

REVIEW

Early Diagnosis of Periodontal Disease Based on Host Response Analysis

Prabhu M N¹, Jaideep Mahendra², Karrunakaran C M³

Department of Orthodontics,
Syamala Reddy Dental College
111/1 SGR College, Main Road,
Marathalli, Munekolala, Bangalore- 560037

Associate professor¹
Professor²
Dean-Research³

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ABSTRACT:

Pathogenesis based evaluation of periodontal diseases are being discussed in this review. This paper gives an idea of how specific aspects of the host response in periodontal disease may be used in the evaluation of patients. The clinical parameters are, however subject to the variability inherent in clinical evaluation. Assessment of the host response, as discussed here, refers to the study by immunological or biochemical methods of mediators recognized as part of the individuals response to the periodontal infection.

Key words: *periodontal disease, gingival crevicular fluid, humoral immunity, serum*

INTRODUCTION

A disease of the periodontium is a common thing as the oral cavity is constantly under the attack of microorganisms. Once the balance between the host and the microorganisms is lost the disease occurs.

A periodontal disease is recognized as a group of inflammatory disorders whose pathophysiology is related to tooth accumulated microbial plaque and the host response to those accumulations. The pathogenic process can be evaluated using the markers of disease progression.

For many years, the diagnosis of periodontal diseases has relied on clinical & radiographical measures of disease severity. Although the evaluation of tissue inflammation, depth of probable sulcus &

radiographic evidence of alveolar bone loss are undergoing modification, these parameters remain the basis of the clinical approach to patient evaluation. Recently **pathogenesis —based evaluation** of the periodontal diseases has evolved to be more useful approach. As the phrase suggests, this diagnostic strategy depends on the improved understanding of the pathological basis of these disorders. As the periodontal diseases are the result of the interaction the periodontal microflora and the multifaceted host response to the infection, aspects of this complex interaction are being identified and evaluated for both their static relationship to disease severity and their association with future disease progression.

CONCEPT OF EVALUATION

The concept of evaluating the host response in periodontal disease should be considered in terms

Email for correspondence:
prabhumds@rediffmail.com

of modern approaches to diagnosing other disorders. For example, the evaluation of the risk for cardiovascular disease depends on the levels of serum cholesterol and high & low density lipoproteins, and the evaluation of diabetes depends on serum glucose and the level of glycosylated hemoglobin. Both these conditions and tests for them illustrate a principal that is very much in evidence when new diagnostic tests for periodontal disease are discussed: understanding the pathology of disease is critical to the development of approaches to the early identification of disease. Understanding the pathological basis of disease can allow diagnosis of the biochemical lesion before it has progressed to a clinical lesion.

HOST RESPONSE IN PERIODONTAL DISEASE

The host response in periodontal disease involves aspects of the acute inflammatory, humoral immune and cellular immune response. Mediators representing each of these systems have been evaluated as diagnostic tests for periodontal disease (Table I, Table II & Table III).

BIOLOGICAL FLUIDS FOR EVALUATING HOST RESPONSE

The host response in periodontal disease can be evaluated in different biological fluids (Table IV). Gingival crevicular fluid can be collected from multiple sites within the mouth and can be analyzed for markers of acute inflammation, humoral immunity or cellular immunity. Analysis of saliva provides a single measure of mediators that originate in the crevice, serum or salivary glands. Serum for analysis of the antibody titre to putative periodontal pathogens can be collected by antecubital fossa venipuncture or finger prick.

CONCLUSION AND OUTLOOK FOR THE FUTURE

Interest in pathogenesis-based evaluation of the patient with periodontal disease is growing. Assessment of the microbial challenge as part of the diagnostic process is generally recognized as useful

the management of patients with rapidly progressive forms of periodontal disease.

The available data suggest that mediators in gingival crevicular fluid identify the acute inflammatory response (neutrophil lysosomal enzymes such as beta-glucuronidase). Kits measuring the neutrophil elastase and neutral protease in gingival crevicular fluid has been introduced for clinical use. A lot of this kind of kits is to be introduced for early detection of the diseases.

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TABLE - I

MEDIATORS OF ACUTE INFLAMMATION	
CELLS	Polymorphonuclear leukocytes, mast cells and platelets
MEDIATORS	Lysosomal enzymes, Complement components, acute phase proteins and protease inhibitors, vasoactive amines, arachidonic acid metabolites.

TABLE - II

MEDIATORS OF HUMORAL IMMUNITY	
CELLS	B lymphocytes, which give rise to plasma cells.
MEDIATORS	Antibody isotypes- IgG, IgM, IgA, IgD & IgE.

TABLE - III

MEDIATORS OF CELLULAR IMMUNITY	
CELLS	T lymphocytes Monocytes/Macrophages
MEDIATORS	Interleukins/cytokines

TABLE - IV**HOST-DERIVED MEDIATORS PROPOSED AS DIAGNOSTIC TESTS FOR PERIODONTAL DISEASE**

	MEDIATOR	SOURCE	Relationship to disease activity demonstrated in humans
GINGIVAL	Prostaglandin E2	Macrophages,Neutrophils	Yes
CREVICULAR	Collagenase	Neutrophils	No
FLUID	Beta-glucuronidase	Neutrophils	Yes
	Neutrophil-elastase	Neutrophils	Yes
	Aspartate amino transferase	Cytoplasmic enzymes	Yes
	Alkaline phosphatase	Many sources	Yes
	IgG4	Plasma cells	Yes
	IgA	Plasma cells	Yes
	SERUM	Specific IgG antibody to putative pathogens	Plasma cells
SALIVA	IgG	Serum & gingival crevicular fluid	Not studied
	IgA	Plasma cells in the salivary glands	
	Collagenase	Neutrophils	