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Characteristics of Odontogenic Infections that Extended to Maxillofacial Space in Oral and Maxillofacial Emergency Department of Dr. Hasan Sadikin Hospital in 2017 - 2019

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Abstract: ***Background*** *: Odontogenic infection is an infection that originates from the teeth, which can extend to maxillofacial space. Severe odontogenic infection can lead to changes in general circumstances so hospitalization is needed for optimal treatment.* ***Methods****: This research is a retrospectively study by reviewing medical records of patients with diagnosis of odontogenic infections that extend to maxillofacial space that is hospitalized in Dr. Hasan Sadikin Bandung from January 2017 to December 2019.* ***Results****: The results found that the average maxillofacial infection sufferers were mostly in the adult age group and occurs more in men (60%) than in women (40%). Based on the teeth involved, it was found that most were caused by lower left posterior teeth.* ***Conclusion****: The incidence of odontogenic infections is still relatively high despite a decline in the last 3 years. Maxillofacial infections begin with the disruption of oral health so more attention is needed by dental health practitioners. Odontogenic infections can be life threatening.*

Keywords: Infection, odontogenic, abscess

1. Introduction

Odontogenic infection is an infection that caused by bacteria of the teeth and spread through pulp,periodontal tissue, odontoma and cyst's secondary infection, untreated tooth or radix, and pericoronal infections. Odontogenic infections (OIs) have been one of the most difficult disease to treat in dentistry and have difficulty level varies, from the simple local infections to the complex and life-threatening infections. [1]-[3]

Space involved odontogenic infection have more complication risks include low-grade fever and life-threatening condition such as upper respiratory obstruction. National Oral Health Survey (NOHS) in 2006 showed almost 50% population in Philippine were suffered from odontogenic infection with characteristics included deep caries affecting pulp, oral ulcers, abscess through fistula tracts, and pain. Those were caused by less oral health educations and knowledge, as of odontogenic infection percentage was increased.Maxillofacial abscess that caused by odontogenic infection needs immediate treatment due to morbidity and mortality possibilityrate. [4] Patients have to be treated by competent oral surgeon when signs of abscess present, with or without the spread of infection, to prevent any widespread of the abscess. [1]

The aim of this study was to discover the characteristics of OIs that spread into the spaces in emergency room of RSUP Dr. Hasan Sadikin Bandung around 2017 – 2019. The result was expected to obtain odontogenic infection that spread to spaces characteristics datas in emergency unit of RSUP Dr. Hasan Sadikin Bandung along 2017-2019.

2. Literature Review

Facial spaces are potential spaces that exist between the fasciae and underlying organs and other tissue that can be penetrated or filled up by purulent exudates. This spaces are not presented in human with a health condition, but indeed in infected condition. Some spaces have neurovascular structure which called as compartments. The facial spaces that could be directly affceted by odontogenic infection are called as primary spaces, both in maxilla and mandible, and they include canine, infratemporal, buccal, submental, and sublingual spaces. Whereas, the extended infection that run over the primary spaces are called as secondary spaces, such as : Primary spaces maxilla(Canine spaces, Buccal spaces, Infratemporal spaces); Primary spaces mandible (Submental spaces, Buccal spaces, Submandible spaces, Sublingual spaces); Secondary spaces (Maseter spaces, Pterigomandibular spaces, Temporal superfisial and deep spaces, Lateral faringeal spaces, Retrofaringeal spaces, Prevertebra spaces). [5], [6]

Extracellular fluid transudation would escalate the hydrostatic pressure followed by excudation of inflamatory cells, so that would prevent the blood supplies. This would happen when OIs exceed through the pulp to the apex of the tooth and periodontal ligament. [5[, [7]The patogenic bacteria that triggered autolytic inflamatory action would present in all infection stages. Not only distribute the

inflamatory process with the antigen products, this pathogens also directly cause bone destruction. Streptococcus are commonly found in the early stage of the infection. These bacteria destroy the tissue by integrating hyaluronidases and causing the damages of extracellular glycoprotein in connective tissue.These bacterial growth period gave a good flora for anaerobic odontogenic infections, and made the response more acidic by processing the local oxygens and metabolic substances. This flora also produced anaerobic bacterial nutrients three days after clinical symptom presented. Anaerobic bacteria such as *Prevotella* dan *Porphyromonasspp*, produce collagenase enzymes that could destruct collagen tissue as the largest connective tissue's extracellular matrix protein. [5], [8], [9]

This process could occur to mandibular spaces infections or subperiosteal palatal abscess. Otherwise, when periosteum has been occured, the musculus attachment around would directly spread the infection to the soft tissue (Figure 1).

