Research Article

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Non-invasive Sampling for Assessment of Oxidative Stress and Pro-inflammatory Cytokine Levels in Beta-Thalassaemia Major Patients

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Abstract

Background: Beta-thalassaemia (β-thalassaemia) major patients are severely anaemic and require life-long blood transfusions for survival. These patients require iron chelation therapy as a result of iron overload due to the monthly blood transfusions. The iron overload can cause oxidative damage and pro-inflammation and therefore, hasten mortality. Thus, regular monitoring of the oxidative stress and pro-inflammatory status may be useful in these patients.

Methods: Measurement of biomarkers is usually performed on serum samples but the evaluation in non-invasive samples such as saliva would be more favourable in paediatric cases. In this study, the levels of pro-inflammatory cytokines such as tumour necrosis factor-a (TNF-a) and interleukin-6 (IL-6) as well as oxidative indices such as lipid hydro peroxide, advanced oxidation protein products (AOPP), ferric reducing antioxidant power (FRAP), uric acid (UA) and glutathione peroxidase (GPx) activity in a total of 65 β-thalassaemia major patients (all on iron chelation) and 55 healthy control subjects were assessed. All the above biochemical parameters, measured using well established assay techniques, were detectable in saliva samples.

Results: Non-parametric analyses showed that lipid hydro peroxide (LH) and glutathione peroxidase (GPx) activities were significantly higher in β-thalassaemia major patients. All other parameters were not significantly different between patient and control groups implying that iron chelation therapy was successful in attenuating oxidative stress. Strong positive correlation was observed between FRAP and UA levels. There was also a notable difference in tumour necrosis factor-a (TNF-a) between the patients and healthy controls when analysed according to ethnicity and age. AOPP level in β+-thalassaemia homozygous patients were significantly higher than β+-β0 compound heterozygous and β0-thalassaemia homozygous patients.

Conclusion: Saliva may serve as a reliable, non-invasive sample which can be used to assess oxidative indices and pro-inflammatory cytokines in β-thalassaemia major patients.

Keywords: β-thalassaemia major; saliva; oxidative stress; biochemical analysis

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