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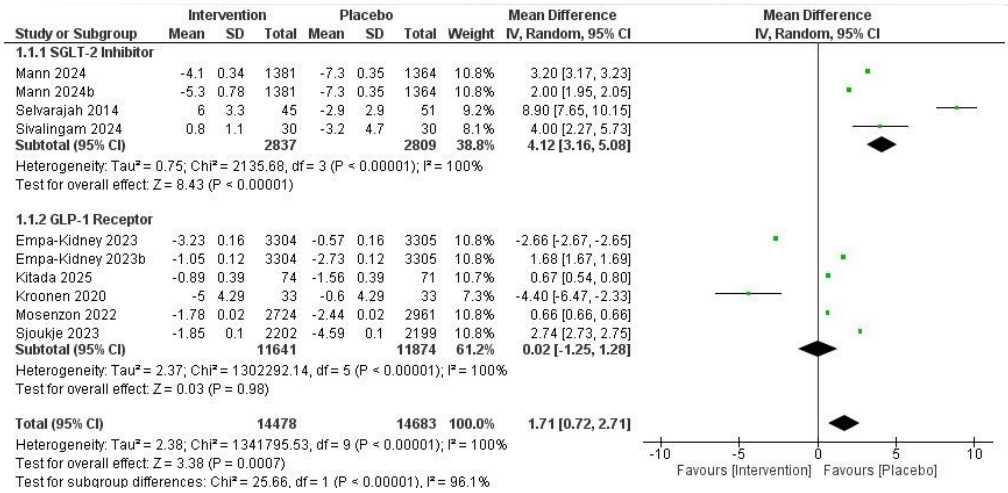
Renoprotective Effects of SGLT-2 Inhibitors Compared with GLP-1 Receptor Agonists in Diabetic Kidney Disease: A Systematic Review and Meta-Analysis

Muhammad Farid Rakhman[1], Tohari Masidi Amin[2]
[1]Department of Internal Medicine, dr. H. Abdul Moeloek Hospital, Lampung, Indonesia, Indonesia
[2]Department of Internal Medicine, Bakti Timah Pangkal Pinang General Hospital, Indonesia

Objectives : Diabetic kidney disease (DKD) is a major microvascular complication of diabetes and a leading cause of end-stage kidney disease worldwide. Recent pharmacologic advances, particularly sodium–glucose cotransporter-2 (SGLT-2) inhibitors and glucagon-like peptide-1 receptor agonists (GLP-1 RAs), have demonstrated renoprotective effects in patients with diabetes. However, their comparative efficacy in slowing the decline of kidney function remains incompletely defined. This study aimed to systematically evaluate the effects of SGLT-2 inhibitors and GLP-1 receptor agonists on estimated glomerular filtration rate (eGFR) decline in patients with diabetic kidney disease.
Methods : A systematic review and meta-analysis of randomized controlled trials was conducted following standard methodological guidelines. Electronic databases were searched to identify eligible studies comparing SGLT-2 inhibitors or GLP-1 receptor agonists with placebo in patients with DKD. The primary outcome was the change in eGFR assessed using creatinine-based and cystatin C–based measurements. Pooled mean differences (MDs) with 95% confidence intervals (CIs) were calculated using a random-effects model.
Results : Eight randomized controlled trials involving 19,807 participants were included. For creatinine-based eGFR, SGLT-2 inhibitors significantly attenuated kidney function decline compared with placebo (MD 4.12; 95% CI 3.16–5.08; $p < 0.00001$). In contrast, GLP-1 receptor agonists showed no significant overall effect on eGFR change (MD 0.02; 95% CI −1.25 to 1.28; $p = 0.98$). For cystatin C–based eGFR, SGLT-2 inhibitors were also associated with significantly less decline compared with placebo (MD 2.83; 95% CI 1.50–4.17; $p < 0.0001$). The pooled analysis demonstrated an overall favorable effect of SGLT-2 inhibitors in preserving kidney function.
Conclusions : SGLT-2 inhibitors demonstrate superior efficacy in slowing eGFR decline in patients with diabetic kidney disease compared with GLP-1 receptor agonists or placebo. These findings reinforce the role of SGLT-2 inhibitors as a cornerstone therapy for renal protection in DKD. Further long-term studies are warranted to clarify comparative mechanisms and optimize combination strategies for kidney disease progression.

1.1 Forest Plot of eGFR (Creatinine) for SGLT-2 Inhibitors and GLP-1 Receptor Agonists Compared with Placebo.jpeg



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