Original Article

DOI: 10.17354/ijss/2016/130

Incidence of Odontogenic Sinusitis – Experience in a Tertiary Care Centre

B G Prakash[1], Suhasini Biyyapu[2]

[1]Professor, Department of ENT, JSS Medical College, Mysore, Karnataka, India, [2]Post-graduate Student, Department of ENT, JSS Medical College, Mysore, Karnataka, India

Abstract

Introduction: Chronic sinusitis is a common rhinological problem and odontogenic sinusitis accounts for 10-12%. Odontogenic sinusitis occurs when the Schneiderian membrane is violated by conditions arising from the dentoalveolar unit. Odontogenic sinusitis differs in its pathophysiology, microbiology, diagnostics, and management from sinusitis of other causes hence, failure to identify the dental cause in these patients usually lead to persistent symptomatology and failure of medical and surgical therapies.

Objectives: (1) To identify and evaluate the frequency of odontogenic conditions that may lead to sinusitis, (2) to investigate how clinical features such as sex, age, etiologic factors, and presenting symptoms of odontogenic sinusitis are differentiated from other types of sinusitis.

Materials and Methods: This study was conducted in 100 patients diagnosed with chronic sinusitis between 2013 and 2015. Patients were selected who met the inclusion criteria and detailed ENT and dental examination was done.

Results: In this study, incidence of odontogenic sinusitis was 17%. It was seen commonly seen in males. Maxillary sinus was involved in all the cases of odontogenic sinusitis followed by ethmoid sinus. Most predominant presenting symptoms are a nasal obstruction, facial pain, nasal discharge, headache, and halitosis. Dental caries, periodontitis, and tooth extraction were the most common causes of odontogenic sinusitis.

Conclusion: In this study, odontogenic sinusitis was seen most commonly in the fourth and fifth decade. First molar and second molar teeth were associated with odontogenic sinusitis. Odontogenic sinusitis should be suspected in cases of refractory sinusitis. Medical and surgical treatment should be considered in the treatment of odontogenic sinusitis.

Key words: Dental caries, Molar teeth, Odontogenic sinusitis, Periodontitis

INTRODUCTION

The inflammation of the sinus membrane that covers the paranasal sinus is referred as "sinusitis." Among the four pair of paranasal sinus, the maxillary sinus is the biggest and most frequently damaged. Possible etiologies of sinusitis comprise local and systemic conditions which can be subdivided into acute, subacute and chronic forms according to their evolution. Chronic sinusitis is an extremely prevalent disorder that has a significant impact on the quality of life of an affected individual.

Access this article online

www.ijss-sn.com

Month of Submission : 01-2015
Month of Peer Review : 02-2016
Month of Acceptance : 02-2016
Month of Publishing : 03-2016

About 10-12% of maxillary sinusitis cases have been attributed to odontogenic infections.[1] It occurs when sinus membrane is violated by conditions such as infections of the maxillary posterior teeth, pathologic lesions of the jaws and teeth, maxillary (dental) trauma, or by iatrogenic causes such as dental and implant surgery complications and maxillofacial surgery procedures. Intimate anatomical relation of the upper teeth to the maxillary sinus promotes the development of periapical or periodontal odontogenic infection into the maxillary sinus. The bony wall, separating maxillary sinus from teeth roots varies from full absence, when teeth roots are covered only by mucous membrane, to the wall of 12 mm. Maxillary sinusitis can also develop because of the maxillary osteomyelitis, radicular cysts,

Corresponding Author: Dr. Suhasini Biyyapu, Sai Vasistha Apartments, Santhapeta, Ongole, Andhra Pradesh, India. Phone: +91-9538588299. E-mail: drsuhab@gmail.com

after mechanical injury of sinus mucosa during root canal treatment, overfilling of root canals with endodontic material, which protrudes into maxillary sinus, incorrectly positioned implants, improperly performed sinus augmentation and oroantral fistulas after tooth extraction.

This disease differs in its pathophysiology, microbiology, diagnostics and management from sinusitis of other causes, although clinical symptoms are not conspicuous. Therefore incorrectly diagnosed, it leads to failure of medical and surgical treatment directed toward sinusitis. This study is done to identify and evaluate the frequency of the different odontogenic conditions that may lead to sinusitis and to investigate how clinical features such as sex, age, etiologic factors, and presenting symptoms of odontogenic sinusitis are differentiated from other types of sinusitis.

