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Case Report

Post-Dental Extraction Cervical Abscess: Diagnosis, Management, and Role of *Streptococcus anginosus*. Case Report and Literature Review

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Abstract

Head and neck infection is a pathology that must be diagnosed correctly in terms of its origin and the anatomical spaces it compromises. This last part is essential since the progression and aggravation of these conditions can lead the patient to serious states since the ability to feed and hydrate can be severely diminished and the airway could also be obliterated by the violent edema they produce. We present the case of an 81-year-old woman who presented to the emergency department with an increase in cervical volume within 5 days of evolution after having undergone a procedure for the extraction of the mandibular molar due to an odontogenic infectious process. Due to the characteristics of the condition and the potential complications, the patient is hospitalized for nutritional, antibiotic, analgesic and anti-inflammatory management; with the corresponding surgical procedure for emptying and drainage of the purulent collection.Among the microbiological results, the cultures showed a predominance of *Streptococcus anginosus*, an infectious agent that is described in the literature as a risk element for rapid spread of the infectionThis study describes the in-hospital management of the case and reviews the behavior of head and neck infections when we are in the presence of *Streptococcus anginosus*.

Keywords: Submandibular Abscess; Streptococcus anginosus; Head and Neck Infection

Introduction

Oral and maxillofacial abscesses are localized infections that present as intraoral swelling of various sizes or facial asymmetry, evolving from a confined infectious collection. They are usually of dental origin; a correct diagnosis is very important for identifying the etiology and planning an effective treatment [1].

The majority of odontogenic abscesses can be treated by incision and drainage, usually under local anesthesia during dental treatment. Management is usually by the dental team, saving the need for general hospital admission, but in some cases there is an imperative need for in-hospital management to care for the patient under intravenous medication and in more serious cases, invasive management of the airway due to the risk of airway occlusion and asphyxiation [2,5].

Recognition and understanding of the disease process can only be achieved once it is realized that the retaining and dissemination of radicular abscesses throughout the spaces of the head and neck, such as the fascial planes, occurs. Therefore, the capabilities and treatment options for the potential space infections of teeth and jaws must be understood [3,4].

Sometimes infectious processes of odontogenic origin diffuse through the tissues, spreading from the bone structures through the cortical bone by the path of least resistance. The spread of infection through the fascial spaces is determined by the presence and distribution of loose connective tissue. The infection can surround or separate the muscles, and the fascia offers a route for the infection to spread to deeper levels of the face and neck structures [4].

There are two fundamental anatomical milestones that surgeons must fully grasp to understand the process of dissemination of odontogenic infectious processes that surpass the oral cavity and its closest vicinity [11].

These structures are:

- **Superficial Cervical Fascia**: Underlies the skin of the head and neck in a continuous plane and covers adipose tissue, sensory nerves, superficial vessels (including the external jugular vein), lymphatics, platysma muscle, and muscles of facial expression
- **Deep Cervical Fascia**: Envelops the deep spaces of the neck, and is divided into a superficial, middle and deep layer.

To determine the severity of the infection we must consider 3 main factors: [11].

Anatomical location

Severity in relation to compromise of the airway or vital anatomical structures (mediastinum, skull).

Degree of progression of the infectious process

Time of evolution, pain, trismus, inflammation, respiratory compromise.

Stage □ inoculation, cellulitis, abscess.

Airway compromise

Important since it considers emergency treatment to open the airway prior to treating the infectious condition itself.

This case report aims to describe the evolution of an intraoral infection after an extraction, how it involves deeper planes of the face and neck to finally be exposed through the patient's skin. Case reported in a 81-year-old female patient treated in the Maxillofacial Surgery Service of Clinica Alemana de Santiago in 2024.

Case Report

Patient attends the emergency department for increased left cervical volume, does not have a relevant morbid history, without allergies to medications.

In the anamnesis, she reports having had a tooth extraction 7 days ago in the area of the left mandibular molar that later evolved with a great increase in volume in the left cervical area and that was initially managed with oral antibiotics (Amoxicillin 1 gram).

