The Periodontal Health Status of Patients with Maxillary Chronic Rhinosinusitis

(Clinical and microbiological study)

A Thesis

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Abstract

Background:

Periodontal diseases are one of the major dental pathologies that affect human populations worldwide at high prevalence rates, occur when there is imbalance between host defense mechanism and pathogenic bacteria. Maxillary rhinosinusitis is the inflammation of the maxillary sinuses and chronic rhinosinusitis is the sinusitis which is last for at least 12 consecutive weeks duration. There are many bacteria associated with chronic rhinosinusitis: e.g. *Haemophilus influenzae, Streptococcus pyogenes, Staphylococcus aureus, Moraxella catarrhalis, Streptococcus pneumoniae* and *Pseudomonas aeruginosa.*

Aims of study:

The first aim is to study the distribution of periodontal diseases (gingivitis and different severities of chronic periodontitis) among patients with maxillary chronic rhinosinusitis according to gender and different associated factors of maxillary chronic rhinosinusitis.

Second aim that patients with and without maxillary chronic rhinosinusitis, the periodontal health status compared through measurements of the clinical periodontal parameters; Plaque Index, Gingival Index, Bleeding On Probing, Probing Pocket Depth and Clinical Attachment Level in addition, compare the types and numbers of maxillary chronic rhinosinusitis related bacteria from plaque samples.

Third aim that in patients with maxillary chronic rhinosinusitis determine the correlation between clinical periodontal parameters and microbiological findings from plaque samples as well as, the similarity in types of maxillary chronic rhinosinusitis related bacteria from middle meatus swabs and plaque samples.

Materials and methods:

Two hundred eighty patients included in this study they were divided into two groups the first group composed of 150 patients with bilateral maxillary chronic rhinosinusitis for more than 12 weeks, the second group consisted of 130 patients without maxillary chronic rhinosinusitis, both groups with an age range of (25-45) years and with at least 20 teeth present. Exclusion

criteria included; smokers, pregnant ladies, on contraceptive pills, antibiotics, anti-inflammatory medications or periodontal treatment 3 months prior to study, other systemic diseases and patients with dental prosthesis. Clinical periodontal parameters; (Plaque index, Gingival index, Bleeding On Probing, Probing Pocket Depth and Clinical Attachment Level) were recorded for four sites per tooth except third molars for all patients and according to this examination we divided them into four subgroups: clinically Healthy periodotium (Healthy), Gingivitis, Chronic Periodontitis 1 when the mean of Probing Pocket Depth is (4-6 mm) and Chronic Periodontitis 2when the mean of Probing Pocket Depth is (>6mm). Middle meatus swabs taken from maxillary sinuses by Otorhinolaryngologist of patients with maxillary chronic rhinisisitis as well as, plaque samples of the two groups taken from upper first molar if extracted from second molar and if not available the second premolar and then first premolar and send to the lab for streak culture of both on blood agar and mac conky agar media then incubated under aerobic condition (37ºC) for 24 hrs and start identification of types and numbers of maxillary chronic rhinosinusitis related bacteria which are: *Haemophilus influenzae, Streptococcus pyogenes, Staphylococcus aureus, Moraxella catarrhalis, Streptococcus pneumoniae* and *Pseudomonas aeruginosa,* by using either morphological appearance, light microscope, biochemical test or Viteck-2 machine as well as, manual counting method.

Results:

About 24.67% of patients with maxillary chronic rhinosinusitis had clinically healthy periodontium and 75.33% had periodontal diseases, the highest percentage was in Gingivitis subgroup (48%) followed by chronic periodontits with 4-6 mm pocket depth subgroup (24%), the percentages of females with Healthy and Gingivitis were higher than males, while the percentages of males with chronic periodontitis were higher.

Patients with Allergy and Anatomical variations revealed the highest percentages in Gingivitis subgroup, while, those with Polyp showed a highest percentage in chronic periodontits with 4-6 mm pocket depth subgroup (52.63%).

