



### Determination of Glucose, Urea, and Albumin in Blood Serum of Malarial Patients

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**Abstract:** Malaria is the most serious tropical diseases in the world. This study may examined blood serum level of Glucose, Urea and Albumin, which have been determined in malarial patients and compared with control subjects by using Microlab 300. For the determination of Glucose, Urea and Albumin fifteen intravenous blood samples each from referred malarial patients and a group of control subjects were collected and immediately centrifuged to obtain the supernatant liquid, serum of both groups for analysis. The blood serum levels of urea in malarial patients was determined to be  $13.7 \pm 3.15$ , which increased as compared to the control subjects, the albumin, glucose were decreased as compared to the control subjects.

**Keywords:** Malaria, Serum, Urea, Glucose, and Albumin

#### 1. INTRODUCTION

Malaria is a communicable disease causes millions of deaths worldwide; it is a major public health problem in Pak. An estimated 500 million cases of malaria occurred worldwide in a year and causes 2.7 million deaths per year (WHO 2010). Serum Albumin, Urea and Glucose, levels were examined in fifteen malaria patients and healthy control subjects by using kit method on Microlab 300. It was reported that severe proteinuria (Rees *et al.*, 1972; Rui-Mei *et al.*, 1998; Ogbadoyi *et al.*, 1999) rises in blood urea, low urine specific gravity, low ratio of urinary to blood urea Velthysen 1996 hyper-kalaemia and metabolic acidosis (Mishra *et al.*, 2002). Acute renal failure occurs in about 60% of all cases of complex malaria (Boonpucknaviq *et al.*, 1979 Nanda *et al.*, 2005).

#### 2. MATERIALS AND METHODS

Fifteen venous blood samples (10ml) of malarial patients and control subjects were collected into sample tubes without the addition of anticoagulant. The blood samples were centrifuged at 1500 rpm for 20 minutes; the serum was separated and immediately used for the determination of the Glucose, Urea and Albumin by kit method using software controlled system on MicroLab300. All the chemicals and reagents obtained were of Analytical grade from Merck.

##### Determination of Glucose

1000 $\mu$ L of reagent Phosphate Buffer ( $P_H$ -7.5) 4-aminophenazone Phenol (R1) followed by reagent Glucose oxidase, Peroxidase, Mutarotase (R2) in a 5ml sample tube containing 10  $\mu$ L blood serum were mixed and allowed to stand for 10 minutes to complete the reaction. The absorbance measured at wavelength (500-546 nm).

##### Determination of Urea

1000  $\mu$ L of reagent sodium hydroxide (R1) followed by 200  $\mu$ L reagent picric acid (R2) in a 5ml sample tube

containing 10  $\mu$ L blood serum were mixed and allowed to stand for 10 minutes to complete the reaction. The absorbance was measured at wavelength 500-546 nm which showed the relationship between content of alkaline phosphates.

##### Determination of Albumin

1000  $\mu$ L of reagent buffer ( $P_H$ -4.2) (R1) followed by reagent bromocresol green (R2) in a 5ml sample tube containing 10  $\mu$ L blood serum were mixed and allowed to stand for 5 minutes to complete the reaction. The absorbance was measured at wavelength 564,540-600 nm).

#### 3. RESULTS AND DISCUSSION

(Table 1) shows the blood serum levels of Glucose, Urea and Albumin in control subjects and (Table 2) shows levels of Glucose, Urea and Albumin in malarial patients. The results show increased level of urea in malarial patients as compared to the control subjects, whereas serum Glucose and Albumin levels were decreased in malarial patients as compared to the controls with  $P < 0.001$ .

**Table: 1. Serum Urea, Albumin and Glucose levels in control subjects. All Values are expressed as mean SEM.**

	Urea (mg/dl)	Albumin (mg/dl)	Glucose (mg/dl)
Mean	12.6	4.133	127.4
Standard Deviation	1.73	0.610	14.57
Relative Standard Deviation	0.10	0.1477	0.114

**Table: 2. Serum Urea, Albumin and Glucose levels in malarial patients. All values are expressed as mean SEM.**

	Urea (mg/dl)	Albumin (mg/dl)	Glucose (mg/dl)
Mean	13.7	2.933	112.4
Standard Deviation	3.15	0.3171	66.6
Relative Standard Deviation	0.22	0.1081	0.5877

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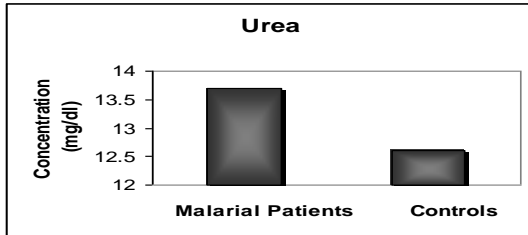


Fig. 1: (a) shows increased level of serum urea in malarial patients as compared to the control subjects.

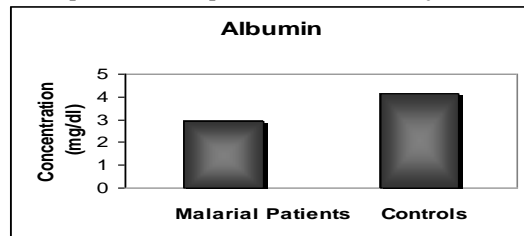


Fig. 1 (b) The decreased level of serum albumin in malarial patients as compared to the control subjects.

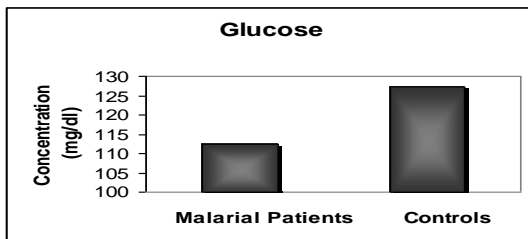


Fig. 1: (c) the decreased level of serum glucose in malarial patients as compared to the control subjects.

(Fig. 1a) shows increased level of serum urea in malarial patients as compared to the control subjects. It was reported that the elevated serum urea levels in malarial patients which vary significantly from the control subjects may primarily be due to factors such as further than malaria there was no positive correlation between parasitaemia and urea levels. Higher than normal values of serum urea and creatinine are indicators of deficiency in renal function (Narayanan *et al.*, 1980; Whelton *et al.*, 1994). In the appearance of all these consideration, serum urea levels do not reflect the performance of the kidneys like creatinine because urea production is also affected by dehydration, food intake and tissue catabolism. Increases in serum urea concentration in the patients recommend that the normal functioning of the kidneys may compromise (Raphael *et al.*, 2010). (Fig. 1b) shows decreased level of serum albumin in malarial patients as compared to the control subjects it was reported that the serum total protein and albumin decreased significantly in malarial patients because the impairment of the synthetic function of the liver (Ginsburg. *et al.*, 2002). (Fig. 1c) shows decreased level of glucose in malarial patients as compared to the control subjects. It was reported that the decreased plasma glucose in malaria patients as compared with the controls which stated that hypoglycemia were common in malaria (Taylor, *et al.*, 1988; White, *et al.*, 1983).

#### 4.

#### CONCLUSION

Prompt diagnosis along with antimalarial drug therapy may reduce malarial chronic kidney disease and find a useful alternative drug that may reduce the rate of hypoglycaemia in malarial patients. The data was obtained to provide a better understanding of metabolic processes in order to intend appropriate therapeutic approaches for patients of malaria, so they may recover and live normal.

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