con aumento de volumen, eritema y calambres en la zona cervical y torácica superior. El diagnóstico principal fue FN, requiriendo desbridamiento quirúrgico del tejido afectado. A pesar de los esfuerzos terapéuticos, el paciente sucumbió a sepsis y falla multiorgánica. La FN es una infección potencialmente mortal con una incidencia muy baja pero una alta tasa de mortalidad. La FN cervical a menudo surge de infecciones odontogénicas y está asociada con factores sistémicos como la diabetes y la obesidad. El diagnóstico temprano es un desafío, pero la tomografía computarizada (TC) y el puntaje de indicadores de riesgo de laboratorio para fascitis necrosante (LRINEC) son esenciales. El tratamiento efectivo incluye desbridamiento quirúrgico, antibióticos de amplio espectro y terapia de oxígeno hiperbárico. La FN sigue siendo una condición crítica con alta mortalidad, lo que subraya la necesidad de un reconocimiento temprano y estrategias de tratamiento agresivas para mejorar los resultados de los pacientes.

PALABRAS CLAVE: Informe de caso, fascitis necrosante, infecciones de tejidos blandos, cabeza, cuello.

REFERENCES

Abdurrazaq, T. O.; Ibikunle, A. A. & Braimah, R.O. Cervical Necrotizing Fasciitis: A Potentially Fatal Disease with Varied Etiology. *Ann. Med. Health Sci. Res., 6(4)*:251-6, 2016.

Balcı, M. K.; Ciger, E.; Arslanoglu, S. & Islek A. Necrotizing fasciitis of the head and neck: our experience with vacuum-assisted closure therapy. *Eur. Arch. Otorhinolaryngol., 275(10)*:2555-62, 2018.

Böttger, S.; Zechel-Gran, S.; Schmermund, D.; Streckbein, P.; Wilbrand, J-F.; Knitschke, M.; Pon-Kühnemann, J.; Hain, T.; Weigel, M.; Imirzalioglu, C.; Howaldt, H-P.; Domann, E. & Attia, S. Odontogenic Cervicofacial Necrotizing Fasciitis: Microbiological Characterization and Management of Four Clinical Cases. *Pathogens, 9;11(1)*:9-11, 2022.

Chen, S-J.; Chen, Y. X.; Xiao, J. R.; Wei, X. Z.; Chen, S. M. & Jiang, W. Z. Negative Pressure Wound Therapy in Necrotizing Fasciitis of the Head and Neck. *J. Oral Maxillofac. Surg., 77(1)*:87-92, 2019.

Choi, M. G. Necrotizing fasciitis of the head and neck: a case report. *J. Korean Assoc. Oral Maxillofac. Surg., 41(2)*:90-6, 2015.

Cortese, A.; Pantaleo, G.; Borri, A.; Amato, M. & Claudio, P. P. Necrotizing odontogenic fasciitis of head and neck extending to anterior mediastinum in elderly patients: innovative treatment with a review of the literature. *Aging. Clin. Exp. Res., 29(Suppl 1)*:159-65, 2017.

Gunaratne, D. A.; Tseros, E. A.; Hasan, Z.; Kudpaje, A. S.; Suruliraj, A.; Smith, M. C.; Riffat, F. & Palme, C. E. Cervical necrotizing fasciitis: Systematic review and analysis of 1235 reported cases from the literature. *Head Neck., 40(9)*:2094-102, 2018.

Hua, J. & Friedlander, P. Cervical Necrotizing Fasciitis, Diagnosis and Treatment of a Rare Life-Threatening Infection. *Ear Nose Throat J. 102(3)*:NP109-13.

Jin, L.; Fan, K.; Liu, S. & Yu, S. Necrotizing fasciitis of the jaw, neck and mediastinum caused by Klebsiella oxytoca and *Streptococcus* constellatus: a case report. *Ann. Palliat. Med., 10(7)*:8431-6, 2021.

Sahoo, A. K.; Singh, I.; Dhakal, S. & Gopal, A. Necrotising Fasciitis of Head and Neck in Infants. *Indian J. Otolaryngol. Head Neck Surg.,74(Suppl 2)*:2049-52, 2022.

Wolf, H.; Rusan, M.; Lambertsen, K. & Ovesen, T. Necrotizing fasciitis of the head and neck. *Head Neck, 32(12)*:1592-6, 2010.

Wong, C. H.; Khin, L. W.; Heng, K. S.; Tan, K. C. & Low, C. O. The LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score: a tool for distinguishing necrotizing fasciitis from other soft tissue infections. *Crit. Care Med., 32(7)*:1535–41, 2004.

Corresponding author:
Florencia Jollán Peña
La Capilla 273
Las Condes
Santiago
Región Metropolitana
CHILE

E-mail: florenciajollan@gmail.com