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Promising biomarkers to diagnose chronic kidney disease of unknown etiology (CKDu) in Sri Lanka – A review

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Objectives: Since 1990s, a new form of chronic kidney disease (CKD) where the obvious cause is unidentifiable has been reported in rural Sri Lanka and basically named as chronic kidney disease of unknown etiology (CKDu). Of the 21 million of total population, 1.7 million live in the affected areas and 69258 patients were attending to clinics; CKD G3 – 31.8%, CKD G4 – 40% and CKD G5 – 24.5%. Hence early diagnosis became imperative. Biomarkers may revolutionize the diagnosis of CKDu. Therefore, through this review we intended to gather information on CKDu biomarkers.

Methods: We have reviewed articles published on potential utility of CKDu biomarkers using following data sources: Pubmed, papers cited in publications retrieved and the worldwide web (using google).

Results: Of total 371 patients data, serum genetic biomarkers including insulin like growth factor binding protein 1 (IGFBP1) and kidney injury molecule-1 (KIM-1) significantly differentiated the early stage of CKDu and glutathione S transferase mu 1 (GSTM1) significantly differentiated the late stage CKDu patients from healthy group. IGFBP1 and KIM-1 also performed better to differentiate the early stage of CKDu patients from late stage CKDu. Urinary alpha 1 microglobulin (AIM), KIM-1 and retinol binding protein 4 (RBP4) as a combination, better seperated CKDu patients from healthy people as well as from all other CKD categories. Osteopontin (OPN), KIM -1 and RBP4 performed better to separate CKDu from CKD patients. Elevated levels of urinary KIM-1, NGAL (neutrophil gelatinase-associated lipocalin), fibrinogen, clusterin, cystatin c and β2-microglobulin (β2-M) also noticed.

Conclusions: Serum genetic markers; IGFBP1, KIM-1, GSTM1 can be considered as potential biomarkers to early screening of CKDu. Combination of urinary AIM, KIM-1, RBP4, and OPN better predicted the CKDu. Furthermore, urinary KIM-1, NGAL, fibrinogen, and β2-M showed promising results for suitable biomarkers.