Biochemical & Immunological Analysis of Saliva & Serum with Evaluation of the Oral Health Status in Thalassemia Major Patients in Mosul

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By

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ABSTRACT

Background :

Thalassemias are group of genetic disorders (hereditary anemias) characterized by absent or deficient synthesis of one or more of the globin chains of the hemoglobin. Thalassemias are widely distributed in the mediterranean basin. In Iraq, thalassemia is carried by about 4.5-5% of the population.The most sever form is β-thalassemia major which if left untreated will lead to death.

Aims of the Study:

This study aimed to, study the biochemical and immunological changes in saliva and serum of thalassemia major patients and evaluate the oral health status of those patients as well as study the relationship between the changes in some of the salivary constituents and the oral health status findings.

The present study investigated (P & HCO3), S-IgA and the enzymes (peroxidase & lysozyme) in saliva of thalassemia major patients for the first time in Iraq.

Materials:

1. Dental chair and sterilized dental mouth mirror, dental probe, periodontal probe and artificial light source.
2. Sterile graduated plane tube for saliva and serum samples collection.
3. Centrifuge.
4. Micropipette.
5. Sterile plastic Eppendorff tubes (0.5 ml) for deep freeze sample sample storage.

6. Flame photometry [Corning 400 Flame photometer, Gallenhamp, England and EEL Flame photometer, HALSTEAD, ESSEX, England].
7. Phosphorus kit from (BIOLABO SA, France) colorimetric determination & UV. Spectrophotometer (UV-9200 spectrophotometer).
8. Water bath (Karl Kolb bath, Germany) & visible spectrophotometer (9200 spectrophotometer), used in SPX activity determination.
9. Sterilized Petri-dishes, agarose gel containing prepared bacteria & standard pure lysozyme (lypholized powder from Fluka Company, Switzerland), all used for lysoplate assay.
10. ELISA kit for the determination of S-IgA in stool and saliva (from IMMUCHROM GMBH, Germany) and ELISA reader with filter 450 nm (reference filter 620 nm) [DNM-9602 microplate reader from BEIJING PROLONG NEWTECHNOLOGY CO. LTD]

Methods :

The study was carried out in Ibn Al-Atheer Teaching Hospital in Mosul and involved (91) subjects. The subjects selection, examination and sample collection was done during the period from February to May 2007. The subjects were divided into two main groups, the study group (total thalassemic) which was composed of (70) thalassemia major patients who were attending the Thalassemia Center for medical management, and the control group which was composed of (21) healthy looking (non-thalassemic) subjects. The study group (total thalassemic) was divided into two groups according to the history of disease and each group involved (35) subjects.

Oral health status was evaluted by recording the dmft/DMFT, plaque & gingival indices as well as recording the occlussal relation and presence of Thalassemic Facies in thalassemia major patients.

Biochemical analysis of saliva & serum by, flame photometry for salivary and serum (Na, K & Ca), colorimetric determination of salivary and serum P by special kit, acid-base titeration method for salivary HCO3, colorimetric determination of salivary peroxidase activity and lysoplate assay for salivary lysozyme. Immunological assay by ELISA for the determination of salivary S-IgA level.

The SPSS 10 program was used for statistical analysis of data . Differences between observations were considered significant at $P \leq 0.05$. the statistical methods used were :

1. Standard statistical methods were used to determine he number, percentage, the mean and standard deviation (SD).
2. Unpaired student t-test was used among the groups for all comparisons.
3. Pearson correlation coefficient was used to find the relationship among the measured variables

Results:

The results of the study showed that, the dmft/DMFT, plaque and gingival indices in thalassemia major patients were significantly higher ($P < 0.001$) than the healthy looking subjects. Thalassemic patients had a relatively high percentage of Class II malocclusion in association with Thalassemic Facies.

The biochemical analysis of saliva in thalassemia major patients showed that the salivary calcium and bicarbonate were significantly lower ($P < 0.001$) than the healthy looking subjects, whereas, the salivary sodium and potassium were significantly higher ($P < 0.001$) than the

healthy looking subjects, while the salivary phosphorus showed no significant difference between thalassemic and the healthy looking subjects.

The salivary lysozyme in thalassemia major patients was significantly lower ($P<0.001$) than the healthy looking subjects. The salivary peroxidase activity although not statistcally significant but was higher in thalassemic patients than the healthy looking subjects.

The immunological analysis of saliva showed that the salivary S-IgA in thalassemic patients were significantly lower ($P < 0.001$) than the healthy looking subjects.

The biochemical analysis of serum in thalassemic patients showed that, the serum calcium was significantly lower ($P < 0.001$) than the healthy looking subjects, whereas, the serum phosphorus and potassium were significantly higher ($P < 0.001$) than the healthy looking subjects, while, the serum sodium showed no significant difference between thalassemic and the healthy looking subjects.

The study showed that there was a significant correlation between the changes in some of the salivary constituents and the high prevalence of dental caries, plaque and gingivitis in thalassemia major patients.

Conclusions:

From the results of the study, high prevalence of dental caries, plaque & gingivitis as well as high percentage of class II malocclusion with Thalassemic Facies was found in thalassemia major patients. Significant biochemical and immunological changes were observed in some of the salivary and serum constituents in thalassemia major patients, and significant correlations were found between some of these changes in saliva and the oral health status records.