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Renal Complications in Patients with Malaria

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Abstract: Background: Malaria is a potentially life-threatening disease and also a major public health problem in Pakistan. Renal failure is an emanate issue correlated by morbidity and mortality, however may diagnose and treated in the initial phases. **Objectives**: To elucidate the biochemical renal factors in patients with malaria and comparison with healthy control subjects. **Method:** 80 patients, who were diagnosed by falciparum malaria. Detailed history, general physical and systemic examination and necessary pathological, biochemical renal laboratory parameters and investigations were done. **Results**: Among the 80 patients, 43 were males and 37 were females. All patients were infected with P. falciparum. All patients had increased serum creatinine and urea levels and urine output of less than 400 ml/day were categorized as suffering from renal failure. **Conclusion:** Patients infected with P. falciparum are at an increased risk of developing renal failure when compared to patients infected with other complications. P. vivax has massive potential to cause life threatening complications and even death. Further research is necessary to understand the exact pathogenesis of various complications encountered in vivax malaria.
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1. INTRODUCTION

Malaria is a parasitic life threatening disease and a major public health problem in Sub-Saharan Africa, Asia including Pakistan. The risk factors such as unhygienic conditions conducive for the growth of mosquito and poor diet habit leading to weaker immune defense system. There are more then 350-500 Million cases of clinical malaria occur annually, 60% of which are in sub-Saharan Africa. Moreover, 80% of all deaths attributed to malaria occur in this state. In records, 1 million Africans die of the disease each year, with the vast majority of deaths occurring among children below five years of age **(1).** It is reported that acute renal failure occurs in about 60% of all cases of complex malaria **(2, 3).** Serum creatinine is a generated from muscle metabolism and passes into the bloodstream, and is usually excreted in urine. It is a molecule of main consequence for manufacturing energy in muscles. About 2% of the body's creatine is converted to creatinine every day. However, creatinine is a transported from bloodstream to the kidneys. The kidneys filter out creatinine and it dispose urine. Because the muscle mass in the body is relatively constant from day to day, the level of creatinine in the blood remains unchanged. Hence, under certain pathological conditions, elevated blood level of creatinine is observed indicating kidneys malfunction. It is usually a more accurate indicator of kidney function than urea **(4).**

In the present study Microlab 300 was utilized to determine Urea and Creatinine levels from the blood serum in malarial patients comparison with control subjects.

2. MATERIAL & METHODS

Eighty 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 urea and creatinine by kit method using software controlled system on MicroLab300.

All the chemicals and reagents obtained were of Analytical grade from Merck.

Determination of Urea

1000 µL of reagent sodium hydroxide (R1) followed by 200 µL reagent picric acid (R2) in a 5ml sample tube containing 10 µL 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 Creatinine

400 µL of reagent Sodium hydroxide (R1) followed by 100 µL reagent Picric acid (R2) in a 5ml

sample tube containing 50 µL blood serum are mixed and were allowed to stand for 01 minutes to complete the reaction. The absorbance was measured at wavelength 500-546 nm which showed the relationship between the content of alkaline phosphatase and the absorbance of picric acid formation in a linear manner.

3. RESULTS AND DISCUSSION

(Table 1) shows the levels of urea and creatinine in control subjects and in malarial patients. The results show increased level of urea and creatinine in malarial patients as compared to the control subjects.

Table: 1. Urea and Creatinine levels in Controls & Patients

Variables	Controls	Malaria Patients
Urea	12.6±1.73	13.7±3.15
Creatinine	0.75±0.74	0.856±1.11

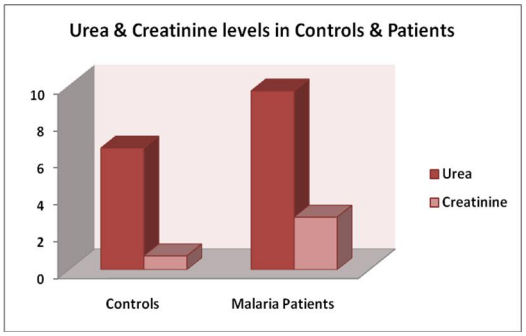

Fig. 1: shows increased level of Urea & serum Creatinine

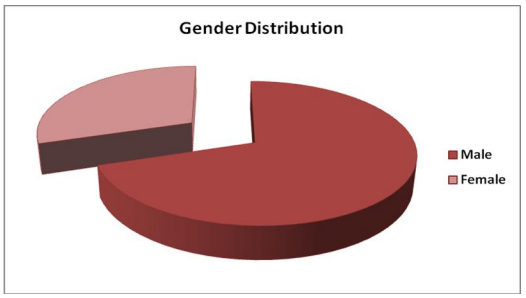

Fig. 2: shows Gender distribution

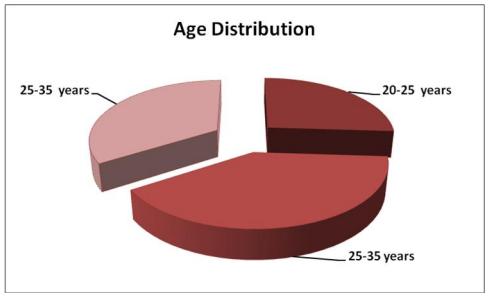

Fig. 3: shows Age distribution

Fig. 1 shows increased level of serum urea and creatinine in malarial patients as compared to the control subjects. Fig 2 and 3 shows age and gender distribution in patients. It was reported that the high urea in malarial patients that vary considerably as the healthy controls could primarily be because of aspect alike further than malaria and the negative association amongst parasitaemia and urea levels. Elevated and average levels of urea and creatinine are signs of insufficiency in renal function **(5, 6).** In the appearance of all these consideration, serum urea levels doesn't replicate the presentation of the renal such as creatinine as urea productivity similarly influence through dehydration, diet consumption and tissue catabolism. Increases in urea levels in the patients recommend that the normal functioning of the kidneys. **(7-9)**

In current study 67% of patient cases have some form of renal involvement. Similarly other studies have given comparable results. Few studies give 50% of renal involvement in falciparum malaria, 23% in vivax malaria **(10).**

The percentage of renal involvement is maximum in mixed infection group. The hemodynamic changes are more malignant in case of falciparum malaria as the RBC parasitization rate and micro-vascular obstruction is maximum in falciparum malaria **(11).**

CONCLUSION

Patients infected with P. falciparum are at an increased risk of developing renal failure when compared to patients infected with other complications. P. vivax has massive potential to cause life threatening complications and even death. Further studies are needed to understand the exact pathogenesis of various complications encountered in vivax malaria

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