

Impairment of Salivary Gland Function in Rheumatoid Arthritis: Association with Changes in Salivary Biomarkers and Disease Activity

A Thesis

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Abstract

Background: Rheumatoid arthritis is a chronic inflammatory autoimmune disease characterized by joint inflammation, involvement of exocrine salivary and lacrimal glands may occur as extra-articular manifestations in this disease. The diminished salivary function in rheumatoid arthritis is supposed to be closely related to the infiltration of lymphocytes that occurs in affected glands and is demonstrated as decrease in salivary flow and chemical changes.

Aims of study: This study aims to provide evidence of altered function and composition of salivary gland in patients with rheumatoid arthritis by determining salivary flow rate and some biochemical and immunological parameters. In addition to investigating the relationship between disease activity and changes in function and composition of salivary gland.

Materials and Methods: Fifty five patients with rheumatoid arthritis (7 male and 48 female) were enrolled in this study with age range from (20-69) years. The patients were separated into two groups regarding to their salivation: normal salivation group (37) and hypo salivation group (18). Thirty five (9 male and 26 female) seemingly healthy persons were also participated in the study, their sexes and ages were matched with the patients. Three ml of unstimulated saliva was collected from all patients and control. Salivary total protein, α -amylase and peroxidase were measured by colorimetric method, whereas enzyme-linked immunosorbent assay was used for measurement of the salivary IgG and IgA in the studied groups.

Results: The present study showed that there is highly significant decrease ($P < 0.01$; $p < 0.001$) in the median salivary levels of (flow rate, total protein, α -amylase and peroxidase) among rheumatoid arthritis patients when compared to control. Moreover, there was highly significant reduction ($P < 0.01$; $p < 0.001$) in median salivary levels of

flow rate, total protein, α -amylase and peroxidase in two patient groups (normal salivation and hypo salivation) as compared to that in control group. Also the levels of all these parameters (sialometry and sialochemistry) were significantly decrease ($P = 0.00$) in rheumatoid arthritis patients with hypo salivation as compared to that in patients with normal salivation. Concerning immunological parameters the current results revealed that there is highly significant increase ($p < 0.001$) in median salivary level of IgA among patients group as compared to control group. Meanwhile the comparison among three study groups (two patients groups and controls group), revealed that there is highly significant increase ($p < 0.001$) in the level of IgA among two patients groups as compared to control group. However, there are no significant differences in salivary levels of IgA between hypo salivation and normal salivation groups ($p > 0.05$). On the other hand, median salivary level of IgG in rheumatoid arthritis patient was significantly less than that in controls ($p < 0.05$), in addition to that IgG level was significantly lower ($p < 0.05$) in two patients groups than that in control group. Interestingly, there is no significant difference ($p > 0.05$) in level of IgG between two groups of patients. Surprisingly, there is strong positive correlation between total protein and salivary flow rate ($r = 0.651$, $P = 0.000$), on one hand, and on the other hand, there is strong positive correlation between α -amylase and both salivary flow rate ($r = 0.623$, $P = 0.000$) and total protein $r = 0.658$, $P = 0.000$). Moreover there is positive correlation between salivary peroxidase and salivary α -amylase ($r = 0.352$, $P = 0.008$). Finally, this result has failed to show any significant correlation between disease activity and salivary biomarkers.

Conclusion: These findings indicate that the changes in salivary composition may represent involvement of salivary glands in patients with rheumatoid arthritis. Thus these results could be one of several observations that changes in salivary gland functions act as an extra-articular rheumatoid arthritis manifestation.