At the time of consultation in the emergency department, the patient was hemodynamically stable, afebrile, eupneic and well perfused, without respiratory pressure. On clinical examination, he presented an increase in phlegmonous volume, not fluctuating in relation to the neck and jaw on the left side, with erythematous skin and a notoriously increased local temperature. Very painful volume increase on palpation (8/10 VAS) with a sudden appearance of fistulization (Figure 1).

Figure 1: A-B Skin plane involvement was observed in the left cervical area with erythematous halo and with the appearance of early externalization of contents.

The mouth opening is slightly restricted by pain at 25 mm, on intraoral examination the patient is partially edentulous, and the vestibule in the left mandibular region is occupied, erythematous and slightly fluctuating. Extraction area of the left mandibular first molar with in situ suture.

On the neck computed tomography (CT) scan with contrast, a left laterocervical phlegmonous inflammatory process centered on the subcutaneous cellular tissue, superficial to the left mandibular angle, is reported. Small left cervical lymphadenopathy with a reactive appearance (Figure 2).

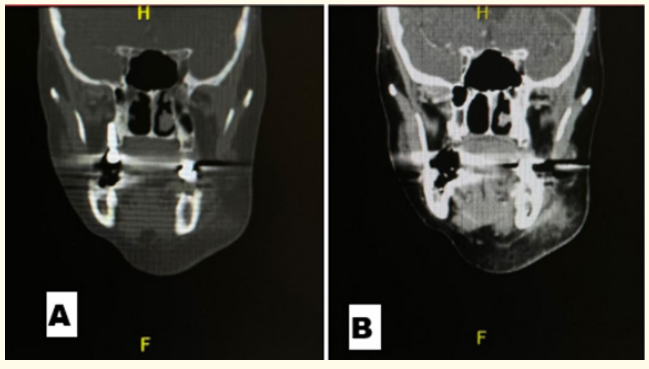

Figure 2: A-B To view hard and soft tissues, where a laterocervical inflammatory process concentrated in subcutaneous cellular tissue is identified.

In Cone Beam CT (CBCT) of the mandibular region, the socket of the second left molar is visualized occupied by soft tissue density, in whose thickness some particles of calcified tissue are observed, probably bone and/or dental remains together with remains of hyperdense restorative material. The alveolus is surrounded by multiple free fragments of variable size of bone tissue and remains of restorative material (Figure 3).

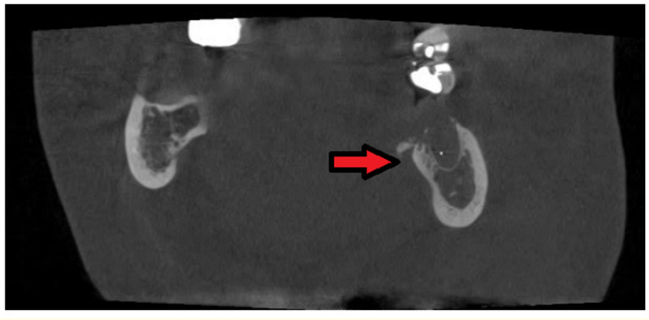

Figure 3: View of coronal section in Cone Beam CT, alveolus area piece 30 with free fragments and restorative material that contaminates the area.

The requested laboratory tests showed: CRP (C-reactive protein): 8.59 mg/dl, confirmed in the current inflammatory picture, so it was decided to hospitalize for medical and surgical management. Within the treatment plan, antibiotic therapy is indicated with Ampicillin/Sulbactam 3 g every 6 hours EV, Acetaminophen 1g every 8 hours EV, Parecoxib 40 mg every 12 hours EV, Omeprazole 40 mg every 24 hours EV.

