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Case Report

Submandibular Approach: Optimizing Drainage of Submandibular Phlegmon. Case Report

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Abstract

This study focuses on describing the submandibular approach for drainage of a phlegmon located in the submandibular region. This condition is a potentially serious complication, which is usually caused by an infection originating from mandibular third molars, therefore, the choice of an adequate drainage method is crucial for a successful recovery. In this paper, we describe the procedure in a male patient presenting with submandibular phlegmon, with airway compromise, whose initial focus is the mandibular 3rd molar, and who undergoes a submandibular approach. The result suggests that the submandibular approach is an effective and safe option, providing a valuable alternative in the management of submandibular phlegmons. This result supports the consideration of this approach in the clinical management of patients with this complication, thus contributing to the optimization of therapeutic outcomes.

Keywords: Submandibular Approach; Submandibular Phlegmon; Dental Absceso; Infection

Introduction

Infections of deep facial regions are a common problem encountered in clinics and usually require emergency surgery. These conditions are mainly odontogenic in origin. Without proper treatment, odontogenic infections (OIs) can lead to serious consequences, such as mediastinitis, sepsis, necrotizing fasciitis and osteomyelitis.

Among the infections of all potential spaces, those located in the submandibular region can be dangerous because of their anatomical location close to the trachea, where the airway can be compromised and emergency care is needed in a hospital setting under a specialist in Oral and Maxillofacial Surgery [1-5].

OIs are commonly the result of pericoronaritis, caries with pulp exposure, periodontitis or the complication of a dental procedure. The causal tooth of these OIs is variable, although the most severe and prevalent infections come from the mandibular second or third molar [2]. Among the most compromised facial regions is the submandibular region [3].

Surgical management of OIs consists of 2 principles: elimination of the etiological focus and surgical drainage of the anatomical spaces involved, followed by complementary medical care: hydration, nutritional support, analgesic, antipyretic and anti-inflammatory drugs [3,6,7].

The causal dental focus should be identified on the basis of clinical and imaging findings, in addition, through knowledge of surgical anatomy we can know the possible routes of spread to other neighboring regions. The elimination of the causal etiological factor should be carried out as soon as possible. However, there may be local contraindications that defer treatment, such as severe trismus or acute suppurative pericoronaritis, the latter of which may cause a more severe infection of deep regions. In these cases the patient should receive a couple of days of antibiotic and anti-inflammatory therapy to control and decrease the infection and inflammation of the involved tissues [3].

The timing of surgical emptying of the involved anatomic spaces should also be approached aggressively and as early as possible. This approach is based on the concept that early surgical emptying and drainage negates the spread of infection to deeper and more severe spaces, even if the infection is in the phlegmon stage [1,3].

Depending on the location of the collection of purulent tissue in the deep cervical spaces, it is decided whether to perform an

intraoral or extraoral approach. Usually when the infection originating from the 2nd or 3rd lower molar (teeth most frequently associated with IO) crosses the limit of the mylohyoid muscle it usually spreads to the submandibular region (deep cervical space most affected, together with the latero-pharyngeal region) [1,3].

The jaw and deep cervical spaces such as the submandibular and latero-pharyngeal region can be exposed by surgical approaches using incisions placed in facial skin. The position of the incisions varies depending on the mandibular and anatomical region approached. One of the most commonly used approaches is the submandibular or Risdon's approach [8].

The submandibular approach is one of the most commonly used to access the submandibular, buccal, pterygomandibular, maseterine and also to expose the mandibular ramus. The descriptions of the approach differ at certain points, but in all of them, the incision is made below the inferior border of the mandible [1,8].

The marginal ramus of the jaw represents the most important anatomical hazard while performing this approach. The average farthest distance of this branch of the facial nerve from the inferior border of the jaw is 1.2 cm, therefore it is recommended that the deepest incision and dissection be at least 1.5 cm inferior to the basilar border. Other structures to consider are the facial vessels [1,8].

Due to the seriousness and complexity of the management of these infections, which can compromise the airway and thus put the patient's life at risk, the aim of this study is to describe through a case report the surgical treatment of a patient with submandibular phlegmon with airway compromise whose initial focus is the mandibular 3rd molar and who underwent a submandibular approach.

Case Study

Male patient, 28 years old, ASA 1, came to the Maxillofacial Emergency Department of Dr. Gustavo Fricke Hospital on November 10, 2022, presenting progressive left peri mandibular enlargement, fever, odynophagia and severe trismus. He had no relevant personal morbid history, no allergies or chronic consumption of medications.

