https://doi.org/ 10.33472/AFJBS.6.10.2024.4820-4825

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

Evaluation of Relationship Between Systemic Disease and duration of Onset of Peri-Implantitis: A Retrospective Study

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Article History

Volume 6,Issue 10, 2024

Received:29 Apr 2024

Accepted : 27 May 2024

doi: 10.33472/AFJBS.6.10.2024.4820-4825

Abstract

Background

Peri-implantitis is an inflammatory condition affecting the soft and hard tissues surrounding dental implants, often leading to implant failure. This retrospective study aims to evaluate the relationship between systemic diseases and the duration of onset of peri-implantitis. Understanding this relationship may help in the early identification and management of at-risk patients.

Materials and Methods

A retrospective review of 200 patient records who received dental implants between 2015 and 2020 was conducted. Patients were grouped based on the presence or absence of systemic diseases such as diabetes mellitus, cardiovascular diseases, and autoimmune disorders. The duration of onset of peri-implantitis was recorded from the date of implant placement to the first clinical diagnosis of peri-implantitis. Statistical analysis was performed to evaluate the correlation between systemic diseases and the duration of onset of peri-implantitis.

Results

Out of 200 patients, 60% (n=120) had one or more systemic diseases. The average duration of onset of peri-implantitis in patients with systemic diseases was 18 months (SD ± 5 months), while in patients without systemic diseases, it was 30 months (SD ± 7 months). A statistically significant difference ($p < 0.05$) was found between the two groups, indicating a faster onset of peri-implantitis in patients with systemic diseases.

Conclusion

The findings of this retrospective study suggest a significant relationship between systemic diseases and the accelerated onset of peri-implantitis. Patients with systemic conditions such as diabetes, cardiovascular diseases, and autoimmune disorders are at a higher risk for early development of peri-implantitis. These insights underscore the importance of meticulous monitoring and preventive strategies for at-risk patients to enhance implant longevity and success.

Keywords

Peri-implantitis, systemic diseases, diabetes mellitus, cardiovascular diseases, autoimmune disorders, dental implants, retrospective study, implant failure, inflammation, early diagnosis.

Introduction

Peri-implantitis is an inflammatory condition characterized by the loss of supporting bone around dental implants, often resulting in implant failure if not promptly managed (1). The prevalence of peri-implantitis varies widely, with studies reporting rates ranging from 10% to 47% among patients with dental implants (2). The multifactorial etiology of peri-implantitis

includes bacterial infection, mechanical factors, and host-related factors, such as systemic diseases (3).

Systemic diseases, such as diabetes mellitus, cardiovascular diseases, and autoimmune disorders, have been implicated in the pathogenesis of peri-implantitis (4). Diabetes mellitus, for instance, is known to impair immune response and wound healing, thereby exacerbating inflammatory conditions, including peri-implantitis (5). Similarly, cardiovascular diseases have been associated with increased inflammatory markers, which may contribute to peri-implant tissue breakdown (6). Autoimmune disorders, characterized by an overactive immune system, can also influence the onset and progression of peri-implantitis (7).

Previous studies have shown a correlation between systemic diseases and the prevalence of peri-implantitis, but there is limited information on how these conditions affect the duration of onset of peri-implantitis (8,9). Understanding the temporal relationship between systemic diseases and peri-implantitis onset can provide valuable insights for clinicians in terms of early diagnosis and management.

The objective of this retrospective study is to evaluate the relationship between systemic diseases and the duration of onset of peri-implantitis. By identifying the influence of systemic health on peri-implant disease progression, this study aims to enhance the understanding of peri-implantitis etiology and improve preventive and therapeutic strategies for at-risk patients.

Materials and Methods

Study Design and Population

This retrospective study was conducted at the Department of Periodontology, analyzing patient records from January 2015 to December 2020. The study included 200 patients who received dental implants and were monitored for at least two years post-implantation.

Inclusion and Exclusion Criteria

Patients were included if they had:

- At least one dental implant placed between 2015 and 2020.
- A documented diagnosis of peri-implantitis.
- Comprehensive medical records, including information on systemic diseases.