MATERIALS AND METHODS

This study was performed from 2013 to 2015. All the patients with symptoms of rhinosinusitis of more than 12 weeks duration are included in the study. Patient's details, symptomatology, clinical presentation, diagnostic nasal endoscopy, dental examination, and radiological findings were recorded from these patients. Diagnostic nasal endoscopy was done using 4 mm Hopkins 0° and 30° angulation scopes, first, second and third pass evaluation of nasal cavity and paranasal sinuses was done after topical anesthesia and decongestion of the nasal cavity of the patients. Radiological evaluation was done using orthopantomogram, X-ray paranasal sinuses using water's view and plain computed tomography scans.

Sample Size

100 patients with chronic sinusitis.

Inclusion Criteria

Patients presenting with two major symptoms persisting for more than 12 symptoms persisting for more than 12 weeks duration are included in the study.

Major factors	Minor factors
Headache	Facial pain/pressure
Nasal obstruction	Halitosis
Nasal discharge/postnasal discharge	Fatigue
Hyposmia/cacosmia	Dental pain
Purulence on nasal examination	Cough, ear pain/ pressure/fullness

Exclusion Criteria

1. Children <5 years of age
2. Acute sinusitis
3. Patients suffering from chronic granulomatous diseases of nose.

Statistical methods applied are:

1. Descriptive
2. Chi-square test
3. Frequency
4. Contingency coefficient test.

Descriptive

It displays univariate summary statistics for several variables in a single table and calculates standardized values. Variables can be ordered by the size of their means (in ascending or descending order), alphabetically, or by the order in which the variables are selected.

Frequencies

The frequencies provide statistical and geographical displays that are useful for describing many types of variables.

Chi-square Test

This procedure tabulates a variable into categories and computes a Chi-square statistic. This compares the observed and expected frequencies in each category to test either that all categories contain the same proportion of values or that each category contains a user specified proportion of values.

Contingency Coefficient Test

This procedure forms two-way or multi-way tables and provides a variety of tests and measure the association for two-way tables. The structure of the table and whether categories are ordered determine what test or measure to use.

All the statistical calculations were done through SPSS for windows (version 16.0).

OBSERVATION AND RESULTS

In the present study, it was common in the females (18.6) than males (15.8) (Table 1).There were 6 (35.3) in >51 years age group with dental problem followed by 4 (23.5) in 21-30 years, 4 (23.5) in 31-40 years and 3 (17.6%) in 41-50 years age group. The higher the age group (>51 years), chances of co-existence of dental pain with sinusitis. Furthermore, the mean age group for general sinusitis was 30.2 ± 11.9 and those for odontogenic sinusitis 42.9 ± 14.3 years (Table 2).

About 9 (69.2%) of patients with halitosis had dental problem, which was statistically significant. Around 7 (38.9%) of patients with postnasal discharge, 13 (32.5%) of patients with facial pain, 5 (27.8%) of patients with dental pain, 10 (20.4%) of patients with nasal discharge, 10 (19.2%) of patients with headache, 13 (14.4%) of with nasal obstruction had co-existence of sinusitis (Table 3).

Table 1: Sex distribution

Sex	Tooth disease, *n* (%)	
	No	Yes
Female	35 (81.4)	8 (18.6)
Male	48 (84.2)	9 (15.8)
Total	83 (83.0)	17 (17.0)

Table 2: Age distribution

Age	Tooth disease, *n* (%)	
	No	Yes
<20	16 (19.2)	0 (0.0)
21-30	31 (37.3)	4 (23.5)
31-40	21 (25.3)	4 (23.5)
41-50	11 (13.2)	3 (17.6)
>51	4 (4.8)	6 (35.3)
Total	83 (100)	17 (100)

Table 3: Distribution of symptoms

Symptoms	Tooth disease, *n* (%)	
	No	Yes
Nasal obstruction	77 (85.6)	13 (14.4)
Nasal discharge	39 (79.6)	10 (20.4)
Postnasal discharge	11 (61.1)	7 (38.9)
Headache	42 (80.8)	10 (19.2)
Halitosis	4 (30.8)	9 (69.2)
Sneezing	32 (91.4)	3 (8.6)
Facial pain	27 (67.5)	13 (32.5)
Dental pain	13 (72.2)	5 (27.8)

High co-existence of halitosis, postnasal discharge, and facial pain was statistically significant. In the present study, there were 17 (17%) subjects with some form of dental problem. Exactly, 5 (5%) had dental caries alone, and 2 had dental caries along with generalized periodontal disease, altogether 7 (7%) had dental caries. Similarly, 5 (5%) had generalized periodontal disease alone and 2 had dental caries along with generalized periodontal disease, altogether 7 (7%) had generalized periodontal disease. One subject had localized periodontal disease. About 4 (4%) had history of teeth extraction in last 12 months (Table 4).

