



Oral Inflammatory Diseases Impact on Atrial Fibrillation: A Comprehensive Review

Patricia Tang*

Department of Anatomical Pathology, Singapore General Hospital, Singapore

Abstract

Atrial fibrillation (AF) is a prevalent cardiac arrhythmia associated with a heightened risk of severe cardiovascular complications. While traditional risk factors have been well-established, there is growing evidence to suggest that oral inflammatory diseases may contribute significantly to AF development and progression. This comprehensive review explores the intricate connection between oral inflammatory diseases and AF, highlighting potential mechanisms and clinical implications.

The oral cavity hosts a diverse microbiome and inflammatory conditions such as periodontal disease and gingivitis, among others. These conditions can release pro-inflammatory mediators, bacterial toxins, and elicit immune responses that may affect remote organs and systems, including the cardiovascular system.

Inflammation, a recognized player in cardiovascular diseases, is believed to contribute to AF by promoting atrial inflammation and fibrosis, affecting the myocardium and conduction system, ultimately leading to electrical and structural remodeling. Potential mechanisms encompass the release of inflammatory mediators, endothelial dysfunction, microbiota dysbiosis, and autonomic nervous system activation.

Recognizing the interplay between oral health and AF holds clinical significance. Collaboration between dentists and cardiologists for at-risk patient identification and integrated care plans is crucial. For AF patients, maintaining good oral health may serve as an adjunctive strategy to reduce the risk of AF recurrence and associated complications.

In conclusion, the association between oral inflammatory diseases and AF represents a promising avenue for understanding the multifactorial nature of this cardiac arrhythmia. While further research is required to establish causality and precise mechanisms, the evidence suggests that oral health is not merely confined to dental care but extends to cardiovascular well-being. Acknowledging this intricate relationship between oral and cardiac health paves the way for more holistic patient care and novel approaches to AF prevention and management. Additional studies are needed to validate the clinical utility of addressing oral inflammatory diseases in AF prevention and treatment strategies.

Introduction

Atrial fibrillation (AF) is a common cardiac arrhythmia characterized by irregular, often rapid heartbeats. It has been a subject of extensive research due to its association with an increased risk of stroke, heart failure, and other cardiovascular complications. While traditional risk factors for AF, such as hypertension, diabetes, and obesity, have been well-established, emerging evidence suggests that oral inflammatory diseases may also play a significant role in its development and progression. This comprehensive review aims to explore the connection between oral inflammatory diseases and AF, shedding light on the potential mechanisms and clinical implications of this association [1].

In addition, C-reactive protein, interleukin-6, tumor necrosis factor- α , and other inflammatory factors can cause an abnormal electrical activity of pulmonary veins, shorten atrial action potential, and interact with heat shock protein or myeloperoxidase to promote atrial fibrosis, thereby promoting the occurrence and recurrence of atrial fibrillation and thromboembolic events [2].

Oral inflammatory diseases are evolving chronic diseases. Periodontitis (PD) is a major oral health problem, leading to tooth loss and bacteremia and resulting in systemic inflammatory responses in severe cases. Surveys show that approximately 50% of the world's population suffers from PD and 10% suffer from severe PD, which is considered to be the sixth global epidemic affecting every country. Based on common risk factors and underlying pathophysiological mechanisms, increasing attention has been given to the association

between oral diseases and cardiovascular diseases [3]. Studies have shown that in PD patients, *Porphyromonas gingivalis* and inflammatory factors could promote the progression of atherosclerosis and may be potential risk factors for coronary heart disease. PD can increase the risk of hypertension through systemic inflammation and oxidative stress.

The oral-heart connection

The oral cavity is not an isolated entity but rather an integral part of the human body. It is home to a diverse microbiome, and disruptions in its balance can lead to various oral inflammatory conditions. Periodontal disease, gingivitis, and dental infections are examples of these inflammatory disorders [4]. Such conditions can lead to the release of pro-inflammatory cytokines, bacterial toxins, and immune responses that may influence distant organs and systems, including the

*Corresponding author: Patricia Tang, Department of Anatomical Pathology, Singapore General Hospital, Singapore, E-mail: Patriciatang@gmail.com

Received: 03-Oct-2023, Manuscript No: jdpm-23-118284, Editor assigned: 06-Oct-2023, Pre-QC No: jdpm-23-118284 (PQ), Reviewed: 20-Oct-2023, QC No: jdpm-23-118284, Revised: 26-Oct-2023, Manuscript No: jdpm-23-118284 (R) Published: 31-Oct-2023, DOI: 10.4172/jdpm.1000182

Citation: Tang P (2023) Oral Inflammatory Diseases Impact on Atrial Fibrillation: A Comprehensive Review. J Dent Pathol Med 7: 182.

