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Cervicofacial Cellulitis of Dental Origin: A Case Report of Serous Cellulitis

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Abstract

Odontogenic cellulitis is a potentially life-threatening infection of the cervicofacial spaces when diagnosis is delayed or management is inappropriate. We report the case of a 36-year-old woman with no significant medical history, presenting as an emergency with serous cellulitis of the left buccal space secondary to pulp necrosis of tooth 24. The patient was afebrile at presentation (temperature 36.8˚C), with no systemic signs of severity, preserved upper airway patency, and adequate oral hydration, supporting outpatient management. Clinical management combined probabilistic antibiotic therapy (oral amoxicillin-clavulanate 1 g/125 mg every eight hours [total daily dose 3 g/375 mg] and metronidazole 500 mg every eight hours), a short course of adjuvant corticosteroid therapy (oral prednisone 1 mg/kg/day for 48 hours then tapered over five days) aimed at reducing inflammatory oedema and improving trismus, and extraction of the causative tooth under antibiotic cover at 48 hours. Complete clinical resolution was achieved within ten days. This case illustrates the importance of a combined therapeutic strategy, initiated without delay, integrating etiological surgical treatment, control of the inflammatory response, and rigorous clinical monitoring.

Keywords

Cervicofacial Cellulitis, Odontogenic Infection, Antibiotic Therapy, Corticosteroids, Dental Emergency

1. Introduction

Cervicofacial cellulitis of dental origin is among the most frequent and potentially serious orofacial emergencies encountered in daily practice. It results from the contiguous spread of bacteria through the cervicofacial fascial spaces from a per-

iapical or periodontal infectious focus [1] [2]. Its prognosis is generally favorable when management is prompt and appropriate. However, extension to the deep cervical spaces or mediastinum, or the onset of sepsis, can affect the patient's vital prognosis [3]. Management rests on three pillars: probabilistic antibiotic therapy initiated without delay, etiological elimination of the infectious focus by extraction or endodontic treatment, and, in selected cases, adjuvant corticosteroid therapy to control the inflammatory response and prevent airway compromise [4] [5]. Antibiotic therapy must never be considered as a standalone treatment: it is always complementary to surgical management, without which clinical failure is almost inevitable [6]. The role of non-steroidal anti-inflammatory drugs (NSAIDs) deserves specific attention: their use is generally contraindicated in the acute phase of odontogenic cellulitis, as they may mask signs of clinical progression and have been associated with a risk of promoting necrotizing soft tissue complications [7] [8]. We report a case of serous cellulitis of the left buccal space managed by a combined approach, and discuss the current evidence supporting each therapeutic modality.

2. Case Report

A 36-year-old woman, with no notable medical or surgical history and no known drug allergy, presented to the dental emergency department with a painful and rapidly progressive left facial swelling that had been evolving over 72 hours, accompanied by moderate trismus and dysphagia. The patient reported no fever at home and no previous antibiotic intake.

2.1. Clinical Examination

Extraoral examination was conducted systematically, beginning with inspection followed by palpation. At presentation, the patient was afebrile (temperature 36.8˚C), haemodynamically stable (blood pressure 118/74 mmHg, heart rate 82 bpm), and in no respiratory distress, with preserved upper airway patency. Oral intake was slightly reduced owing to dysphagia, but hydration was adequate. On inspection, a diffuse, ill-defined swelling of the left maxillary region was observed, extending across the buccal and infraorbital areas, with tense and erythematous overlying skin (**Figure 1(a)**, **Figure 1(b)**). The swelling did not extend toward the submandibular or cervical regions. On palpation, the swelling was indurated, warm, and tender. No fluctuation was detected, consistent with the serous stage of cellulitis. No cervical lymphadenopathy was identified.

Intraoral examination followed the same sequential approach. Inspection revealed grade II trismus, limiting mouth opening to 22 mm. The left buccal mucosa was erythematous and oedematous, with marked vestibular swelling in the region of the upper left first premolar (tooth 24). This tooth presented with an extensive mesiodistal carious lesion. On palpation, axial percussion of tooth 24 elicited pain, vitality testing yielded a negative response, and tooth mobility was grade 1. No intraoral fluctuation was detected, confirming the absence of a suppurative col-

lection at this stage.

(a) (b)

Figure 1. (a) (b): Extraoral clinical appearance: diffuse and indurated swelling of the left buccal region, with tense and erythematous skin.

2.2. Radiographic Examination

The panoramic radiograph revealed a moderate periapical radiolucency associated with tooth 24, with periradicular bone resorption, confirming the diagnosis of chronic apical periodontitis complicated by secondary cellulitis (**Figure 2**). Laboratory investigations and cross-sectional imaging were not performed, in keeping with the clinical decision framework applicable to circumscribed, uncomplicated serous cellulitis managed on an outpatient basis: in the absence of fever, systemic signs of severity, deep space involvement on clinical examination, or risk factors for rapid progression, routine blood workup and computed tomography are not mandatory and do not modify the initial treatment plan [9]. They would have been indicated in the presence of any of the following: temperature above 38.5˚C, signs of sepsis, progressive trismus or dysphagia despite 48 hours of antibiotic therapy, suspected deep cervical or mediastinal extension, or immunocompromised status. It should be noted that, in the context of a drained suppurative collection, bacteriological sampling with aerobic and anaerobic cultures, including antibiotic susceptibility testing, is recommended to guide antibiotic adaptation in the event of clinical failure [10].

