Is Periodontal Disease a Risk Factor for Coronary Artery Disease (CAD)?

(Les maladies parodontales sont-elles un facteur de risque des coronaropathies?)

· Chris Lavelle, DDS, DSc, FRCPath, FRCDC, MBA ·

Sommaire

Les coronaropathies (CP) demeurent la principale cause de décès dans la plupart des pays industrialisés, malgré les progrès sensibles qui ont été réalisés en matière de prévention et de traitement. Et les données épidémiologiques actuelles laissent croire qu’on pourra difficilement maintenir les gains récents réalisés dans la réduction de la prévalence de ces maladies, tant que les populations à haut risque ne seront pas mieux ciblées. Bien que les infections dentaires (et principalement les infections parodontales) aient récemment été définies comme un facteur de risque indépendant des CP, les données actuelles sont insuffisantes pour justifier le traitement de ces infections comme moyen de freiner une CP ou autre affection systémique (p. ex., diabète, accident vasculaire cérébral ou issues défavorables de la grossesse) ou d’en renverser la progression.

Mots clés MeSH : coronary disease/etiology; periodontal diseases/complications; risk factors

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other, possibly more important, risk factors may predispose genetically more susceptible individuals to CAD. As a result, current evidence cannot be used to justify the routine prescription of antibiotics for prevention or treatment of CAD. This review evaluates whether similar reservations apply to the treatment of oral (notably periodontal) infections for the arrest or reversal of CAD.

Is There Evidence for an Association Between Periodontitis and CAD?

Recently published studies that have purportedly designated dental infections as independent risk factors for CAD are difficult to validate. The inherent deficiencies include the following:

- difficulties in the design of studies to accommodate potential interactions between variable clusters of risk factors and other factors that are more ill defined (e.g., physical and mental stress, differential circadian periodicities);
- difficulties in the reliable acquisition of standardized data for dental (especially periodontal) infections for baseline and sequential analysis.

These deficiencies have yet to be comprehensively addressed in published studies. For example, not only do the available studies range from cross-sectional to case-control and prospective designs, but quantitative assessments of dental infections extend from periodontal probing to non-validated indices and self-reporting. Most of these studies suggest that CAD is linked to periodontal infections (Tables 1-3), although inconsistencies in design preclude rigorous assessment (e.g., through a Cochrane review).

Is the Periodontitis-Associated Risk of CAD Reversible?

If the link between periodontal infections and CAD is confirmed by subsequent studies, the question will still remain whether the benefits of treating the infections are analogous to

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Summaries of case-control studies on the relationships between periodontal infections and coronary artery disease (CAD)</th>
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<tbody>
<tr>
<td>Patient numbers and characteristics</td>
<td>Results</td>
</tr>
<tr>
<td>100 consecutive patients ≤ 50 years of age admitted to hospital for MI and 102 ≤ 50 years without MI as controls</td>
<td>No significant association between chronic CAD and severity of dental disease</td>
</tr>
<tr>
<td>Series 1: 40 men with MI, 41 men without MI as controls</td>
<td>Significant oral health differences (p &lt; 0.001) between cases and controls</td>
</tr>
<tr>
<td>Series 2: 44 men and 17 women with MI, 44 men and 17 women without MI as controls</td>
<td>Significant oral health differences (p &lt; 0.001) between cases and controls</td>
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<tr>
<td>85 patients with CAD and 46 random controls without CAD</td>
<td>Oral health parameters more strongly associated with CAD than serum cholesterol levels, body mass index, diabetes and smoking; also, subjects with 1–14 teeth more likely to have CAD than those with 15 or more teeth</td>
</tr>
<tr>
<td>320 veterans ≥ 60 years of age</td>
<td>Periodontal disease may have been associated with acute MI</td>
</tr>
<tr>
<td>151 subjects with either CAD or significant CAD risk factors and 943 healthy controls, 26–53 years of age</td>
<td>CPITN scores of 4 subjects significantly related to hypercholesterolemia and possibly associated with CAD</td>
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</table>

MI = myocardial infarction, CPITN = Community Periodontal Index of Treatment Need.
The results of the prospective cohort study on participants in NHANES I did not confirm that treatment for periodontal infections prevents or reverses the prevalence of CAD. However, after adjustment for the principal risk factors (e.g., smoking, blood pressure and cholesterol level), the risks of CAD were no lower among patients without dental infections (those who were edentulous) than among those with periodontitis. These data argue against a causal relationship between these 2 variables and suggest that the limited associations reported by others may be attributable to other confounding factors, such as smoking. Inadequate prior dental histories (e.g., the prevalence and severity of previous periodontally induced bacteremia) for the patients in this and other studies further compromise more rigorous interpretation of the data. Certainly dental clearances will restore the integrity of epithelial barriers and thereby reduce the potential for recurrent oral sepsis, although CAD may be the chronic problem and may have been initiated while the patient was still dentate.

**Can Treatment of Periodontal Infections Reduce the Risk of CAD?**

The results of the prospective cohort study on participants in NHANES I did not confirm that treatment for periodontal infections prevents or reverses the prevalence of CAD; in other words, they failed to show that CAD risks were reduced in those with no periodontal infection (edentulous) or exacerbated in those with periodontitis. These data therefore suggest that the treatment of dental (especially periodontal) infections should be based principally on dental determinants rather than CAD prevention or treatment. Alternatively, even if periodontal infections are not independent risk factors for CAD, these 2 diseases might still be associated after due consideration of confounding factors (e.g., smoking). Patients at high risk for CAD may have similar risks for periodontitis, since the diseases have some commonalities in their underlying pathophysiological processes. Furthermore, patients may be genetically predisposed to both diseases, in addition to others (e.g., diabetes mellitus). If these relationships are subsequently substantiated by interventional trials, then periodontitis should not be expected to be improved by treatment for CAD, nor CAD arrested or improved after periodontal treatment. Such commonalities may, however, explain the associations between periodontitis and atherosclerosis, diabetes and adverse outcomes for pregnancy identified in animal and population-based studies.

**Conclusions**

Current evidence is insufficient to unequivocally support the premise that dental (especially periodontal) infections constitute an independent risk factor for CAD. However, the deposition of atheromatous plaque in the coronary arteries may be associated with many other infections in addition to periodontitis (e.g., bacterial, viral and even parasitic). The association between periodontitis and chronic disorders such as diabetes and CAD may also be mediated by either nonspecific (e.g., hypercoaguability, increase in C-reactive protein) or specific (e.g., induction of pathogenic anti-heat-shock protein) mechanisms, in addition to being linked to immunologic components (e.g., serum amyloid protein, fibrinogen). Therefore, evidence for potential associations between dental infections and systemic diseases must be carefully re-examined to distinguish potential confounding factors from other risk factors (e.g., smoking) before treatment with the aim of preventing or treating CAD can be justified. Alternatively, significant similarities in the etiologic and pathogenetic...
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Processes of these chronic diseases underscore the urgent need for rigorous interventional trials.

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Les vues exprimées sont celles de l'auteur et ne reflètent pas nécessairement les opinions et les politiques officielles de l'Association dentaire canadienne.

Références
La définition de la santé buccodentaire de l’ADC :

La santé buccodentaire est un état des tissus et des structures associés à l’appareil buccodentaire d’une personne qui contribue à son bien-être physique, mental et social et qui améliore sa qualité de vie, en lui permettant de s’exprimer, de s’alimenter et de socialiser sans douleur, malaise ou gêne.

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