At the time of general physical examination, he is hemodynamically stable and febrile.

Vital signs

Heart rate: 88 BPM (beats per minute); Blood pressure: 150/90 mmHg; Respiratory rate: 15 RPM (breaths per minute); SpO2: 99%; T°: 37.9 °C.

On extraoral examination: there was evidence of left facial enlargement affecting the maseterine and left submandibular region, firm consistency and normal skin appearance (without erythema). In addition, she presented severe trismus with a mouth opening of 5 mm.

Intraoral examination showed apparent involvement of the left retromolar area and soft palate. No visualization of the anterior pillar or floor of the mouth.

Complementary examinations

- Oblique lateral radiograph of left jaw shows tooth 32 with deep dentin caries and periapical radiolucent area of 12 mm in diameter (Figure 1).
- Leukocyte count: 17,800/mm^3. C-reactive protein (CRP): 220 mg/L.
- Creatinine in blood: 0.77 mg/dL.
- CT: Coronal section shows facial asymmetry, in addition there is a hypodense area in relation to the basilar border on the right side, which is increasing in size, causing a displacement and collapse of the airway, involving the entire submandibular and latero-pharyngeal region (Figure 2).

Figure 1: Left oblique lateral radiograph showing tooth 3.8 (lower left 3rd molar) with penetrating caries.

Diagnosis

Submandibular phlegmon associated with tooth 3.8 or left mandibular third molar.

Treatment

Hospitalization to start E/V antibiotic treatment, defocation and drainage.

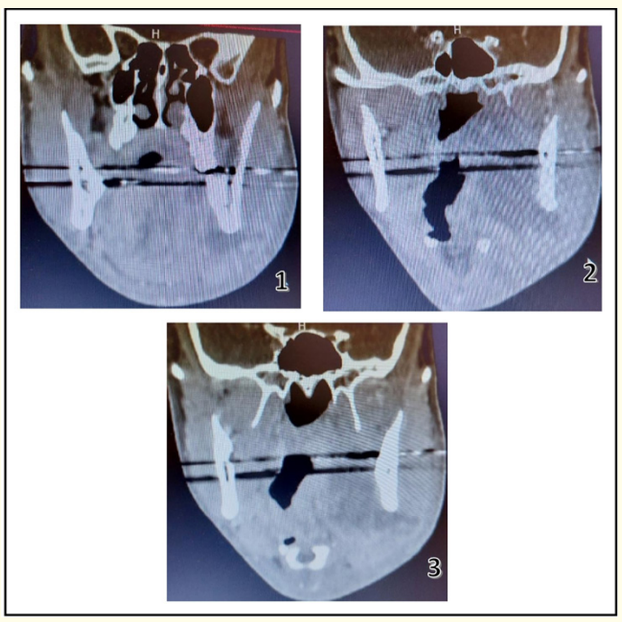

Figure 2: Three coronal CT images, showing radiolucent area in relation to the left mandibular area, causing displacement of surrounding soft tissue and airway narrowing.

Prophylactic medication:

- Bencilpenicillin powder for solution for injection 4,000,000 IU.
- Ketoprofen solution for injection 100mg.
- Metamizole (sodium) solution for injection 1gr/2ml.
- Betamethasone solution for injection 4 mg/ml.

Surgical protocol

- Under general anesthesia, orotracheal intubation. Asepsis, antisepsis and installation of sterile field. Pharyngeal pack is installed.
- Extraction of tooth 3.8 plus irrigation with physiological saline solution.
- Left submandibular cervical approach Risdon type, 2 cm long, skin plane with cold scalpel and celluloadipose-muscular plane with electroscalpel (Figure 3).
- Blunt division up to communication with submandibular purulent collection (Figure 4).
- Irrigation in which 5 liters of physiological saline were used (Figure 5).
- Installation of Penrose fixed with 2-0 silk. Partial closure of the cervical approach with 2-0 silk. Washing and cleansing with physiological saline (Figure 6).
- Removal of pharyngeal pack.
- Normal hemostasis.

Figure 3: Surgical field exposing the left buccal commissure and lower lip. In addition, a cold scalpel incision for submandibular or Risdon's approach is shown.