Figure 2. Panoramic radiograph showing the periapical lesion associated with tooth 24.

2.3. Therapeutic Management

The patient was managed on an outpatient basis, given the absence of systemic signs of severity, the circumscribed nature of the cellulitis, and the preservation of the upper airway. Three therapeutic components were combined.

Probabilistic antibiotic therapy consisted of oral amoxicillin-clavulanate 1 g/125 mg every eight hours (total daily dose 3 g/375 mg) combined with metronidazole 500 mg every eight hours. This combination was selected for its broad-spectrum activity against the polymicrobial flora typical of odontogenic infections, covering aerobic and anaerobic organisms alike [11] [12]. In accordance with current guidelines, antibiotic therapy was initiated simultaneously with etiological surgical treatment, and not as a substitute for it [6].

Adjuvant corticosteroid therapy consisted of oral prednisone at 1 mg/kg/day for 48 hours, followed by a tapering regimen reducing the dose by half every 48 hours over five additional days (day 3 - 4: 0.5 mg/kg/day; day 5 - 6: 0.25 mg/kg/day; day 7: 0.125 mg/kg/day). The rationale was to reduce inflammatory oedema, improve trismus, and prevent compressive extension toward the airway [13]. This indication was deemed appropriate given the absence of contraindications, namely, no suppurative collection, no uncontrolled diabetes, and no immunosuppression.

Symptomatic treatment consisted of first-line analgesics (paracetamol 1 g every six hours) and local oral hygiene measures. NSAIDs were deliberately avoided given the risk of promoting infectious extension and necrotizing complications [7] [8].

Under antibiotic cover, extraction of tooth 24 was performed at 48 hours, following adequate analgesia. The 48-hour pre-extraction interval was chosen deliberately: antibiotic and corticosteroid pre-treatment allowed substantial improvement in trismus (mouth opening increased from 22 mm at presentation to 31 mm at 48 hours) and significant regression of inflammatory oedema, thereby facilitating the procedure under safer local anesthetic and surgical conditions [9]. Given the reduced efficacy of conventional infiltration anesthesia in an acute inflammatory environment due to tissue acidity, an intraligamentary technique was used as an adjunct to achieve an adequate anesthetic block. The tooth was extracted with its complete root contents. Periapical curettage enabled the evacuation of abundant granulomatous tissue. The socket was left for secondary intention healing, without primary closure (**Figure 3**).

2.4. Outcome

At the 48-hour review, the patient was afebrile, mouth opening had improved to 31 mm (from 22 mm at baseline), dysphagia had resolved, pain was rated 2/10 on the visual analog scale, and buccal swelling had measurably reduced. No adverse effects attributable to corticosteroid therapy were reported. Within the first 72 hours following extraction, significant regression of the buccal swelling and trismus was observed, alongside normalization of temperature. The total duration of antibiotic therapy was 14 days, chosen given the extent of the initial presentation

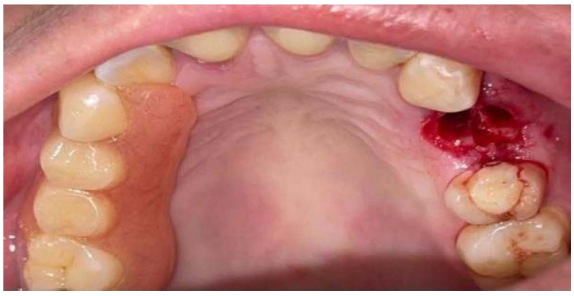

Figure 3. Intraoperative view after extraction of tooth 24: Open socket left for secondary intention healing after periapical curettage.

and the progressive nature of the clinical response. Although current guidelines recommend discontinuing antibiotics 24 hours after complete resolution of systemic signs regardless of the initially prescribed duration [6], the 14-day course was retained in view of the moderate pace of early clinical recovery and the absence of microbiological data to guide early de-escalation. At the ten-day follow-up, clinical examination confirmed complete resolution of the infectious signs and soft tissue induration. At one month, healing was complete with no evidence of recurrence (**Figure 4**).

Figure 4. Clinical appearance at day 10: Complete regression of the left buccal swelling, alveolar healing in progress.

3. Discussion

Odontogenic cellulitis remains one of the most common orofacial emergencies in daily dental practice, with a polymicrobial aetiology combining aerobic streptococci of the Streptococcus milleri group with strict anaerobes including *Prevotella* and *Fusobacterium* species [1] [2]. Infection spreads by contiguity through the cervicofacial fascial spaces from a periapical or periodontal focus, most commonly originating from a maxillary or mandibular premolar or molar [3]. In the present case, tooth 24, exhibiting pulp necrosis and a periapical lesion, constituted the unambiguous etiological source.

