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Type IV Collagen as a biomarker for the early detection of Diabetic Nephropathy: A Meta-Analysis

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Objectives:

Diabetic nephropathy is a consequential complication of Type 1 and Type 2 diabetes and has been the major cause of end-stage renal disease (ESRD). It is characterized by albuminuria in the early stages and progresses into renal function impairment. Type IV collagen is the primary component of the glomerular basement membrane and mesangial matrix and has been a helpful indicator for DN compared to albumin. Increased urinary excretion of type IV collagen in diabetic patients that progresses to diabetic nephropathy (DN) has been investigated in several studies. This meta-analysis was conducted to scrutinize the difference between Type IV collagen in diabetes mellitus (DM) and DN as a predictor of DN.

Methods:

A literature search was conducted in PubMed from 19 July to 22 July 2022 to gather related research. Selected articles were reviewed, and data were extracted and subjected to statistical analysis. Standard mean differences (SMDs) and 95% confidence intervals (CIs) were computed, pooled, and interpreted.

Results:

This meta-analysis included a total of 222 participants from the three publications. Fixed effects pooled data, meta-analysis models, and heterogeneity was assessed using I^2 statistics. The pooled data show a difference in the levels of Type IV collagen among DN and DN patients (SMD: 7.71, 95% CI: 7.22 to 8.20, $P < 0.00001$).

Conclusions:

The pooled results suggest that there is a difference in urinary Type IV collagen between DM and DN. The meta-analysis increases the strength of the association of DM with nephropathy and retention of Type IV collagen in the body.