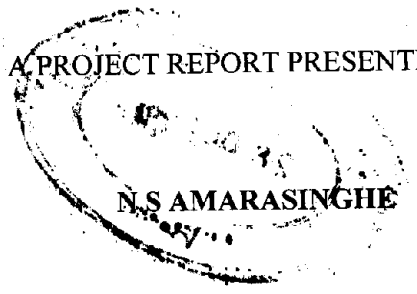
SERUM CALCIUM AND OXIDATION –REDUCTION STATUS OF ERYTHROCYTES IN DIABETIC AND NON-DIABETIC CATARACTS



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ABSTRACT

Serum calcium and oxidation-reduction status of erythrocytes in diabetic and non-diabetic cataracts

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Cataract is an opacification or loss of transparency in crystalline lens of the eye that causes decreased visual activity, which can lead to blindness. It is particularly common in Sri Lanka and only treatment for cataract is surgical removal. There is thus a need for more epidemiological and basic research to reveal the aetiological and promotive factors that cause in the formation of cataracts.

The literature reveals an association between cataract formation and variation of serum calcium and antioxidant levels in the body. Therefore this study was designed to study the status of serum calcium and antioxidant status in relation to cataracts.

Serum total calcium, free (ionized) calcium, serum albumin/globulin ratio and erythrocyte antioxidant status markers namely catalase, glutathione peroxidase were investigated in a total of 156 subjects to investigate this hypothesis.

Results were categorized and analyzed diabetic and non-diabetic with and without cataracts. The control groups was taken as non-diabetics without cataracts.

No significant differences were observed between diabetics and non-diabetics with respect to the blood parameters investigated.

Erythrocyte GPX activities of cataract groups were significantly higher than non-cataract groups. It was also significant, when diabetic cataract subjects were compared with non-diabetic cataract subjects ($p<0.05$).

Serum free calcium concentrations were significantly lower in cataract groups when compared with the non-cataract groups ($p<0.05$). Erythrocyte catalase activity, serum total calcium concentration, and albumin/globulin ratio of the cataract groups were not significantly different from all other groups studied.

Regression analysis of results shows a positive association of erythrocyte GPX activity with cataracts, and a negative association of free calcium with cataracts.

Finding of this study are,

(i) the presence of low level of serum free calcium concentrations and high erythrocyte glutathione peroxidase activities in cataract subjects, who are diabetic and non-diabetic.

(ii) absence of change in erythrocyte catalase activities in subjects with cataracts, who are either diabetic or non-diabetic.

(iii) alteration of calcium concentration, and redox status as likely contributing factors in the genesis of cataracts in diabetic and non-diabetic subjects.

(iv) elevated blood levels of GPX as a reliable marker for detection of cataract formation, both in diabetic and non-diabetic subjects.

(v) changes in serum albumin/globulin ratio being not considered as a risk factor in the formation of cataracts.