Comparison of clinical periodontal parameters between patients with maxillary chronic rhinosinusitis and patients without maxillary chronic rhinosinusitis subgroups revealed significant and highly significant differences

in Plaque index, Gingival index, Probing Pocket Depth and Clinical Attachment Level except, Bleeding On Probing score 1 demonstrated non –significant difference in chronic periodontits with 4-6 mm pocket depth and chronic periodontits with >6 mm pocket depth subgroups.

In patients with maxillary chronic rhinosinusitis found that *Staphylococcus aureus* and *Streptococcus pyogenes* detected in highest percentages in Healthy and Gingivitis subgroups respectively, while, *Moraxella catarrhalis* and *Pseudomonas aeruginosa* presented in highest percentages in Gingivitis and chronic periodontits with 4-6 mm pocket depth subgroups respectively. *Streptococcus pneumoniae* was the only type which found in chronic periodontits with >6 mm pocket depth subgroup and with highest percentage. All types of maxillary chronic rhinosinusitis bacteria detected in Gingivitis and chronic periodontits with 4-6 mm pocket depth subgroups.

In comparison between patients with maxillary chronic rhinosinusitis and patients without maxillary chronic rhinosinusitis subgroups, *Streptococcus pyogenes* and *Staphylococcus aureus* showed highly significant and significant differences in Healthy and Gingivitis subgroups. While, *Streptococcus pneumoniae* showed highly significant and significant differences in chronic periodontits with 4-6 mm pocket depth and Healthy subgroups respectively.

In patients with maxillary chronic rhinosinusitis, the Healthy subgroup demonstrated strong and moderate correlations between *Streptococcus pyogenes* and *Streptococcus pneumoniae* with Gingival index respectively, while Gingivitis subgroup revealed strong and moderate correlations between Plaque index and Gingival Index with *Staphylococcus aureus*, *Moraxella catarrhalis* and *Pseudomonas aeruginosa*. In chronic periodontits with 4-6 mm pocket depth subgroup, *Moraxella catarrhalis* and *Pseudomonas auroginosa* demonstrated moderate and strong correlations with Gingival Index, Probing Pocket Depth and Clinical Attachment Level respectively, while, it was moderate correlations between *Streptococcus pyogenes* with Gingival Index and Clinical Attachment Level, as well as, *Staphylococcus aureus* with Clinical Attachment Level, on the other hand, *Streptococcus pneumoniae* showed strong correlations with Plaque Index, Gingival Index, and Bleeding On Probing score1. In chronic periodontits with >6 mm pocket depth subgroup there were strong correlations between *Streptococcus pneumoniae* with Plaque Index, Gingival Index, and Clinical Attachment Level, while it was moderate with Bleeding On Probing score1.

It was found that (54%) of patients with maxillary chronic rhinosinusitis group had the same types of maxillary chronic rhinosinusitis related bacteria in plaque samples and middle meatus swabs in the same patients, hence, the highest percentage of similarity was (43.13%) demonstrated by patients had *Staphylococcus aureus* and no similarity in chronic periodontits with >6 mm pocket depth subgroup as well as, *Pseudomonas aeruginosa.*

Conclusion:

1. Periodontal diseases are more frequently seen in patients with maxillary chronic rhinosinusitis and the commonest was gingivitis.
2. Maxillary chronic rhinosinusitis are affecting females more than males; however, females in the Healthy and Gingivitis subgroups were higher than males.
3. There are significant and highly significant differences in Plaque Index, Gingival Index, Probing Pocket Depth and Clinical Attachment Level, but non-significant differences in Bleeding On Probing score1 between patients without maxillary chronic rhinosinusitis and patients with maxillary chronic rhinosinusitis subgroups.
4. Patients with maxillary chronic rhinosinusitis have more related bacteria in their plaque samples especially those with Gingivitis and chronic periodontits with 4-6 mm pocket depth subgroups.
5. There is correlation between maxillary chronic rhinosinusitis related bacteria and clinical periodontal parameters in subgroups of patients with maxillary chronic rhinosinusitis.