International Journal of Infectious Diseases 16 (2012) e296–e302

Contents lists available at SciVerse ScienceDirect

International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid

Odontogenic maxillofacial space infections at a tertiary care center in North India: a five-year retrospective study

George C. Mathew [b], Laxman Kumar Ranganathan [b], Sumir Gandhi [b], Mini Elizabeth Jacob [a,*], Inderjot Singh [b], Manisha Solanki [b], Saurab Bither [b]

[a] Department of Community Medicine, Christian Medical College, Brown's Road, Ludhiana 141008, Punjab, India
[b] Department of Oral and Maxillofacial Surgery, Christian Dental College, Ludhiana, Punjab, India

ARTICLE INFO

Article history:
Received 5 August 2011
Accepted 5 December 2011

Corresponding Editor: William Cameron, Ottawa, Canada

Keywords:
Odontogenic
Maxillofacial
Infection
Abscess
Antibiotic
Complication

SUMMARY

Objective: Odontogenic infections contribute to a significant proportion of maxillofacial space infections (MSI) across the world. MSI can cause several life-threatening complications despite skillful management. The objective of this study was to review the clinical characteristics, management, and outcome of odontogenic MSI treated at a tertiary care center, and to identify the factors predisposing to life-threatening complications.

Methods: A retrospective chart review of all patients treated for MSI from January 2006 to December 2010 at the Christian Medical College Hospital in Ludhiana, North India, was conducted.

Results: Out of 137 patients identified, 66.4% were men. Mean patient age was 40 years, and 24.1% of the patients were diabetic. The most common origin was pulpal (70.8%), the most common space involved was the submandibular space, and the most common teeth responsible were the lower third molars. Twenty patients (14.6%) developed complications. Diabetes, multiple space involvement, and a total leukocyte count of $\geq 15 \times 10^9$/l were associated with complications.

Conclusions: Patients with MSI who present with multiple space involvement, a high leukocyte count, and those with diabetes are at higher risk of developing life-threatening complications and need to be closely monitored.

1. Introduction

Anatomical and microbial factors and impairment in host resistance, compounded by a delay in receiving adequate treatment in the early stages, can result in the progression of a localized odontogenic infection into a maxillofacial space infection (MSI).[1] Severe space infections present a challenging problem to the maxillofacial surgeon because of the complex anatomy and serious medical complications that can occur despite skillful management. Septicemia,[2] airway obstruction,[3] cavernous sinus thrombosis,[4,5] necrotizing fasciitis,[6] and mediastinitis,[7] which can develop subsequent to MSI, are potentially fatal. The objective of this study was to review the clinical characteristics, management, and outcome of odontogenic MSI managed at a tertiary care center, and to identify the factors predisposing to life-threatening complications.

2. Methods

2.1. Study design and sample

We carried out a retrospective study of all patients with a diagnosis of odontogenic MSI treated in the Department of Oral and Maxillofacial Surgery at the Christian Medical College Hospital in Ludhiana, Punjab, from January 2006 to December 2010. All odontogenic infections that had spread beyond the confines of the jaw were included. Localized dental abscesses without space involvement and non-odontogenic space infections were not included in the study.

Patients with MSI were diagnosed and managed using a standard protocol. These patients were either admitted or managed as outpatients. Criteria for hospital admission included space infections with impending threat to the airway or vital structures, fever greater than 38 °C, need for general anesthesia, and the need for inpatient control of a concomitant systemic disease.

All patients who were admitted underwent pre-operative investigations, including hematological and biochemical tests. Intravenous access was obtained and the patients were rehydrated.

* Corresponding author. Department of Epidemiology, Graduate School of Public Health [University of Pittsburgh] 130 DeSoto Street, Pittsburgh, PA 15261 USA. Tel.: +412 223 2283.
E-mail address: mini.e.jacob@gmail.com (M.E. Jacob).

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doi:10.1016/j.ijid.2011.12.014

Empirical treatment with intravenous antibiotics was started preoperatively. All patients subsequently underwent incision and drainage under local or general anesthesia. Irrespective of whether pus had formed or not, spaces were explored and drains placed. The causative diseased teeth were extracted. If pus or a serosanguinous discharge was drained, it was sent for culture. Intravenous antibiotics were continued for a minimum of 1 week, and the patient was followed up until complete resolution of infection.

