

Pathophysiological Red Blood Cell changes in Sickle Beta Thalassemia patients under glutamine treatment

Introduction: Glutamine, one of the most abundant amino acids in human body, is also a gluconeogenic precursor in certain tissues. The fact that it is a precursor of glutathione (GSH) and Nicotine adenine dinucleotide (NAD), which protect erythrocytes from oxidative damage, provokes hematologists' interest. Because of redox inefficiency, the sickle cell is prone to oxidative damage and destruction, compare to normal erythrocytes. As a result, sickle cells absorb more glutamine than they can produce. Thus, glutamine supplementation results in its improved carriage and utilization, as well as the increase of oxidation factors NAD and NADH. As a result, cell defence against oxidative stress is well improved.

Objective: The pathophysiology of RBCs and plasma of patients with Sickle Beta Thalassaemia, who undergo glutamine or hydroxyurea therapy, without any transfusion therapy included. The outcome may help the quality of patients' life.

Materials and Methods: Two study groups will be formed: a) 15 Sickle beta Thalassaemia patients who undergo glutamine treatment and b) 15 Sickle Beta Thalassaemia patients under hydroxyurea treatment. Five Heterozygous beta Thalassaemia and five Heterozygous Sickle cell anemia patients will be used as controls. Apart from the classic hematological, the sickle cell, the biochemical and haemostasis tests, the glutamine concentration will be measured with HPLC method. Concerning the cell biological changes of RBCs, erythrocyte ghosts will be extracted using the Dodge method. Cytosole will be also extracted and osmotic RBC resistance will be measured. Other changes will be also measured: NAD/NADP/NADH and ROS concentrations. Antioxidant plasma capacity will be measured with FRAP method. Finally, a statistical analysis of the data will be performed for the detection of any differences between two groups as well as for the discovery of any correlations among studied parameters.

Expected Results: There is some evidence that glutamine drug usage has shown positive results in the quality of sickle cell patients' life, the positive laboratory markers response to treatment as well as the reduction of oxidative stress.

Conclusions: The present study is going to answer the question whether glutamine can be used as an effective drug for Sickle beta Thalassaemia patients.