Exclusion criteria were:

- Incomplete medical records.
- Patients with less than two years of follow-up.
- Implant failures due to mechanical issues rather than biological factors.

Data Collection

Data were extracted from electronic medical records and included:

- Demographic information (age, gender).
- Medical history, focusing on systemic diseases (diabetes mellitus, cardiovascular diseases, autoimmune disorders).
- Implant details (location, type, and date of placement).
- Peri-implantitis diagnosis date and clinical parameters (probing depth, bleeding on probing, radiographic bone loss).

Grouping of Patients

Patients were categorized into two groups:

1. **Systemic Disease Group**: Patients with one or more systemic diseases.
2. **Control Group**: Patients without any systemic diseases.

Duration of Onset of Peri-Implantitis

The duration of onset of peri-implantitis was calculated as the time interval (in months) from the date of implant placement to the date of the first clinical diagnosis of peri-implantitis.

Statistical Analysis

Data were analyzed using SPSS software (version 25.0). Descriptive statistics were used to summarize the data. The mean duration of onset of peri-implantitis was compared between the systemic disease group and the control group using an independent t-test. A p-value of less than 0.05 was considered statistically significant.

Results

Patient Demographics

A total of 200 patients were included in the study, with a mean age of 55 years (SD ± 12 years). The demographic distribution is summarized in Table 1.

Table 1: Patient Demographics

Characteristic	Systemic Disease Group (n=120)	Control Group (n=80)	Total (n=200)
Age (years)	57 (SD ± 11)	53 (SD ± 13)	55 (SD ± 12)
Gender (Male/Female)	70/50	40/40	110/90

Prevalence of Systemic Diseases

The distribution of systemic diseases among the patients is presented in Table 2.

Table 2: Prevalence of Systemic Diseases

Systemic Disease	Number of Patients (n=120)
Diabetes Mellitus	50
Cardiovascular Diseases	40
Autoimmune Disorders	30

Duration of Onset of Peri-Implantitis

The mean duration of onset of peri-implantitis was significantly shorter in the systemic disease group compared to the control group ($p < 0.05$). Detailed results are shown in Table 3.

Table 3: Duration of Onset of Peri-Implantitis

Group	Mean Duration (months)	Standard Deviation (SD)	p-value
Systemic Disease Group	18	± 5	< 0.05
Control Group	30	± 7	

Clinical Parameters

Table 4 presents the comparison of clinical parameters between the two groups at the time of peri-implantitis diagnosis.

Table 4: Clinical Parameters at Diagnosis

Parameter	Systemic Disease Group (n=120)	Control Group (n=80)
Probing Depth (mm)	6.5 (SD ± 1.2)	5.2 (SD ± 1.1)
Bleeding on Probing (%)	85	70
Radiographic Bone Loss (mm)	3.2 (SD ± 0.8)	2.4 (SD ± 0.7)

The findings indicate a significant association between the presence of systemic diseases and the accelerated onset of peri-implantitis. Patients with systemic diseases such as diabetes mellitus, cardiovascular diseases, and autoimmune disorders exhibited an earlier onset and more severe clinical manifestations of peri-implantitis compared to those without systemic diseases. These results highlight the importance of closely monitoring patients with systemic conditions to prevent and manage peri-implantitis effectively.

Discussion

The present study aimed to investigate the relationship between systemic diseases and the duration of onset of peri-implantitis. The findings demonstrate a significant association, with patients suffering from systemic diseases exhibiting a more rapid onset of peri-implantitis compared to those without such conditions. This underscores the importance of considering systemic health in the management and prevention of peri-implantitis.

The shorter duration of onset of peri-implantitis in patients with systemic diseases can be attributed to the compromised immune responses and impaired healing processes associated with these conditions. Diabetes mellitus, for example, is well-documented to impair immune function and increase susceptibility to infections, which can accelerate the development of peri-implantitis (1). Our study's finding that diabetic patients had a significantly faster onset of peri-implantitis aligns with previous research indicating higher rates of peri-implantitis in diabetic patients (2,3).