2.2. Data collection

A retrospective medical chart review was performed of patients with a diagnosis of odontogenic MSI who were treated in the department. Clinical charts and investigation reports were reviewed. The following variables were recorded systematically: demographic data (age, sex), etiopathogenesis (etiology, number and location of teeth involved, spaces involved, associated systemic diseases, previous antibiotic treatment), clinical presentation (presenting symptoms, time from onset of symptoms until presentation, temperature at presentation), results of investigations (white blood cell (WBC) count, blood sugars, pus culture), medical treatment (antibiotics used), surgical treatment (type of anesthesia, intubation, incision, usage of drains), and outcome (complications, duration of stay).

2.3. Data management and analysis

Data were recorded on standardized collection forms. A database was constructed using Microsoft Excel (Microsoft, Redmond, WA, USA) and imported into Epi Info version 3.5.3 for statistical analysis. Descriptive statistics were computed for all variables. Univariate analysis was done for identifying associations of different variables with life-threatening complications. Odds ratios and *p*-values (based on the Chi-square test or Fisher's exact test) were calculated. A *p*-value of <0.05 was considered to be statistically significant. Significant risk factors were further analyzed using multivariate logistic regression analysis.

3. Results

3.1. Patient characteristics

One hundred and thirty-seven patients with complete records were included in the study. Eleven patients with incomplete records were excluded. The demographic and clinical characteristics of the patients in our study are summarized in Table 1.

Table 1
Patient characteristics

Variable	Frequency	Percentage
Gender		
Male	91	66.4
Female	46	33.6
Age group, years		
≥65	11	8.0
<65	126	92.0
Diabetes		
Present	33	24.1
Absent	104	75.9
Other illnesses		
Present	10	7.3
Absent	127	92.7
Site		
Maxilla	28	20.6
Mandible	108	79.4
Fever		
Present	49	35.8
Absent	88	64.2
Admission		
Inpatient	91	66.4
Outpatient	46	33.6
WBC count, $\times 10^9$/l		
≥15	79	77.5
<15	23	22.5
Bacterial growth on culture		
Positive	20	16.4
Negative	102	83.6
Type of anesthesia		
General	71	51.8
Local	66	48.2
Intra-operative drainage of pus		
Present	94	68.6
Absent	43	31.4
Complications		
Present	20	14.6
Absent	117	85.4
Duration of stay, days		
>6	26	28.6
≤6	65	71.4
Number of spaces involved		
Multiple	88	64.2
Single	49	35.8

WBC, white blood cell.

The mean age of the study subjects was 39.96 years, with a standard deviation (SD) of 15.9 years. The age distribution of the study subjects is shown in Figure 1. The most common sign/symptom was swelling (100%), followed by pain (97.1%), trismus (50.4%), fever (42.3%), dysphagia (40.1%), pus discharge at

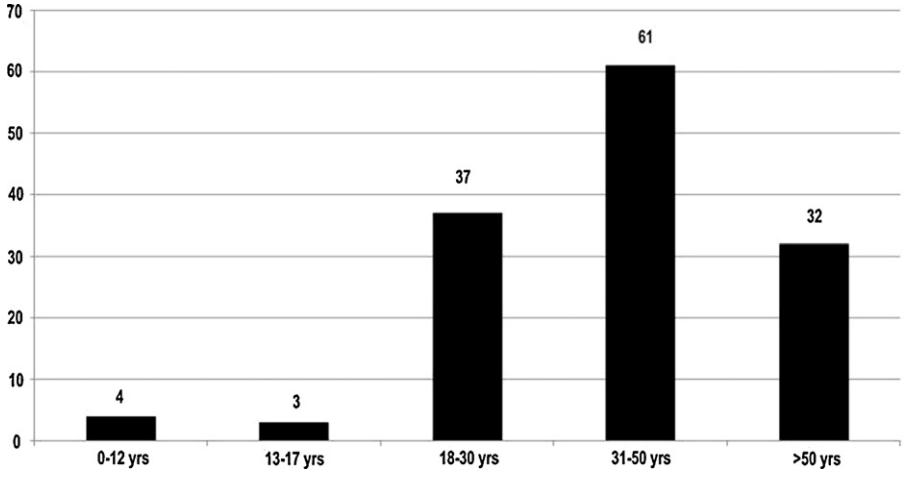

Figure 1. Distribution of patients according to age.