Transforming Growth Factor-β (TGF-β) and chronic kidney disease progression among black patients attending a tertiary hospital in Johannesburg, South Africa

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Abstract

Background: Transforming growth factor-beta (TGF-β) has both fibrotic and protective roles; in its fibrotic roles it can serve as a novel biomarker essential for early diagnosis and prediction of chronic kidney disease (CKD) progression.

Methods: This was a prospective longitudinal study among black patients with CKD who attended the kidney outpatient clinic between September 2019 and March 2022 at the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) in South Africa. Patients provided urine and blood samples for laboratory investigations at study entry (0) and at 24 months follow up. Serum and urine (TGF)-β1, TGF-β2 and TGF-β3 levels were measured at baseline using the Human TGF-β duoset ELISA. Multivariable logistic regression analysis was used to determine if TGF-β predicted CKD progression.

Results: A total of 312 patients were enrolled into the study, 297 (95.2%) patients completed the 2 years of follow up. The prevalence of CKD progression was 47.8% by a sustained decline in eGFR of >4 ml/min/1.73 m^2/year or more and 51.9% by a change in uPCR > 30 %. Of the patients with CKD progression, 54.9% were men, the baseline median age was 59 (46 - 67) years, eGFR was lower [37 (32 -51) mL/min/1.73 m2] and urine protein creatinine ratio (uPCR) was increased [0.039 (0.015-0.085) g/mmol]. Comparing patients with, and those without CKD progression, the median serum TGF-β1 was 21210 (15915 – 25745) ng/L vs 24200 (17570 – 29560) ng/L (p = 0.004), the median urine TGF-β3 was 17.5 (5.4 – 76.2) ng/L vs 2.8 (1.8 – 15.3) ng/L (p = 0.017) respectively. There was no significant association of baseline serum and urine TGF-β isoforms with CKD progression after multivariable logistic regression analysis.

Conclusion: Patients with CKD progression had lower concentrations of serum TGF-β1 and increased urinary TGF-β3 concentrations at baseline. However, baseline TGF-β isoforms did not predict CKD progression.