Hence 7 (7%) had dental caries, 7 had periodontitis, 4 had teeth extraction, 2 had oroantral fistula.

In the present study, there were 12 involved tooth were seen on examination. Out of these first upper molar was commonly involved 10 (10%), followed by second upper molar 6 (6%), first upper pre-molar 3 (3%) and second upper premolar 2 (2%) (Table 5).

In the present study, 17 maxillary sinusitis was involved and ethmoid sinusitis involved in 6 cases, 4 cases frontal sinusitis involved and in 2 cases sphenoid sinusitis involved (Table 6).

Table 4: Teeth diseases

Teeth diseases	*n* (%)
Dental caries	7 (7)
Generalized periodontitis	7 (7)
Tooth caries	4 (4)
Localized periodontal disease	1 (1)
Oroantral fistula	2 (2)

Table 5: Tooth involvement

Teeth examination	*n* (%)
First upper molar	10 (10)
Second upper molar	6 (6)
First pre-molar	3 (3.0)
Second pre-molar	2 (2.0)

Table 6: Sinus involvement

Sinuses	Dental problem, *n* (%)
Maxillary sinus	17 (100)
Ethmoid sinus	6 (35.3)
Frontal sinus	4 (23.5)
Sphenoid sinus	2 (11.7)

DISCUSSION

This study was from November 2013 to October 2015. A total of 100 patients were enrolled in the study between 8 and 60-year-old. All the patients presenting with symptoms of rhinosinusitis of more than 12 weeks duration with 2 major and 1 minor or 2 minor symptoms were included in the study.

Frequency of maxillary sinusitis due to odontogenic origin is often underestimated. Proper examination and investigations should be done to rule out dental origin especially in cases of unilateral sinusitis. Normally, the roots of the maxillary premolar and molar teeth are separated from the sinus floor by a dense cortical bone with a variable thickness, but sometimes they are separated only by the mucoperiosteum. Clearly, this anatomical layout can explain the source and development of an inflammatory process. The otolaryngologist should suspect an odontogenic etiology of purulent chronic maxillary sinusitis in patients failing to improve with antibiotics, regardless of a negative dental workup.

In the present study, incidence of odontogenic sinusitis is 17%. Females were more involved than males. The incidence was the highest in the fourth decade.

In a study conducted by Lee and Lee,[2] in which the male to female ratio was 15:12 with a higher incidence in men.

Most predominant symptoms were nasal obstruction (76%), facial pain (76%), nasal discharge (58%), headache (58%), halitosis (52%), and postnasal discharge (47%). Other symptoms were dental pain (29%) and sneezing (n = 3, 17%).

Retrospective chart review of 27 patients diagnosed with odontogenic sinusitis, Lee and Lee[2] reported that unilateral purulent rhinorrhea was the most common and found in 66.7% of their patients with oral and maxillofacial surgeon, followed by facial pain in one-third of the patients, whereas 26% reported a foul smell or taste.

Longhini and Ferguson[3] reports nasal obstruction as the most common and bothersome symptom followed by facial pressure/pain. This case series reported foul smell or rotten taste in 48% and tooth pain in 29% of patients.

Andric *et al.*[4] showed nasal obstruction in 43% cases, nasal discharge in 43%, and facial pain in 71% cases.

Maxillary sinus was involved in all 17 cases of odontogenic sinusitis; ethmoid sinus was involved in 6 cases, frontal sinus in 4 cases, and sphenoid sinus in 2 cases.

Lechien *et al.*[5] where maxillary sinus (75%) and frontal sinus (18%) were most commonly involved, ethmoidal or sphenoid sinus being rare.

Lee and Lee[2] also showed the distribution of paranasal sinus involvement in sinusitis of dental origin, in his study maxillary sinuses were involved 70.4% cases, the maxillary and ethmoid sinuses in 5 cases (18.5%), the maxillary, ethmoid, and frontal sinuses in 2 cases (7.4%), and the maxillary, ethmoid, and sphenoid sinuses in 1 case (3.7%).

