

## EFFECT OF SERUM ANTIOXIDANT ASCORBIC ACID CONCENTRATION BY MALARIAL INFECTION MAN

### INTRODUCTION

Malaria is a vector-borne infectious disease caused by five protozoan parasite species of the Plasmodium, the most serious forms of the disease are caused by *P. falciparum*. Other species are *P. vivax*, *P. ovale* and *P. malariae* caused milder disease in humans that is not generally fatal. A fifth specie *P. knowlesi*, cause malaria in macaques but can also infect humans. It is wide spread on tropical and subtropical regions like Africa, Asia and South America. It is one of the six killer diseases in the world to-day and 500 million people are suffered annually [1]. Malaria is associated with poverty, lower hygienic conditions. People get infected by bitten only infective (by sucking blood of infected person) female anopheles mosquito, because only female anopheles mosquito transmitted malaria. In infected person, some symptoms can be observed like, anemia, fever, and finally death. Transmission can be reduced by preventing mosquito bites by using mosquito nets, insect repellants and draining of stagnant water. Work has been done on malaria vaccines with limited success and genetic manipulation of mosquitoes to make them resistant to the parasite [2]. Malarial infection causes significant destruction of erythrocytes. This leads to the release of toxic products, including oxidant compounds. These oxidants are influenced on antioxidants substances in the body. The effect of ascorbic acid level has remained scarce. The plasma concentration of the antioxidant particularly ascorbic acid was studied in varying degrees of malarial parasitaemia and acute malarial infection. Results showed that overall malarial infection reduced plasma vitamin C concentration. However, severe malarial infection significantly reduced plasma vitamin C level when compared with either mild or moderate infection, irrespective of sex and age, but effects were more marked among the infected children. Supplementation should be given and biochemical effects assessed in order to modify the chemotherapeutic regimen for the treatment of malarial infection [3].

In human serum and other extracellular fluids, antioxidants participate in protection against oxidative damage. Vitamin C, water soluble, antioxidant and probably recycles  $\alpha$ -tocopherol back to its active form. Uric acid/urate and bilirubin contribute to the antioxidant capacity of plasma. Vitamins C, E and carotenoids cannot be synthesized in body, and must be taken from diet. Oxidative damage is connected with and probably has a role in the several important age-related diseases such as Alzheimer's, Parkinson's, cataract, and neurodegenerative, chronic inflammatory and cardiovascular diseases. The antioxidants (vitamins C and E), based on their epidemiologically observed health-protective action, could have a role in protection against these diseases [4]. The plasma ascorbate concentration was higher in healthy children than the adults. This is due to the children require vitamins for both growth and maintenance. The ascorbic acid could play important roles on the pathogenesis of malaria infection due to the role of vitamins on the immune system, higher levels of the plasma concentration of vitamin C seen in adult falciparum malaria patients compared with the children's level aimed at boosting host immunity. Reason for this is leucocytes are known to participate as components of cell-mediated immunity in the early response of the host to malarial infection, while serum or plasma levels follow the circadian rhythm or short term dietary changes, those within the tissues themselves are more stable and give a better view of the availability of ascorbate within the organism [4]. From the observation, leucocytes are the best store for ascorbate and they are also mediated when the malaria infection occurs, it can be a very good reason why the level of leucocytes is increased in infected patient, than their uninfected counterpart. The release of the ascorbic acid from leucocytes is due to response to parasite induced stress. Also, the release toxic substance/product, including oxidant compounds, as a consequence of erythrocytic merogony, and the homolysis of red blood cells, may impose a demand on the patient for increased mobilization of antioxidants (vitamin C). However, considering the complex nature of the pathogenic processes associated with malaria infection [5] either factors may be responsible for the increased concentration of ascorbate in infected patients. The level of serum ascorbate in infected patients was above the range 0.5–2.0mg/dL. The evidence that infection in adult patients mobilize the tissue stores of the antioxidant as a part of early response to the infection. Malarial is to be associated with depressed immune function, this may also be responsible for the reduced concentration of plasma ascorbate.

Oxidative damage plays important causative roles in disease initiation and progression. Oxidants are produced naturally through mitochondrial oxidative metabolism and are present in many environmental pollutants. Free radicals and reactive oxygen species (ROS) damage cell membranes, oxidation of low-density lipoprotein is a major factor in the promotion of CHD and carcinogenesis may also be initiated through oxidatively-induced DNA damage. Oxidative damage is balanced by endogenous antioxidants. Antioxidants are becoming increasingly important in understanding the beneficial aspects. Antioxidants are routinely used by the

industry to prevent the oxidation of food in storage and inhibit rancidity. Malaria causes destruction of the erythrocytes. Antioxidants act against free radicals, which is increased during various infections. When there are more free radicals in the body versus antioxidants, human is under the condition-oxidative stress. Oxidative stress induces a lot of other diseases. The plasma ascorbate concentration in oxidative stressed patients (less than 0.5 $\mu$ L) is lower than that of healthy individuals. The association between malaria infection and oxidative stress is very less study on the effect of malaria parasitaemia on the levels of serum vitamin C [5]. The influence of *P. falciparum* count on the changes in vitamin C concentration, the results indicate the changes in serum ascorbate content by mild, moderate and severe parastaemia. It was found that the mean ascorbate level for adults was found to be higher than that of children. A clear reversal trend was observed and the plasma ascorbate level was considerably higher in control children than in control adults.

## REFERENCES

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