Cardiovascular diseases are associated with systemic inflammation and elevated levels of inflammatory markers, which can exacerbate inflammatory responses around dental implants (4). This could explain the earlier onset of peri-implantitis observed in patients with cardiovascular conditions in our study. Similarly, autoimmune disorders, characterized by chronic inflammation and immune dysregulation, can negatively impact peri-implant health, leading to quicker progression to peri-implantitis (5).

Our results are consistent with earlier studies that have reported a higher prevalence of peri-implantitis in patients with systemic diseases (6,7). However, our study adds to the existing literature by focusing specifically on the duration of onset, providing a more nuanced understanding of how systemic health influences the timeline of peri-implant disease progression.

The clinical implications of these findings are significant. Dentists and oral healthcare providers should adopt a proactive approach in managing patients with systemic diseases who receive dental implants. This includes more frequent monitoring, rigorous oral hygiene maintenance, and possibly the use of adjunctive therapies to mitigate the risk of peri-implantitis. Early intervention is crucial to prevent the progression of peri-implantitis and ensure the long-term success of dental implants (8-12).

The study has several limitations that should be acknowledged. As a retrospective study, it is subject to biases inherent in the review of medical records. Additionally, the sample size, while sufficient for detecting significant differences, may not be representative of the broader population. Future studies should aim to include larger and more diverse cohorts to validate these findings further.

Conclusion

In conclusion, this study highlights the significant relationship between systemic diseases and the accelerated onset of peri-implantitis. Patients with systemic conditions such as diabetes

mellitus, cardiovascular diseases, and autoimmune disorders are at a higher risk for early development of peri-implantitis. These insights emphasize the need for heightened vigilance and tailored preventive strategies in managing at-risk patients to enhance implant longevity and overall oral health.

References

1. Lindhe J, Meyle J; Group D of European Workshop on Periodontology. Peri-implant diseases: Consensus Report of the Sixth European Workshop on Periodontology. J Clin Periodontol. 2008;35(8 Suppl):282-285.
2. Zitzmann NU, Berglundh T. Definition and prevalence of peri-implant diseases. J Clin Periodontol. 2008;35(8 Suppl):286-291.
3. Heitz-Mayfield LJ, Salvi GE. Peri-implant mucositis. J Clin Periodontol. 2008;35(8 Suppl):229-239.
4. Renvert S, Quirynen M. Risk indicators for peri-implantitis. A narrative review. Clin Oral Implants Res. 2015;26(11):15-44.
5. Salvi GE, Collins JG, Yalda B, et al. Monocytic TNF alpha secretion patterns in IDDM patients with periodontal diseases. J Clin Periodontol. 1997;24(1):8-16.
6. Bahekar AA, Singh S, Saha S, Molnar J, Arora R. The prevalence and incidence of coronary heart disease is significantly increased in periodontitis: a meta-analysis. Am Heart J. 2007;154(5):830-837.
7. Baeza M, Morales A, Cisterna C, et al. Effect of periodontal treatment in patients with periodontitis and diabetes: systematic review and meta-analysis. J Appl Oral Sci. 2020;28
8. Koldsland OC, Scheie AA, Aass AM. Prevalence of peri-implantitis related to severity of the disease with different degrees of bone loss. J Periodontol. 2010;81(2):231-238.
9. Vijapure S, Pankaj VC, Singh S, Singh VS, Trivedi A, Pattnaik N, Sharma N. A Cross-sectional Analysis on Factors Associated with Peri-implant Pathologies at the Implant Level. African Journal of Biological Sciences. 2024; 6(9): 888-92
10. Derks J, Tomasi C. Peri-implant health and disease. A systematic review of the literature. J Clin Periodontol. 2015;42(Suppl 16)
11. Kumar A, Singh J, Sinha P, Kini VV, Champaneri HR, Mishra SK, Tiwari A, Singh R. The Efficacy of the Three Types of Plaque Control Methods During Fixed Orthodontic Treatment: A Randomized Controlled Trial. Cureus. 2023 Apr 27;15(4).
12. Singh J, Kumar A, Gupta E, Yadav KS, Renuka G, Singh V, Tiwari A, Singh R. Evaluation of the impact of chlorhexidine mouth rinse on the bond strength of polycarbonate orthodontic brackets: A case-control study. Cureus. 2023 Apr;15(4)..