Salivary IgA in Periodontal Disease

Orhan Güven*, and Jan G.A.M. De Visscher†

Accepted for publication 28 June 1981

UNSTIMULATED, whole-salivary immunoglobulin A (IgA) was investigated by the multiple radial diffusion technique (MRD). IgA was detected in all salivary samples examined. Higher levels of IgA were observed in whole saliva collected from patients with gingival and periodontal diseases. These values were compared to normal salivary samples. There was a positive correlation between the severity of gingival and periodontal inflammation and IgA concentrations.

Periodontal tissue destruction is assumed to result from the interaction of antigenic materials produced by bacteria, situated in the dental plaque, with the host's immune system.1-3 Endotoxins present in these bacteria are capable of inducing an inflammatory response by activating the immunologic effector system (complement). The consequent release of biologically active mediators induces changes in vascular permeability as well as contraction of smooth muscles and chemotaxis of neutrophils. Edema and increased gingival tissue permeability may follow, allowing penetration of bacterial antigens with subsequent stimulation of the host's immune system. In addition, host neutrophils on phagocytizing bacterial products may release damaging enzymes which cause further tissue destruction. In the continuous presence of these factors the condition becomes chronic.1,3,4

It has been reported previously that immunoglobulins are present in gingiva, their concentrations changing according to the condition of the tissue.5,6 Inflammation enhances the immunoglobulin (Ig) levels of periodontal tissues.7-11 It has been demonstrated also that secretions contain three major immunoglobulins: IgA, IgG and IgM. In human saliva as well as in colostrum, tears, nasal, bronchial and duodenal fluid, IgA predominates.12-18SECRETARY IgA is mainly synthesized in plasma cells closely related to the mucous membrane of glandular epithelium. IgA is selectively transported through secretory epithelium by specific "transfer sites" in its heavy polypeptide chains.12,18

The present study compared the concentrations of whole-salivary IgA in gingivitis and periodontitis patients with normal samples.

MATERIALS AND METHODS

After breakfast whole-salivary samples (5 ml) were collected from 60 individuals without any stimulation. Each tube of saliva was centrifuged at 2500 g for 5 minutes to spin down heavy mucous and other particles. Participants in the study were selected according to Löe's39 Gingival Index, and the severity of gingival inflammation was assessed by the same index (GI). Each of the following four groups consisted of 15 subjects.

Group 1 (GI 0): 12 males, 3 females. The age ranged from 19 to 36 years.
Group 2 (GI 1): 6 males, 9 females. The age ranged from 20 to 55 years.
Group 3 (GI 2): 4 males, 11 females. The age ranged from 21 to 55 years.
Group 4 (GI 3): 8 males, 7 females. The age ranged from 20 to 63 years.

The IgA concentrations of salivary samples were measured by the method of Multiple Radial Diffusion (MRD) as described by Doman.21

RESULTS

IgA was detected in all of the salivary samples studied. In the first group (GI 0) the range of concentrations of IgA was 1.35 to 8.5% mg. Statistical analysis of the results showed a distribution with a mean value of 4.4% mg and a standard deviation (SD) of 2.1% mg. In the second group (GI 1) the range was 5 to 30% mg, mean 11.1% mg, SD 5.6% mg. The third group (GI 2) had a minimum IgA concentration of 13.5% mg and the maximum was 30% mg, mean 27.4% mg, SD 4.2% mg. The concentration of IgA in four of the samples from the last (fourth) group were: 25% mg, 28% mg, 29% mg, 29.5% mg and in three of the samples it was 30% mg. In eight other samples the concentrations were higher than 30% mg. The exact concentrations for this group of eight were not...
determined because they lay outside the range of the constructed calibration curve.

The results indicate a positive correlation between the severity of gingival and periodontal inflammation and measured salivary IgA concentrations.

DISCUSSION

In this study higher levels of IgA were observed with the technique of MRD in unstimulated whole saliva from patients with gingival and periodontal disease than from normal salivary samples of healthy persons. There was a positive correlation between the severity of gingival and periodontal inflammation and IgA concentrations. This is in contrast to the original findings of Lindstrom and Folke in 1968. They reported no significant differences in whole-salivary IgA concentrations for subjects with periodontal disease and normal subjects, and their findings were supported by DiCarlo et al. in 1971. In the previous year Brandtzæg et al. had come to the opposite conclusion, showing experimentally that severity of periodontitis could be positively correlated with increased IgA concentrations. This work was subsequently backed up by Chandler et al. and Shillito et al. In 1973 Lindstrom and Folke reversed their earlier conclusions and found the same positive correlation.

Further support has been provided by Lazarovska et al., Brandtzæg, and Lindstrom. Most recently Harding et al., working with acute gingivitis sufferers, reported similar results and Demetriou et al., with parotid saliva, found the same correlation.

Summing up, it is apparent that in patients with gingival and periodontal disease an increased concentration of IgA can be observed in saliva. The concentration of IgA is directly and positively related to the severity of the inflammation.

ACKNOWLEDGMENTS

We wish to thank: Prof. Dr. H. P. M. Freihofer, Department of Oral and Maxillo-facial Surgery, Catholic University, Nijmegen, for his kindly interest and advice; and Dr. D. Randall, Department of Chemistry, Open University, Bucks, England, for his invaluable help.

REFERENCES


Send reprint requests to: Dr. Orhan Gürer, Yesilyurt Sokak, No. 24/15, Aşıği Ayrancı, Ankara, Turkey.