

Maxillofacial infections in a tertiary hospital in São Paulo, Brazil - A two-year retrospective study

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Abstract:

Background: Odontogenic infections can cause fatal complications and should be diagnosed and treated as early as possible, in addition to public health measures for preventing these diseases. **Objective:** This study aimed to conduct an epidemiological survey of patients hospitalized for odontogenic infections at the Mandaqui Hospital (São Paulo, Brazil) between 02/01/2011 and 02/01/2013. **Results:** The leading cause of maxillofacial infections was odontogenic, corresponding to 89%. The prevalence of odontogenic infections was higher in males (56%), with a predominance in the age group of 21 to 30 years (36%), with teeth affected by cavities with pulp necrosis being the main responsible for triggering this disease, corresponding to 79% of cases. The average hospitalization period was 5.31 days. The primary surgical treatment was drainage under general anesthesia associated with immediate extraction in 35% of patients. **Conclusions:** The primary surgical treatment was drainage associated with immediate teeth extraction under general anesthesia, which improved most patients effectively, with few complications reported. This finding reinforces the idea that surgical drainage is the main procedure that leads to the patient's clinical improvement regardless of the type of antibiotic used.

Keywords: Focal Infection, Dental; Infection Control, Dental; Periapical Abscess; Periodontal Abscess

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INTRODUCTION

Knowledge about oral and maxillofacial infections is essential due to their high incidence and risk of complications. The diagnosis must be made through clinical history, physical examination, and complementary tests. The main complementary tests are hematological tests, which are critical in evaluating the leukocyte count and C-reactive protein levels, which are essential in monitoring the evolution of the disease. Among the imaging exams, computed tomography with a soft tissue window and preferably with contrast is the choice to evaluate the airway and the affected fascial spaces^{1,2}.

Maxillofacial infections are infections that can spread to adjacent tissues and fascial spaces in the head, neck and chest region and can be caused by lacerations and blunt wounds in the mouth and face, facial bone fractures, sinusitis, facial surgeries infection, anesthetic injection, cysts and tumors in the maxillofacial region, salivary gland infections, tonsil infections and infections of odontogenic origin. Odontogenic infections are the leading cause of infections in the maxillofacial area. They can be caused by extensive caries lesions, periodontal disease, pericoronitis and post-exodontic infections³.

Treatment is based on airway assessment and maintenance, when necessary, systemic support, antibiotic therapy, surgical intervention through drainage, exploring the spaces affected by the infection, and removing the infectious focus. Treatment often must be multidisciplinary. Patients with some diseases that compromise the immune system, such as Diabetes Mellitus, AIDS or other immunosuppressive diseases, are more susceptible to this type of comorbidity and may have their condition worsened if the underlying disease is not compensated, requiring evaluation by the medical team to stabilize the systemic condition. The main complications that can evolve from odontogenic infections are brain abscess, cavernous sinus thrombosis, orbital abscess, avascular skin necrosis, necrotizing fasciitis, mediastinitis, dyspnea and apnea, sepsis and death. Lemierre's Syndrome is also cited as a complication of odontogenic infections⁴. Odontogenic infections are more prevalent in developing countries⁵. With the development of antibiotics, improvements in oral hygiene care and early treatment of dental infections have contributed to the reduction in complications and deaths caused by these infections⁶.

In the present study, an epidemiological survey was carried out on patients treated for infections of the

maxillofacial area who were indicated for hospitalization and surgical and pharmacological treatment following the protocol established by the institution.

MATERIALS AND METHODS

This retrospective study collected data from patient records after approval by the Ethics and Research Committee of the Mandaqui Hospital (516.287) between 02/01/2011 to 02/01/2013.

Inclusion criteria

Patients treated for an odontogenic infection with medical records duly filled out, evaluating the following patient data: gender, age, underlying pathologies, period of hospitalization, main complaints, clinical manifestations, etiology, fascial spaces affected, type of treatment, antibiotic therapy, and complications.

Exclusion criteria

Patients whose medical records were incomplete and patients with minor odontogenic infections treated on an outpatient.

RESULTS

A total of 54 medical records were included in this study. Five medical records were excluded due to incomplete data, and ten were excluded due to minor odontogenic infections, which were treated on an outpatient basis.

Among the 54 medical records, 48 (89%) were of odontogenic origin, and six (11%) were of other causes. Of the 48 patients hospitalized for infections of odontogenic origin, 38 (79%) had teeth affected by caries and endodontic infection, five cases (11%) due to pericoronitis, three (6%) cases were due to periodontal disease and two (4%) post-extraction cases, of the six patients who had an infection in the maxillofacial region of non-odontogenic origin, five cases of postoperative infections following facial surgery, and one case of jaw fracture caused by a firearm projectile.

Age ranged from 4 to 81 years old, with an average of 27.93 years old. The highest incidence of cases of odontogenic infections was in the age group corresponding to 21 to 30 years (18 patients - 36%), followed by the age groups from 0 to 10 years (08 patients - 16%), 11 to 20 years (06 patients - 10%), 41 to 50 (05 patients- 6%), 51 to 60 (04 patients - 8%), 61 to 70 (04 patients - 8%), 71 to 80 (02 patients - 4%) and 81

at 90 (01 patients - 02%). There was a predominance of males, with 28 patients (56%) compared to 20 patients (44%) of females.

Hospitalization period

The hospitalization period for patients with odontogenic infections ranged from 2 to 17 days, with an average of 5.31 days. There was no difference in the length of stay for diabetic patients (5.6 days) with the non-diabetic group (5.2 days).

Immunosuppressive pathologies

Only 05 patients had immunosuppressive diseases; all of them had Diabetes Mellitus.

