Abstract

Introduction - Chronic Kidney Disease of Unknown Etiology (CKDu) is a growing health problem in Sri Lanka as well as some parts of the world. It first appeared during early 1990s in North Central Province (NCP) among agricultural workers and since then, number of CKDu patients have been increased dramatically. Most studies in finding the etiology were focused on the environmental factors even though genetic factors appeared to be play an important role in the development of the CKDu. G6PD gene is a candidate gene as high proportion of CKDu patients found to be deficient in G6PD enzyme activity.

Objectives - To determine the prevalence of selected point mutations (rs766420 and rs915942) in CKDu patients with and without G6PD enzyme deficiency and to compare the CKD stage with G6PD enzyme activity in CKDu patients presenting to the Teaching Hospital, Kandy.

Method - A descriptive cross sectional study was conducted with 111 patients with CKDu attending to Nephrology Clinic at Teaching Hospital Kandy. They were screened for G6PD enzyme activity using dried blood spots blotted on filter papers. G6PD activity was measured according to a method described by Kuwahata et al., (2012). Twenty two patients from each group (With G6PD deficiency and normal G6PD activity) were selected to identify the presence of selected SNPs. DNA was extracted from dried blood spots and flanking regions of each SNP were amplified by PCR using specific primers. Genotypes were determined by restriction enzyme digestion and restriction fragment length polymorphism (RFLP) with agarose gel electrophoresis.

Results - A total of 111 CKDu patients were screened during the study period to achieve the target sample size. Out of them, 73% (n=81) of were males with the mean age being 51.34 years (SD=12.191). Majority of them (58.6%, n=65) were farmers and 40.5% (n=45) had a past history of Malaria. Out of all CKDu patients, 18.9% (n=21) of the study group had at least one CKDu patient in their families. Prevalence of G6PD enzyme deficiency in CKDu patients was 56.8% (n=63). Only 3.6% (n=4) of them had severe deficiency and all of them were males.

Twenty two patients were selected from each group (Both D6PD deficient and normal) for genotyping. Out of the 22 G6PD deficient patients, 59.1% (n=13) had rs766420 and 22.7% (n=5) had rs915942 mutations. Out of the 22 patients with normal G6PD activity, 63.6% (n=14) had rs766420 and 18.2% (n=4) had rs915942 mutations. There was no statistical significance observed between the presence of either rs766420 or rs91594 and G6PD enzyme activity ($p = 0.866$) and ($p = 0.613$) respectively. CKD stage was compared with G6PD enzyme activity but no significant association was found ($f = 2.389$, $df = 3$, $p = 0.073$).

Conclusions - A significant number of CKDu patients had low G6PD enzyme activity. However, no association was found between the studied SNPs or CKD stage and G6PD enzyme activity in patients with CKDu.