Dental caries, periodontitis, iatrogenic causes and oroantral fistula were the most common causes of odontogenic sinusitis. In our study, most of the patients with iatrogenic causes presented within 10 months of dental treatment.

Nimigean *et al.*,[6] 125 patients suffering from odontogenic chronic maxillary rhinosinusitis (CMRS), the main etiology was periapical chronic periodontitis (79% of patients), followed by complications of endodontic treatment (21% of cases).

In addition, in two prospective studies of Melén *et al.*[7] and Lindahl *et al.*,[8] most cases of CMRS were secondary to a dental infectious process such as marginal periodontitis and apical diseases.

In a study conducted by Lee and Lee[2] showed the interval from the dental procedures to the first visit to the outpatient clinic with symptoms was 1 month in 11 (40.8%), 1-3 months in 5 (18.5%), 3 months to 1 year in 8 (29.6%), and over a year in 3 cases (11.1%).

The time interval between symptoms onset and the causal dental procedure may be highly variable: According to Mehra and Murad,[9] 41% of patients developed CMRS in the following month, 18% between 1 and 3 months after the procedure, 30% from 3 months to 1 year, and 11% of patients after more than 1 year first upper molar was commonly involved 10 (10%), followed by second upper molar 6 (6%), first upper pre-molar 3 (3%) and second upper premolar 2 (2%).

Melén *et al.*[7] shows that the most commonly involved teeth are the first (40.6%) and second molars (24.6%). Andric *et al.*[4] observed similar proportions in their retrospective analysis where first and second molars account for 42% and 35%, respectively. Lindahl *et al.*[8] reported a higher proportion of the first molar (38%), followed by the second premolar (24%) and second molar (22%).

CONCLUSION

From this study we conclude that:

1. The incidence of odontogenic sinusitis is 17%
2. Mostly seen in males and in elderly people
3. Most common presentation was nasal obstruction, halitosis, postnasal discharge and facial pain
4. Most common causes of odontogenic sinusitis are dental caries, periodontitis and iatrogenic
5. First molar followed by second molar teeth are the most commonly involved in odontogenic sinusitis
6. In all cases of sinusitis, odontogenic cause should be looked both clinically and radiologically
7. Medical treatment should cover Gram-positive organisms and chronic sinusitis should cover mixed organisms
8. Surgical treatment should include dental and sinus surgery.

REFERENCES

1. Brook I. Bacteriology of chronic sinusitis and acute exacerbation of chronic sinusitis. Arch Otolaryngol Head Neck Surg 2006;132:1099-101.
2. Lee KC, Lee SJ. Clinical features and treatments of odontogenic sinusitis. Yonsei Med J 2010;51:932-7.
3. Longhini AB, Ferguson BJ. Clinical aspects of odontogenic maxillary sinusitis: A case series. Int Forum Allergy Rhinol 2011;1:409-15.
4. Andric M, Saranovic V, Drazic R, Brkovic B, Todorovic L. Functional endoscopic sinus surgery as an adjunctive treatment for closure of oroantral fistulae: A retrospective analysis. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2010;109:510-6.
5. Lechien J, Mahillon V, Boutremans E, Loeb I, Kampouridis S, Chantrain G,

et al. Chronic maxillary rhinosinusitis of dental origin: Report of 2 cases. Rev Med Brux 2011;32:98-101.
6. Nimigean VR, Nimigean V, Maru N, Andressakis D, Balatsouras DG, Danielidis V. The maxillary sinus and its endodontic implications: Clinical study and review. B-ENT 2006;2:167-75.
7. Melén I, Lindahl L, Andréasson L, Rundcrantz H. Chronic maxillary sinusitis. Definition, diagnosis and relation to dental infections and nasal polyposis. Acta Otolaryngol 1986;101:320-7.
8. Lindahl L, Melén I, Ekedahl C, Holm SE. Chronic maxillary sinusitis. Differential diagnosis and genesis. Acta Otolaryngol 1982;93:147-50.
9. Mehra P, Murad H. Maxillary sinus disease of odontogenic origin. Otolaryngol Clin North Am 2004;37:347-64.

How to cite this article: Prakash BG, Biyyapu S. Incidence of Odontogenic Sinusitis – Experience in a Tertiary Care Centre. Int J Sci Stud 2016;3(12):105-109.

Source of Support: Nil, **Conflict of Interest:** None declared.