Surgical protocol: (Figure 4)

- In the ward and under local anesthesia with orotracheal intubation.
- Installation of pharyngeal pack, sample collection is performed for culture with a perimandibular abscess swab with cutaneous fistula.
- Skin abscess is emptied, necrotic tissue is removed in the subcutaneous plane, and irrigation with abundant saline solution.
- Intraoral curettage of the necrotic remains of the alveolus of the first lower left molar, regularization of bone ridges and removal of spicules, irrigation with physiological solution with 1500cc.
- On skin at the level of the cutaneous fistula, Penrose type drainage is installed and fixed with 5/0 nylon suture, patency is checked. Intraoral, tissue synthesis is performed with Vicryl 4/0 resorbable suture. The size of the fistula is about 2 cm and communicates the oral cavity at the level of the left mandibular molar region (Figure 5)

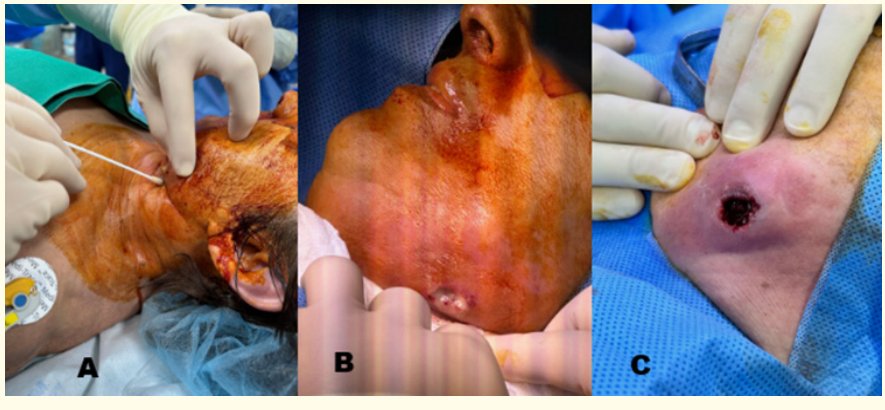

Figure 4: A: Sample is taken for culture with swab. B: The purulent content is observed externalized through the approach. C: Inflammatory tissue with necrotic remains standing in relation to the drainage area.

Figure 5: Penrose-type drainage sutured into the skin is observed.

In the 24-hour post-surgical control, the patient evolved favorably, did not present facial paresis and the mandibular dynamics were preserved.

At the 48-hour check-up, he is in good general condition, without pain, without respiratory pressure, without dyspnea or dysphagia. On examination without bruises or facial ecchymosis, no purulent discharge was observed in the drainage.

The results of the current culture of secretions showed the development of *Streptococcus anginosus*. The antimicrobial susceptibility test indicates resistance to erythromycin and sensitivity to cefotaxime, clindamycin, penicillin and vancomycin.

In the anaerobic culture there was no development of anaerobic microorganisms.

In the 21-day post-operative follow-up, skin wound in the normal healing process, in the process of closure by second intention (Figure 6).

Figure 6: In postoperative control of 21 days, the surgical site was observed healing by second intention, without signs of infection.

Discussion

Infections in the head and neck region present a significant clinical challenge due to anatomical complexity and proximity of vital structures. Submandibular abscess is a severe manifestation that can arise from odontogenic or soft tissue infections, with rapid spread affecting multiple anatomical compartments. *Streptococcus anginosus*, a pathogen recognized for its ability to form abscesses, plays an important role in these infections.

The spread of infections in this region is facilitated by the continuity of the fascial planes and the network of lymphatic vessels, which allows a rapid spread of odontogenic or pharyngeal infections to the submandibular, retropharyngeal and parapharyngeal space. This progression can lead to serious complications such as mediastinitis and sepsis, especially if diagnosis and treatment are not made in time [1,4].

Submandibular abscess can cause symptoms such as pain, edema, and trismus (limitation of oral opening), which can progress to respiratory distress in advanced cases [3]. Risk factors include untreated dental infections, immunosuppression, and poor oral hygiene [5]. Dissemination through the deep cervical fascia can result in serious complications such as mediastinal extension, which aggravates the patient's prognosis [3,6].

