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Review Article

Diabetes Management: The Emerging Role of SGLT2 Inhibitors and GLP-1 Receptor Agonists

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ABSTRACT

Objective-To summarize current evidence on the efficacy, safety, and clinical relevance of SGLT2 inhibitors and GLP-1 receptor agonists in the modern management of type 2 diabetes mellitus.
Materials and Method- This narrative review is based on a focused search of major medical databases, including PubMed, Scopus, and Google Scholar. Relevant clinical trials, reviews, and guideline documents related to SGLT2 inhibitors and GLP-1 receptor agonists were identified, screened for relevance, and summarized to highlight key therapeutic insights.
Results-Review of current evidence shows that SGLT2 inhibitors and GLP-1 receptor agonists improve glycaemic control, promote weight reduction, and provide significant cardiovascular and renal benefits. Both classes demonstrated favourable safety profiles and consistent advantages across multiple clinical trials.
Conclusion- SGLT2 inhibitors and GLP-1 receptor agonists offer significant benefits beyond glucose control, including weight reduction and cardiovascular and renal protection. Current evidence supports their early use in managing type 2 diabetes, particularly in patients with high cardiometabolic risk. They represent an important shift toward more comprehensive and organ-protective diabetes therapy.

Keywords*: Type 2 diabetes; sodium–glucose cotransporter-2 inhibitors; GLP-1 agonists; heart-related outcomes; kidney protection; metabolic interventions; diabetes medications.*

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a growing global health concern, driven by rising rates of obesity, sedentary lifestyles, and metabolic disorders. Despite the availability of several glucose-lowering medications, many patients remain at high risk for cardiovascular and renal complications, which continue to be the leading causes of morbidity and mortality in diabetes. In recent years, two newer classes of antidiabetic agents—sodium–glucose cotransporter-2 (SGLT2) inhibitors and glucagon-like peptide-1 (GLP-1) receptor agonists—have gained prominence due to their clinically proven benefits that extend beyond glycaemic control. [1-4]These therapies not only lower blood glucose but also improve weight, reduce cardiovascular events, and slow the progression of kidney disease.[3,4,6] As evidence from large outcome trials continues to expand, these agents are increasingly recognized as key components of modern, organ-protective diabetes management.[5,9] This review highlights the evolving role of SGLT2 inhibitors and GLP-1 receptor agonists in contemporary clinical practice.

MATERIALS AND METHODS

This review was prepared by examining relevant studies and guidelines sourced from major scientific databases, including PubMed, Scopus, and Google Scholar. Clinical trials, systematic reviews, and key publications related to SGLT2 inhibitors and GLP-1 receptor agonists in type 2 diabetes were selected based on their relevance and quality. The findings were synthesized narratively to present current evidence on their therapeutic roles.

MECHANISM OF ACTION

SGLT2 inhibitors and GLP-1 receptor agonists differ in mechanism.(Figure 1)

SGLT2 inhibitors act on the kidney's proximal tubules by blocking the sodium–glucose cotransporter-2, the main pathway responsible for reabsorbing filtered glucose. By inhibiting this transporter, these drugs increase urinary glucose excretion,[1,3,4] leading to lower blood glucose levels. This mechanism also produces additional effects such as mild diuresis, reduced blood pressure, and modest weight loss.

GLP-1 receptor agonists mimic the activity of the natural incretin hormone GLP-1. They enhance insulin secretion[2,4]in a glucose-dependent manner, suppress Glucagon release, slow gastric emptying, and promote satiety. These combined actions help improve postprandial and fasting glucose levels while supporting meaningful weight reduction. GLP-1 agonists also exert cardioprotective and anti-inflammatory effects that contribute to broader metabolic benefits.

