Evaluation of adherence to medication by LC-MS/MS urine testing and relation with clinical outcomes in type 2 diabetes: an analysis in the Diabetes and Lifestyle Cohort Twente.

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Background: To reach treatment targets in Type 2 Diabetes (T2D) and prevent long-term complications, medication adherence is essential, yet difficult to determine. A novel objective tool to assess medication adherence is biochemical urine testing of drug metabolites using liquid chromatography-tandem mass spectrometry (LC-MS/MS). We used this tool in a real-world setting to assess adherence to the main drug classes important for T2D and determined the association of non-adherence with clinical outcomes.
Methods: Adherence to oral antidiabetics (OADs), antihypertensives, and statins was determined by LC-MS/MS in 457 patients included in the Diabetes and Lifestyle Cohort Twente. Non-adherence was defined as the absence of minimal one prescribed drug in the urine. Differences between groups were tested using the ANOVA, χ^2 test, and the Kruskal-Wallis test.
Results: Overall, 89.3% patients were adherent. Adherence to OADs, antihypertensives, and statins was 95.7%, 92.0%, and 95.5%, respectively. Prevalence of both microvascular and macrovascular complications was higher in non-adherent than adherent patients (81.6% vs 66.2%, $p = 0.029$ and 55.1% vs 37.0%, $p = 0.014$, respectively). Less non-adherent than adherent patients reached an LDL-cholesterol target of $\leq$2.5 mmol/L (67.4% vs 81.1%, $p = 0.029$), and mean HbA1c was higher (62.9 $\pm$ 14.5 vs 57.4 $\pm$ 11.2 mmol/mol, $p < 0.01$). Among non-adherent patients were more smokers (28.6% vs 15.0%, $p = 0.047$) without other demographic differences. Logistic regression analysis demonstrated higher BMI, smoking, elevated LDL-cholesterol, high HbA1c, presence of diabetic kidney disease and macrovascular disease as significant predictors of non-adherence.
Conclusion: Overall medication adherence determined by LC-MS/MS in this real-world setting was relatively high. In non-adherent patients, overall prevalence of diabetic complications was higher and treatment targets were reached less frequently. This emphasizes the importance of objective detection and tailored interventions to optimize adherence.