S. anginosus, part of the *Streptococcus anginosus* group (also known as the *Streptococcus milleri* group), is a commensal bacterium of the oral cavity that can act as an opportunistic pathogen. It is frequently associated with abscesses due to its ability to invade deep tissues and proliferate in low-oxygenation environments [4]. It is responsible for a significant proportion of abscesses in the submandibular area, due to its ability to evade the immune system and form biofilms that complicate its treatment [4,5].

Streptococcus anginosus (formerly known as *Streptococcus milleri*) is a bacterium that is part of the *Streptococcus anginosus* group, along with S. constellatus and S. intermedius. It is a commensal bacterium that is normally found in the oral cavity, upper respiratory tract, and gastrointestinal tract. However, it has a remarkable pathogenic capacity, especially in head and neck infections [4,5].

Importance of *Streptococcus anginosus* in head and neck phlegmons:

- **Ability to Invade and Shape Abscesses:** *S. anginosus* is known for its ability to invade deep tissues and form abscesses. In head and neck infections, it can spread rapidly from an odontogenic or upper respiratory infection to the subcutaneous tissue and fascia, causing deep phlegmons.
- **Polymicrobial Infections:** Head and neck infections are often polymicrobial, and *S. anginosus* is often found in combination with other anaerobes and facultative bacteria. Their presence can contribute to a favorable environment for the spread of infection.
- **Tissue Destruction and Complications:** *S. anginosus* infections in this region can lead to serious complications such as septic jugular vein thrombophlebitis, mediastinitis, or even sepsis, due to its ability to spread along the fascial planes.

- Although generally sensitive to penicillin, *S. anginosus* can form part of biofilms in abscesses, making it difficult to eradicate completely and may require surgical interventions in addition to antibiotic treatment.
- **Risk Factors and Clinical Presentation:** It is more common in patients with poor oral hygiene, immunosuppression or a history of odontogenic infections. Clinically, patients may present with pain, edema, erythema, and fever, along with signs of airway obstruction in severe cases.

For all these reasons, *Streptococcus anginosus* is a significant bacterium in the context of head and neck abscesses and requires a careful diagnostic and therapeutic approach.

The identification of *S. anginosus* is critical, as its presence can influence the selection of antibiotic treatment. Although traditionally sensitive to penicillin, emerging antimicrobial resistance makes culture and susceptibility testing necessary to guide appropriate therapy [4,8]. The combination of penicillin and metronidazole or clindamycin is an effective therapeutic option, given its activity against anaerobes and other microorganisms involved in these infections [6,9].

Initial management of submandibular abscesses begins with a detailed clinical evaluation and the use of imaging techniques such as computed tomography (CT) to determine the location and extent of infection [6]. Standard treatment includes surgical drainage and initial empirical antimicrobial therapy, followed by adjustments based on culture results and susceptibility testing [8].

Surgical dissection is critical to the success of treatment and can be performed through an intraoral or external incision, depending on the access and extent of the abscess [6]. The choice of antibiotics should include coverage against *S. anginosus* and other anaerobes. Recent studies recommend the use of penicillin combined with metronidazole or clindamycin, especially in mixed infections [5,7].

Extraction of the causative tooth, in the case of odontogenic infections, is also crucial to prevent recurrence. In addition, additional procedures such as repeated drainage should be considered in case of recurrent abscesses [8]. Multidisciplinary management, including specialists in otolaryngology, dentistry, and maxillofacial surgery, is critical for successful treatment and prevention of long-term complications [6,10].

Conclusion

The spread of infections in the head and neck region, particularly submandibular abscesses, requires an immediate and coordinated clinical approach. *Streptococcus anginosus* is a key pathogen in these infections, and its precise identification allows for targeted treatment. The combination of surgical drainage and specific antibiotic therapy is essential to avoid complications and improve the patient's prognosis.

Bioethical Aspects

To carry out this report, the patient read and signed the informed consent prepared for this report.

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