Systemic Immunological Consequences of Chronic Periodontitis

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ABSTRACT

Chronic Periodontitis (CP) is a prevalent inflammatory disease affecting 46% of the US population. CP produces a profound local inflammatory response to dysbiotic oral microbiota that leads to destruction of alveolar bone and tooth loss. CP is also associated with systemic illnesses including cardiovascular diseases, malignancies, and adverse pregnancy outcomes. However, the mechanisms underlying these adverse health outcomes are poorly understood. We used a highly multiplex mass cytometry immunoproteasome to perform an in-depth analysis of the systemic consequences of CP in patients, before and after periodontal treatment in this prospective cohort study. A high-dimensional analysis of intracellular signaling networks revealed immune system-wide dysfunctions differentiating patients with CP from healthy controls. Notably, we observed exaggerated pro-inflammatory responses to P. gingivalis-derived lipopolysaccharide in circulating neutrophils and monocytes from patients with CP. Simultaneously, natural killer cell responses to inflammatory cytokines were attenuated. Importantly, the immune alterations associated with CP were no longer detectable three weeks after periodontal treatment. Our findings demarcate systemic and cell-specific immune dysfunctions in patients with CP which can be temporally reversed by the local treatment of CP.

STUDY DESIGN

Patient recruitment and sample collection: En race stimulation of immune cells with cytokines.

RESULTS

A. cSfN model values before and after CP treatment

B. cSfN model features at baseline

C. cSfN model features after CP treatment

PHASE II

[Images and data not fully transcribed due to graphical nature]