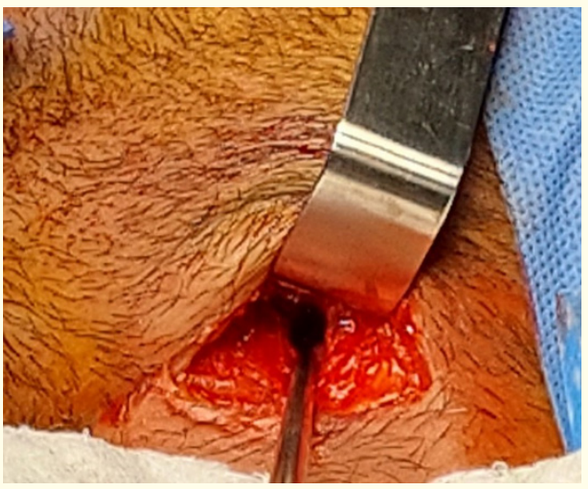

Figure 4: Access to purulent collection located in the submandibular region through the submandibular approach.

Figure 5: Irrigation of the affected site using 5 liters of physiological saline solution.

Figure 6: Penrose installation fixed with 2-0 silk. Partial closure of cervical approach with 2-0 silk.

No local anesthesia was used and the surgical field was left uncovered in the buccal commissure and neck of the affected area, for reflex control performed by the marginal nerve of the mandible (Figures 3 and 4).

ATB medication was changed to ceftriaxone + clindamycin as antibiotic therapy.

Patient was discharged 3 days after surgery.

Discussion

Currently, complications due to odontogenic infection are less frequent due to the advent of antibiotics. However, when the infection begins to involve deep cervical spaces, it is necessary to act as quickly as possible by eliminating the causal focus and installing drains [1-3].

Flynn demonstrated that fever, facial enlargement, dysphagia, and trismus were the most commonly observed symptoms in patients hospitalized for odontogenic infection (Flynn., *et al*.) Elevated white blood cell count and CRP have also been shown to be key findings in the decision to admit patients with odontogenic infection [5,9], criteria that are consistent with those presented by the patient in our study.

It is worth mentioning that the teeth and region most involved in odontogenic infections have been described as lower third molars and the submandibular region. For example, in the study by Solano., *et al*. [2] it was concluded that dental septic foci were the main etiological factor, with the lower third molar being the tooth most involved in OI, which also implies that the most affected region was the submandibular region. On the other hand, in the study by Alotaibi., *et al*. [5] described that the incidence of dental abscess requiring surgical drainage and hospital stay were significantly higher for mandibular OIs. These results are reflected in the case described in the present study.

This case report describes the surgical-hospital protocol (drainage of the infection through an extraoral surgical approach) of a submandibular phlegmon originating in tooth 3.8 (lower left 3rd molar). This protocol took into consideration the stages of the submandibular approach described in the studies of Contreras Alvarado., *et al*. [8] and Yuvaraj [1], they emphasize avoiding the marginal branch of the mandibular and facial artery, so the incision has an average length of 3 cm and is performed 2 cm below the basilar border of the mandible.

In addition, the protocol for the submandibular approach used considers the principle of making the shortest and most direct route to the collection of exudate or pus, but always preserving the integrity of anatomical structures and making incisions with criteria and in areas of minimal aesthetic repercussion [10].

The result of the treatment performed suggests that the submandibular approach is an effective and safe option, providing a valuable alternative in the management of submandibular phlegmons. This result supports the consideration of this approach in the clinical management of patients with this complication, thus contributing to the optimization of therapeutic outcomes.

The main limitation of this study is that, as it is a case report, several factors that can affect the final result of the treatment, such as systemic pathologies that can compromise the patient's immune response at the time of treatment, thus causing a longer hospital stay, are not included.

Conclusion

Due to the fact that infections originating in mandibular third molars are the most frequent cause of submandibular phlegmon, and in turn cause compromise of the airway due to their anatomical relationship with deeper spaces, it is essential that dental surgeons know the surgical protocol and the proper approach to access deep regions of the face, as in the case of a submandibular phlegmon. Therefore, in complex situations such as the case of airway compromise caused by infections located in the submandibular space, a timely surgical treatment is required, where the submandibular approach proved to be effective to gain access to the submandibular region and to be able to perform an efficient drainage of the odontogenic infection.

However, more prospective comparative studies are needed to provide more solid evidence to define the clinical and therapeutic management of patients with odontogenic infection affecting deep maxillofacial regions.

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