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study

Effect of periodontal therapy with systemic antimicrobials on parameters of metabolic syndrome: A randomised clinical trial

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RELEVANT BACKGROUND

Periodontitis is an inflammatory disease that may contribute to increasing the risk of insulin resistance, type-II diabetes, and cardiovascular disease. Periodontitis has also been associated with metabolic syndrome (MetS), with cross-sectional studies showing an increased prevalence of MetS in periodontitis patients compared to healthy individuals or patients with gingivitis. However, few studies have investigated changes in the metabolic status in periodontitis patients after basic periodontal therapy (BPT), with or without adjunctive systemic antimicrobials (AM, amoxicillin and metronidazole).

AIMS

This one-year randomised controlled trial aimed to investigate, in a population of periodontitis patients without known comorbidities, the effect of BPT with adjunctive AM compared to BPT without AM on five parameters defining MetS: waist circumference, triglycerides, blood pressure, HDL-cholesterol, and glucose. The proportion of patients fitting the diagnosis of MetS was also assessed.

MATERIALS AND METHODS

Patients were eligible for inclusion if they presented with no known comorbidity apart from chronic periodontitis and if they did not receive any medication for hypertension, dyslipidaemia, or hyperglycaemia. Periodontitis was defined as $\geq 30\%$ alveolar bone loss at ≥ 2 teeth per quadrant with presence of ≥ 2 teeth with periodontal pockets ≥ 5 mm with at least ≥ 3 mm of clinical attachment loss and at least 50% of all sites with bleeding on probing (BoP).

Measurements for general health and MetS included: height and weight to calculate the body mass index (BMI); waist circumference; blood pressure; and fasting blood tests. MetS diagnosis was based on the presence of central obesity with ≥ 2 of the following risk determinants: triglycerides ≥ 1.7 mmol/L, HDL < 1.03 mmol/L in males or < 1.29 mmol/L in females, blood pressure $\geq 130/85$ mmHg, fasting glucose ≥ 5.6 mmol/L.

The patients were randomised into two groups:

- Group 1: receiving BPT;
- Group 2: receiving BPT+AM (amoxicillin 375mg and metronidazole 250mg, both three times daily for seven days).

All baseline measurements of general health, MetS, and periodontitis were repeated at three, six, and 12 months after treatment. All included patients were treated between 2008 and 2013.

results

- The study included 56 patients in the BPT group and 54 in the BPT+AM group. Overall, 11 patients were lost in the follow-up, thus 99 patients completed the study. The average age was 47.8 years, with a mean BMI of 25.2kg/m².
- Periodontal therapy led to an improved periodontal condition through the whole follow-up time for both groups.
- The BPT+AM group showed a significant additional improvement compared to the BPT group.
- At baseline, no group difference was observed for the five MetS parameters assessed, with 30 patients (27.2%) fulfilling the diagnostic criteria of MetS.
- At 12 months, there were significant intra-group reductions in systolic blood pressure (from 134.8 to 132.1mmHg in the BPT group and from 138.9 to 133.5mmHg in the BPT+AM group) and triglycerides (from 1.71 to 1.35mmol/L in the BPT group and from 1.59 to 1.28mmol/L in the BPT+AM group), without inter-group differences.
- The intention-to-treat analysis showed that the number of MetS patients decreased to 16 (14.5%, p=.007) at the three-month follow-up, but rose to 25 (21.8%, p=.383) at the 12-month follow-up.
- MetS patients who changed their metabolic status were more prevalent in the BPT+AM group than in the BPT group (statistical trend).



LIMITATIONS

- *External validity:* the analysed periodontitis population showed a prevalence of MetS that is higher than those previously reported (in the Netherlands and in Europe). Furthermore, the study population consisted of consecutive patients seeking periodontal treatment in a highly specialised academic centre for dentistry.
- *Study design:* did not allow an estimation of the impact of the reduction in periodontal inflammation on the metabolic condition of the included patients in relation to other possible confounders.
- *Study outcomes:* to test the objective impact of periodontal therapy on patients' metabolic condition, an untreated control group would have been necessary (but unethical and hardly feasible).
- *Sample size:* was calculated on clinical attachment level changes and not on MetS parameters. This should be therefore considered as a pilot study.



CONCLUSIONS

- Periodontal therapy was associated with a reduction in systolic blood pressure and triglycerides level, with a temporarily improvement in the whole metabolic status of periodontitis patients.
- However, the use of AM in conjunction with BPT does not yield any additional improvement in MetS parameters.



IMPACT

- Basic periodontal therapy, regardless of the use of adjunctive AM, improves the metabolic status of patients with periodontitis.
- General dentists, periodontists, and dental hygienists need to be alert to the fact that severe periodontitis may be associated with disturbed metabolic control that may require further specific medical referral.



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