Antibiotic therapy constitutes the medical cornerstone of management, but its

role must be clearly defined: it complements etiological surgical treatment and cannot replace it. Current evidence is unambiguous: antibiotic therapy without elimination of the infectious focus almost invariably leads to clinical failure and progression of the infection [6]. The organisms involved justify the use of a broad-spectrum combination [11] [12]. Amoxicillin-clavulanate represents the reference molecule for its activity against aerobic and anaerobic oral organisms and its favorable tissue penetration [12]. The addition of metronidazole strengthens anaerobic coverage and is recommended in clinically severe or spreading forms [13]. Recent guidelines recommend reassessing the patient within 48 to 72 hours and discontinuing antibiotic therapy 24 hours after complete resolution of systemic signs, regardless of the initially prescribed duration [6]. In the present case, a 14-day course was retained, given the extent of the initial inflammatory response and the progressive clinical recovery.

The adjuvant use of corticosteroids in odontogenic cellulitis remains a subject of debate, and their role should be understood as selective rather than universal. Corticosteroids are not an indispensable component of management for all patients: their prescription requires careful patient selection and is contraindicated in suppurative or diffuse cellulitis, uncontrolled diabetes, and immunosuppression. A growing body of evidence supports their benefit under well-defined conditions. A recent systematic review reported that dexamethasone use reduced the risk of reoperation and was associated with a shorter hospital stay in several observational studies, while acknowledging that available evidence remains heterogeneous [13]. Their anti-inflammatory and antioedematous properties contribute to rapid improvement in trismus, facilitate swallowing, ease the surgical procedure, and prevent airway obstruction by limiting the extension of inflammatory oedema [13] [14]. A short course of 48 to 72 hours, initiated under adequate antibiotic cover and in the absence of contraindications, appears well tolerated and does not adversely affect the infectious outcome [13]. In the present case, oral prednisone contributed to a marked reduction in trismus within 48 hours, enabling the extraction of tooth 24 under safer conditions. The decision to prescribe corticosteroids was based on the presence of severe trismus (22 mm mouth opening), risk of worsening airway oedema, and the absence of all contraindications; it is not a recommendation applicable to all forms of odontogenic cellulitis.

NSAIDs must be avoided throughout the acute phase of odontogenic cellulitis. Beyond their limited analgesic efficacy in this context, they mask signs of infectious progression and have been associated with an increased risk of necrotizing soft tissue complications [7] [8]. A retrospective study found that NSAID self-medication was present in 40% of patients who subsequently developed necrotizing fasciitis of odontogenic origin [8]. A large cross-sectional study of children with odontogenic cellulitis similarly showed that prior intake of NSAIDs was associated with higher rates of trismus and prolonged hospitalization [15]. Analgesic management should therefore rely on paracetamol, with opioid escalation if necessary.

Elimination of the infectious focus is an indispensable prerequisite for durable clinical resolution. When the tooth is non-restorable, extraction represents the reference etiological treatment [4] [5]. The optimal timing of extraction remains a subject of ongoing discussion. Some authors advocate immediate extraction at the first consultation, arguing that prompt elimination of the infectious source promotes drainage and accelerates resolution [5]. Others recommend a 24 to 48-hour window of antibiotic and corticosteroid therapy prior to extraction, particularly in the presence of severe trismus or risk of rapid infectious spread [4]. A prospective clinical study further supports this approach, demonstrating that a brief pre-extraction antibiotic interval reduced intraoperative complications in patients with severe odontogenic infections presenting with trismus [9]. In the present case, the 48-hour pre-extraction interval permitted substantial improvement in trismus and inflammatory oedema, facilitating the procedure under safer conditions. The challenge of achieving adequate local anesthesia in an inflamed environment must also be anticipated: the acidity of infected tissue impairs the ionization and diffusion of local anesthetic agents, reducing the efficacy of conventional infiltration techniques. Alternative approaches, such as intraligamentary anesthesia, may be necessary to ensure adequate pain control [4].

4. Conclusion

Serous cellulitis of dental origin carries a favorable prognosis when managed early, but requires a rigorous and codified therapeutic approach. This approach rests on two indispensable pillars: probabilistic antibiotic therapy, which must always complement and never replace local etiological treatment; and early surgical elimination of the infectious focus by extraction of the causative tooth. Adjuvant corticosteroid therapy represents a carefully selected option in patients meeting specific criteria, including severe trismus, risk of airway compromise, and the absence of all contraindications; it is not a universal component of management applicable to all forms of odontogenic cellulitis. The avoidance of NSAIDs in the acute phase, the anticipation of anesthetic difficulties in an inflammatory environment, appropriate bacteriological sampling when a collection is drained, and close clinical monitoring with systematic 48-hour reassessment are all elements that condition the prognosis and prevent progression toward suppurative or diffuse forms. Any delay in etiological management risks infectious extension to the deep cervical spaces, constituting a vital threat. Publication of additional cases will contribute to refining recommendations on the optimal timing of extraction and the precise indications for adjuvant corticosteroid therapy.

Patient Consent

Written and oral informed consent was obtained from the patient for publication of this case report and the associated clinical images.

Ethical Declaration

All procedures were performed in accordance with the ethical standards of the institutional research committee and with the Declaration of Helsinki.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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