Clinical manifestations

The main clinical manifestations observed in these patients with odontogenic infections were edema in the anatomical regions involved (41 patients), followed by local pain (34 patients), toothache (16 patients), trismus (15 patients), fever (14 patients), dysphagia (6 patients),odynophagia (5 patients), dyspnea (03 patients) and dysphonia (02 patients).

Affected Fascial Spaces

The most affected fascial space was the submandibular space present in 45 patients, followed by the sublingual (23 patients), pterygomandibular (19 patients), submental (18 patients), buccal (11 patients), masseteric (06 patients), parapharyngeal (04 patients), canine (04 patients), and superficial temporal (02 cases).

Antibiotic therapy

The antibiotics most used to treat these infections were firstly the combination of crystalline Penicillin G + Metronidazole (40 patients), followed by Clindamycin (03 patients), crystalline Penicillin G + Metronidazole + Amikacin (03 patients), crystalline Penicillin G + Metronidazole + Ceftriaxone (03 patients), Cefazolin (02 patients), Crystalline Penicillin G (1 patient), Clindamycin + Ceftriaxone + Amikacin (1 patient) and Crystalline Penicillin G + Amikacin + Meropenem (01 patient).

Surgical treatment

The primary treatment performed was surgical drainage under general anesthesia with immediate extraction of the infected teeth (17 patients), followed by surgical drainage under local anesthesia without removing the infected teeth (13 patients), drainage under

general anesthesia without removing the infected teeth (10 patients) and drainage under local anesthesia plus removing the infected teeth (08 patients).

Complications

There were four complications (8%), three cases in which the patient's clinical condition worsened, needing re-surgical intervention, and one of Necrotizing Fasciitis.

Three patients had to undergo a second surgical drainage intervention under general anesthesia after their clinical conditions worsened after the first drainage was performed under local anesthesia. Only one of these patients had Diabetes Mellitus. All three of these patients needed to stay in the Intensive Care Unit due to the severity of the case.

There was one case in which the patient developed necrotizing fasciitis and was treated through surgical debridement + antibiotic therapy and subsequent cosmetic treatment with the Plastic Surgery team.

DISCUSSION

In this study, odontogenic infections were responsible for 89% of cases of maxillofacial infections, like the findings of Igoumenakis et al. (2014)³, Martini et al. (2010)¹, Bakathir et al. (2009)⁷. The leading causes of odontogenic infections were caries with endodontic involvement 79%, pericoronitis 11%, post-extraction infections 6% and periodontal disease 4%, which is in line with the work proposed by Sánchez et al. (2011)⁸ in which the leading causes were teeth caries with pulp involvement, post-exodontic infections and pericoronitis and with the study of Martini et al. (2010)¹ where the leading causes of odontogenic infections were: decayed teeth with periapical infection 65.7%, post-exodontic infections 17.1% and pericoronitis 14.3%.

In the studies of Osunde et al. (2015)⁵, and Bakhatir et al. (2009)⁷ the leading causes of odontogenic infections were decayed teeth with pulp necrosis, periodontal disease and pericoronitis.

Concerning age group, there was a greater predominance among patients ranging from 21 to 30 years old (36%), like the findings of Cachovan et al. (2013)⁶, Osunde et al. (2015)⁵, Boffano et al. (2012)⁹, Martini et al. (2010)¹ and Akinbami et al. (2010)¹⁰.

Regarding gender, there was a higher prevalence of these infections in males (56%) compared to females (44%), similar to the findings of Boffano et al. (2012)⁹, Osunde et al. (2015)⁵, Sánchez et al. (2011)⁸, Martini et al. (2010)¹ and Bakathir et al. (2009)⁷.

The main clinical manifestations observed in the patients in this study were edema 30%, local pain 25%, toothache 12% and trismus 11%, following the findings of Boffano et al. (2012)⁹, Martini et al. (2010)^{1,11}.

The average hospitalization period observed was 5.31 days; there was no significant difference between the hospitalization period of diabetic patients (5.6 days) and non-diabetic patients (5.2 days). One could assume that this finding may be due to the small number of patients affected by Diabetes Mellitus in this study besides having a well-controlled disease.

Regarding the fascial spaces affected in this study, the most frequent were submandibular 34%, sublingual 17% and pterygomandibular 14%. Most studies in the literature report that the most prevalent space affected in maxillofacial infections is the submandibular space^{3,5,9,12,13}.

The most common antibiotic used in this study was Penicillins, if the patient was not allergic. Due to a protocol established in the service, we started empirical antibiotic therapy with crystalline Penicillin G associated with Metronidazole in most cases (72% of cases) due to the factor of the abundant existence of anaerobic microorganisms present in the oral cavity and most of the odontogenic infections, like some authors¹¹.

Regarding bacterioscopy, culture and antibiogram tests were requested for all patients hospitalized for maxillofacial infections; however, in 25% of the tests, there was no bacterial growth, and approximately 40% of the test results were not located. Of the few culture results obtained to carry out this study, the most prevalent group of bacteria was *S. viridans*, followed by *K. pneumoniae*. All patients underwent surgical drainage with immediate extraction except for cases in which the teeth causing the infection had favorable indications for endodontic-restorative treatment and cases of periodontal diseases with a good prognosis regarding tooth maintenance.

Regarding complications, the three cases in which the clinical condition worsened and required second surgical drainage were probably because these three patients were drained under local anesthesia the first time, but due to the significant discomfort caused by the procedure. Even under local anesthetic techniques performed rigorously and with little collaboration, drainage was probably ineffective.

CONCLUSION

The main surgical treatment was drainage associated with immediate teeth extraction under general anesthesia, which improved most patients effectively, with few complications reported. This finding reinforces the idea that surgical drainage is the main procedure that leads to the patient's clinical improvement regardless of the type of antibiotic used.

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