Copyright: © 2023 Tang P. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

cardiovascular system [5].

Inflammation and atrial fibrillation

Inflammation has long been recognized as a crucial player in the development and exacerbation of cardiovascular diseases. In the context of AF, it is believed that the systemic inflammation triggered by oral diseases can affect the myocardium and conduction system, leading to electrical and structural remodeling. This, in turn, can promote the initiation and maintenance of AF [6].

Mechanisms of influence

Several potential mechanisms underlie the relationship between oral inflammatory diseases and AF. These mechanisms include:

Inflammatory mediators: The release of inflammatory mediators like interleukin-6 (IL-6), C-reactive protein (CRP), and tumor necrosis factor-alpha (TNF- α) from oral inflammation may promote atrial inflammation and fibrosis, contributing to the development of AF [7].

Endothelial dysfunction: Oral inflammatory diseases can impair endothelial function, leading to increased oxidative stress and reduced nitric oxide bioavailability [8]. This endothelial dysfunction may contribute to AF by affecting the endothelium of the atria.

Microbiota dysbiosis: An altered oral microbiota composition may lead to the translocation of oral pathogens into the bloodstream, potentially causing systemic inflammation and impacting cardiac health [9].

Autonomic nervous system activation: Local inflammation in the oral cavity can activate the sympathetic nervous system, which is known to influence atrial electrophysiology and increase the likelihood of AF.

Clinical Implications

Understanding the link between oral inflammatory diseases and AF has clinical implications. Dentists and cardiologists should collaborate more closely to identify patients at risk and develop integrated care plans. For patients with AF, maintaining good oral health may

be an adjunctive strategy to reduce the risk of AF recurrence and complications [10].

Conclusion

The connection between oral inflammatory diseases and atrial fibrillation is an emerging field of research that holds promise for improving our understanding of the multifactorial nature of AF. While more research is needed to establish the exact mechanisms and causality, the evidence suggests that maintaining good oral health is not only important for oral well-being but may also have a positive impact on cardiovascular health. Recognizing the intricate relationship between oral and cardiac health is a step toward more holistic approaches to patient care and cardiovascular disease management. Further studies are needed to validate the clinical utility of addressing oral inflammatory diseases as part of AF prevention and treatment strategies.

References

1. Khader YS, Rice JC, Lefante JJ (2003) Factors Associated with Periodontal Diseases in A Dental Teaching Clinic Population in Northern Jordan. *J Periodontol* 74: 1610-1617.
2. Chaffee BW, Rodrigues PH, Kramer PF, Vitolto MR, Feldens CA (2017) Oral Health-Related Quality-of-Life Scores Differ by Socioeconomic Status and Caries Experience. *Community Dent Oral Epidemiol* 45: 216-224.
3. Bergenholtz G, Mjör IA, Cotton WR, Hanks CT, Kim S, et al. (1985) The Biology of Dentin and Pulp: Consensus Report. *J Dent Res* 64: 631-633.
4. Liu G, Yang Y, Min KS, Lee BN, Hwang YC (2022) Odontogenic Effect of Icaritin on the Human Dental Pulp Cells. *Medicina (Kaunas)* 58: 434.
5. Leslie JE, Marazita LM (2013) Genetics of Cleft Lip and Cleft Palate. *Am J Med Genet C Semin Med Genet* 163: 246-258.
6. Shkoukani AM, Chen M, Vong A (2013) Cleft Lip – A Comprehensive Review. *Front Pediatr* 1: 53.
7. Burg LM, Chai Y, Yao AC, Magee W, Figueiredo CJ (2016) Epidemiology, Etiology, and Treatment of Isolated Cleft Palate. *Front Physiol* 7: 67.
8. Khan ANMI, Prashanth CS, Srinath N (2020) Genetic Etiology of Cleft Lip and Cleft Palate. *AIMS Molecular Science* 7: 328-348.
9. Schutte BC, Murray JC (1999) The many faces and factors of orofacial clefts. *Hum Mol Genet* 8: 1853-1859.
10. Bender PL (2000) Genetics of cleft lip and palate. *J Pediatr Nurs* 15: 242-249.