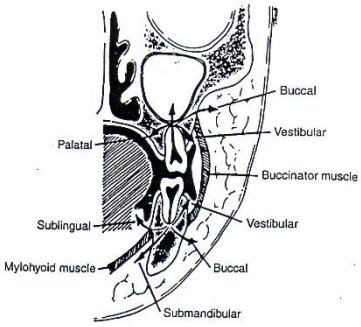

Figure 1: Potential course of odontogenic infection.[5]

Through the inflamatory process and tissue destruction, could be discover the stages and pathways of odontogenic infection. (Table 1).

Table 1: Stages of Infection

Characteristics	Inoculation	Cellulitis	Abscess
Duration	0 – 3 days	3 – 7 days	>5 days
Pain	Mild – fair	Severe, generalized	Fair – severe, localized
Size	Small	Large	Small
Localization	Difuse borders	Difuse borders	Well circumscribed
Palpation	Tender, sticky, mildly smooth	Hard, highly smooth	Fluctuate, smooth
Color	Normal	Redness	Redness aroud the area
Skin quality	Normal	Thick	Rounded and shiny
Surface Temperature	Low-grade febrile	Febrile	High-grade febrile
Functio laesa	Minimum, not present	Severe	Fair – severe
Tissue fluid	Present	Serous, spotting pus	Pus
Malaise level	Edema	Severe	Fair – severe
Severity	Mild	Severe	Fair – severe
Pericutaneous bacteria	Aerobic	Mixed	Anaerobic

The stages of infection could be a good reference to conceive the spread of untreated severe OIs to profund head and neck fascia. Medical treatments for OIs patients were undergone in emergency department, based on OIs characeteristics. There are so many factors to be considered in treating OIs patients, such as medically compromised patients who have systemic disease, include hypertention, diabetic patients, or patients with organ damages or failure such as renal or heart disease. [1], [5]

3. Methods

Secondary data of OIs patients who had the OIs spreade into the spaces was used as the material of this study. The data were taken from medical records of OIs patients in Oral and Maxillofacial Department of Hasan Sadikin Hospital for the past three years from january 2017 – december 2019. The target populations were medical records of patietns who diagnosed by OIs in Oral and Maxillofacial Department of RSUP Dr. Hasan Sadikin Bandung. The accessable population of this study were medical records of patietns who diagnosed by OIs that spread to maxillofacial spaces in Oral and Maxillofacial Department of RSUP Dr. Hasan Sadikin Bandung. The sample of this study were taken based on data and medical records comphrehensiveness. Age, gender, and diagnosis were recorded from medical records. The datas were recorded in tabular form based on some factors, include gender, age, involved spaces, treatment procedure, comorbidities, laboratory result, and follow up after emergency treatment (Table 2).

A retrospective descriptive analytical study was made for this study. Secondary data was taken retrospectively from medical records by using OIs patients characteristics. This study was done in RSUP Dr. Hasan Sadikin Bandung, from September – December 2020

4. Results

The data collection result showed the data for the past three years (2017-2019), there were 212 patients who diagnosed by odontogenic abscess that spread to maxillofacial spaces in Oral and Maxillofacial Department RSUP Dr. Hasan Sadikin Bandung, and 210 patients were included after confirming the following inclusion criteria of this study. Odontogenic abscess that spread to spaces were found more in men for 60% (126 patients), than women for 40% (84 patients), with age range in the 6 – 74 years old (mean 42 years old). The mean of involved spaces number is 2,19, with submandible and submental spaces as the most involved spaces, and the number was decreased by the time. (Chart 1)

