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Original Article

The Association between Oral Health and Atherosclerotic Coronary Artery Disease in Patients submitted to Coronary Angiography: a Controlled Cross-Sectional Study

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ABSTRACT

Background: Cardiovascular and periodontal diseases are common inflammatory conditions. In atherosclerosis, inflammation plays a continuous role in the development, destabilization, and rupture of atheromas. There is controversial scientific evidence regarding the association between chronic periodontitis and coronary artery disease (CAD). The objective of this study was to assess the association between chronic periodontitis and CAD in this practice. **Methods:** This was a cross-sectional controlled study of 206 patients with no prior CAD and for whom coronary angiography was indicated; the data included clinical history, physical examination and blood sample collection to test for blood glucose, lipid profile, and C-reactive protein levels. The presence of chronic periodontitis was determined by clinical examination performed by a periodontist. The levels of bacterial plaque, gingival calculus, bleeding, exudate, and classical signs of inflammation were recorded. **Results:** The mean age was 60.3 ± 10.1 years, and 60.2% of the subjects were male. CAD was present in 126 patients (61.2%). There was an association between CAD and gender [male gender, odds ratio (OR) 2.18; P = 0.0075], age (61–70 years, OR 5.63; P = 0.0007), and educational level (higher educational level, OR 2.08; P = 0.02). Inflammatory biomarkers did not differ between the groups with and without CAD. Signs of inflammation and bacterial plaque were present in 88% of patients with CAD, slightly higher than the rate observed in patients without

RESUMO

Associação entre Saúde Bucal e Doença Arterial Coronária Aterosclerótica em Pacientes Submetidos a Cineangiocoronariografia: Estudo Transversal Controlado

Introdução: Doenças cardiovasculares e periodontais são condições inflamatórias comuns na população. Na aterosclerose, a condição inflamatória tem papel contínuo no desenvolvimento, desestabilização e ruptura da placa do ateroma. Existe evidência científica controversa em relação à associação entre periodontite crônica e doença arterial coronária (DAC). O objetivo do estudo foi verificar a associação entre periodontite crônica e DAC em nosso meio. **Métodos:** Estudo transversal controlado, com amostra de 206 pacientes sem DAC prévia e com indicação clínica de cineangiocoronariografia, submetidos a anamnese, exame físico e coleta de sangue para verificação de glicemia, perfil lipídico e proteína C-reativa. A presença de periodontite crônica foi determinada por exame clínico realizado por periodontista, buscando avaliar quantidade de placa bacteriana, cálculos gengivais, sangramento, exsudato e sinais clássicos de inflamação. **Resultados:** A média de idade foi de 60,3 ± 10,1 anos e 60,2% eram do sexo masculino. DAC esteve presente em 126 pacientes (61,2%). Houve associação da presença de DAC com gênero [sexo masculino, odds ratio (OR) 2,18; P = 0,0075], idade (61-70 anos, OR 5,63; P = 0,0007) e escolaridade (ensino superior, OR 2,08; P = 0,02). Os biomarcadores inflamatórios não diferiram entre os grupos com e sem DAC. Sinais inflamatórios e placa

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CAD. Poor oral health, as indicated by the loss of teeth, was more prevalent in patients with CAD. The number of missing teeth was 14 ± 6.4 and 11.9 ± 6.7 (P = 0.04) in patients with and without CAD, respectively. **Conclusions:** There is an association between poor oral health and CAD.

DESCRIPTORS: Periodontitis. Cardiovascular diseases. Atherosclerosis. Myocardial ischemia. Oral health.

bacteriana ocorreram em 88% dos pacientes com DAC, índice ligeiramente superior ao observado naqueles sem DAC. Má saúde bucal, representada por perda de dentes, foi mais prevalente nos pacientes com DAC. O número de dentes faltantes foi de 14 ± 6,4 e de 11,9 ± 6,7 (P = 0,04) nos pacientes com e sem DAC, respectivamente. **Conclusões:** Há associação entre saúde bucal comprometida e DAC.

DESCRITORES: Periodontite. Doenças cardiovasculares. Aterosclerose. Isquemia miocárdica. Saúde bucal.

Coronary heart disease due to atherosclerosis accounts for most deaths from cardiovascular disease. Its pathophysiology is multifactorial and includes the response to injury and immuno-inflammatory, lipogenic, and infectious mechanisms. Many risk factors, such as family history, male gender, older age, obesity, diabetes mellitus, hypertension, dyslipidemia, and smoking have been linked to the development of atherosclerosis and its complications. However, some cases of ischemic heart disease are not explained by these factors.[1]

Poor oral hygiene is the main cause of chronic periodontitis.[2] A low frequency of tooth brushing and lack of flossing result in specific bacterial plaque build-up around one or more teeth, which leads to gum inflammation. In a genetically susceptible patient, this inflammation leads to the development of chronic periodontitis, which is characterized by support epithelial migration towards the root surface followed by loss of support tissue and alveolar bone, culminating in the loss of the dental element.[3]

Chronic periodontitis is an infection caused by Gram-negative bacteria, which find an ideal habitat in the periodontal pockets.[3] The association between chronic periodontitis and cardiovascular disease can be explained by different pathophysiological mechanisms involving both microbial and inflammatory factors,[4] as well as other shared known risk factors.[5]

In recent decades, the interest in establishing an association between inflammatory conditions, oral health, and ischemic heart disease has increased.[6] Previous studies have determined the role of inflammation and its biomarkers in cardiovascular disease.[7] In this context, chronic periodontitis, one of the most prevalent infections, has emerged as a possible modifiable factor in systemic inflammatory conditions.[8] This has been observed, for instance, in the increases in C-reactive protein levels,[9] which is an important prognostic marker of cardiovascular risk.[7] However, these studies were not conclusive due to a lack of homogeneity in chronic periodontitis assessment and the presence of other confounding variables, such as smoking.[10–13] Therefore, the association between chronic periodontitis and coronary artery disease remains inconclusive.

Given the importance of atherosclerotic coronary artery disease and chronic periodontitis with regard to public health, the ease of assessing the clinical signs of chronic periodontitis, and the availability of a recognized method for the evaluation of coronary artery disease (coronary angiography), this study aimed to clarify the association between oral health and coronary lesions.

METHODS

This study was approved by the Ethics Committee of the Instituto de Cardiologia do Rio Grande do Sul and Centro de Pesquisas Odontológicas São Leopoldo Mandic (Porto Alegre, RS, Brazil).

A controlled cross-sectional study was performed using a sample of 216 patients; the data were collected from March, 2010 to May, 2011 at the Instituto de Cardiologia do Rio Grande do Sul, Porto Alegre, RS, Brazil. Individuals with a medical indication for coronary angiography were invited to participate in the study; all signed an informed consent. The sample consisted of patients aged 18 years and older. The exclusion criteria included the use immunosuppressive drugs, the presence of autoimmune or neoplastic diseases, a history of infective endocarditis, and pregnancy or lactation.

The patients were then evaluated through a clinical history and structured physical examination. Data collected from these examinations included demographic and anthropometric information, family history, and associated diseases. The presence of chronic periodontitis was determined by clinical examination that included visual and tactile inspection performed by a periodontist. The periodontist evaluated the amount of plaque, gingival calculus, bleeding, and exudate, and searched for signs of inflammation. Subsequently, blood glucose, lipid profile, and ultrasensitive C-reactive protein levels were assessed. All patients underwent coronary angiography performed by one of two cardiologists blinded to the periodontal examination and laboratory results to determine the presence of coronary atherosclerosis, which was defined according to the ACC National Cardiovascular Data Registry.[14]