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Urinary Peptidase Inhibitor 3 could be a potential biomarker for diabetic and hypertensive nephropathy

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Introduction

Peptidase Inhibitor 3 (PI3) gene, known as elafin is a protein inhibitor. Its expression is predominantly found in kidney tubules and causes a cytokine-mediated inflammatory response in kidney injury.

Objectives

This research aims to study the gene expression pattern of the PI3 gene in chronic kidney disease (CKD) specific to different aetiology and determine the correlation of its expression with current renal markers, serum creatinine (Scr) and estimated glomerular filtration rate (eGFR).

Methods

A total of 115 urine samples were obtained from different study groups, including diabetic nephropathy (DN) (n=25); hypertensive nephropathy (HN) (n=32); CKD with both diabetes and hypertension (DH) (n=16); other cause of CKD (O-CKD) (n=22); and healthy controls (HC) (n=20). Extracted mRNA was reverse-transcribed and used for a quantitative polymerase chain reaction. A relative quantification method of gene expression analysis was used to calculate fold changes (FC) and log₂ normalized fold changes (Log₂Fc).

Results

The results showed that 100% and 92.6% of PI3 gene expression were seen in HC and CKD study groups, respectively. PI3 gene was significantly upregulated in both HN and DN groups compared to HC and the values were 39.22±7.53-fold (Log₂Fc=3.96±0.59; p<0.001) and 25.53±7.28-fold (Log₂Fc=3.48±0.61; p<0.05) respectively. Urinary PI3 gene expression was not correlated with both serum markers, Scr and eGFR in DN and HN study groups while showing a significant positive correlation in the DH study group (r=0.61; p<0.05).

Conclusions

From this study, Peptidase inhibitor 3 could be used as a potential biomarker for diabetic and hypertensive nephropathy and further validation is necessary using proteomic analysis before clinical implementation.

Key words: Chronic kidney disease, diabetic nephropathy, gene expression, and hypertensive nephropathy