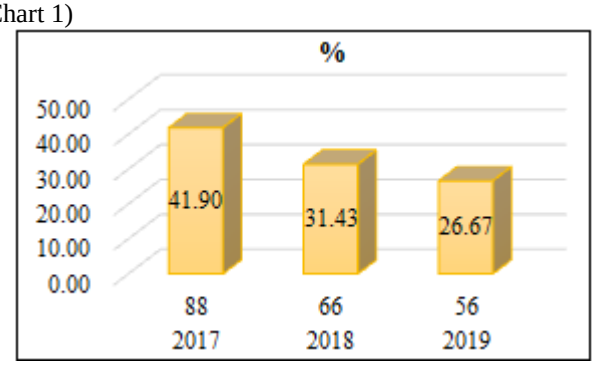

Chart 1: Number of patient with odontogenic infection extended to maxillofacial space of Hasan Sadikin Hospital in 2017- 2019

The average number of leukocyres was 16.795 /uL, with madibular left molars as the highest cause in 84 patients (40%), followed by mandibular right molars in 81 patients (38,57%), and in 45 patients (21,43%) were caused by the other teeth (chart 2). 67 patients (31,9%) had medically compromised condition history. Study variables based on gender, age, involved spaces, treatment procedure, comorbidities, laboratory result, and follow up after emergency treatment were recorded in table (Table 2).

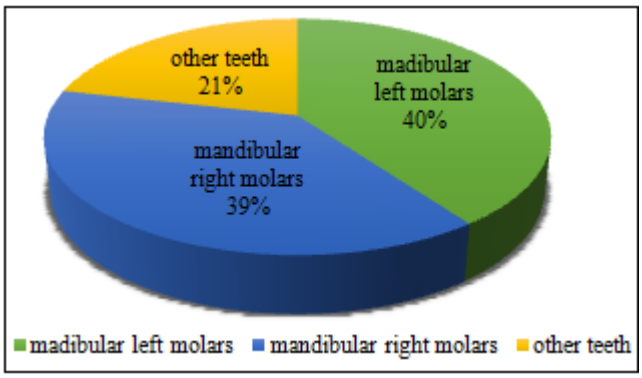

Chart 2: Tooth causes of odontogenic infection extended to maxillofacial space of Hasan Sadikin Hospital in 2017 - 2019

Table 2: Characteristics of the sample study

Variable		n (%)
Gender	Male Female	126 (60,0%) 84 (40,0%)
Age	<20 year 20 – 40 year >40 year	40 (19,1%) 45 (21,4%) 125 (59,5%)
Involved spaces	1-2 >2	135 (64,3%) 75 (35,7%)
Treatment procedur	Extraction Extraction + Incision drainage	14 (6,7%) 196 (93,9%)
Comorbidities	Yes No	67 (31,9 %) 143 (68,1%)
Leukocytes	Normal Abnormal	41 (19,5%) 169 (80,5%)
Follow up	Hospitalized Discharge	49 (23,3%) 161 (76,7%)

5. Discussion

The successful rate of the treatment that was done in emergency department was good as most of the patients came with severe conditions, septicemia, and comorbidities. There were some factors that allegedly related to the successful rate and risks of mortality. One of this study's variables is leukocyte numbers which realted to the spread of OIs to maxillofacial spaces, whereas the further research is needed to discover the recorrelation between leukocyte numbers and protactedly recovery time of a patient who administered in hospital.A specific variable is also needed such as nutritional intake of a patient and laboratory result such as the albumin numbers.

The laboratory numbers such as leukocytes can be used as a reference to assess an infection level and how long the patient shold be administered in hospital. However, the number of leukocytes is not the only factor to assess the patient, indeed the patient's general condition is the most valuable factor. The number of involved spaces is one the most valuable factor to be considered to guide the treatment plan in emergency condition. The treatment plan of OIs including the use of antibiotics and surgical treatment such as tooth extraction and drainage incision to eliminate the pus which is toxic and gain decompression.

6. Conclusion

The incidence of odontogenic infections is still relatively high despite a decline in the last 3 years. Maxillofacial infections begin with the disruption of oral health so more attention is needed by dental health practitioners. Odontogenic infections can be life threatening.

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