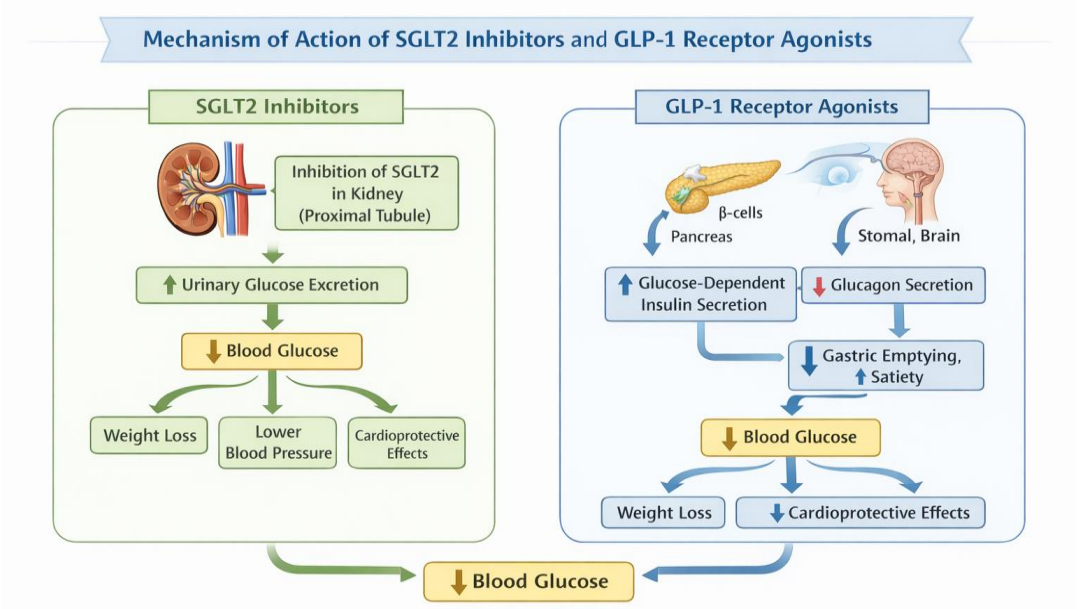

Figure 1. Mechanism of action of SGLT2 inhibitors and GLP-1 receptor agonists

RESULTS

The review of current literature indicates that both SGLT2 inhibitors and GLP-1 receptor agonists effectively lower blood glucose and promote weight loss in patients with type 2 diabetes. SGLT2 inhibitors consistently reduce the risk of heart failure hospitalization[1,3,4] and slow the progression of chronic kidney disease, while GLP-1 receptor agonists significantly decrease major adverse cardiovascular events[2,8] and support greater weight reduction.The results are shown in figure 3.

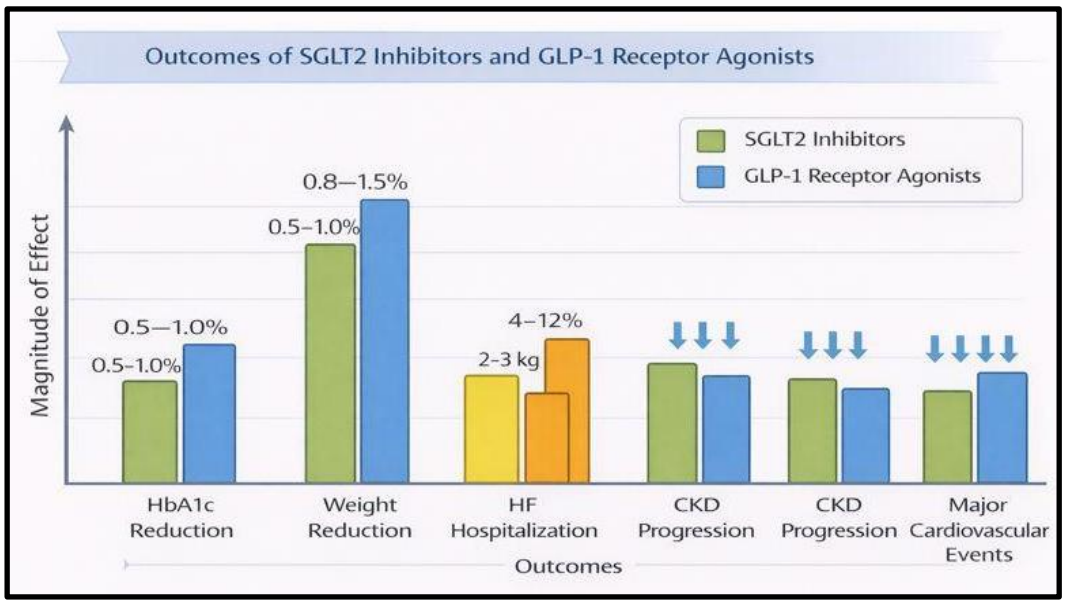

Figure 3. Outcomes of SGLT2 inhibitors and GLP-1 receptor agonists

FUTURE PERSPECTIVES

SGLT2 inhibitors and GLP-1 receptor agonists are transforming the management of type 2 diabetes by offering benefits beyond glucose control. Future research is expected to explore combination therapies, personalized treatment approaches, and long-term organ protection. Emerging areas include their use in prediabetes, obesity, and other metabolic disorders, as well as development of oral and dual-acting agents to improve efficacy and adherence. Integrating clinical trial data with real-world evidence will help refine guidelines and optimize patient outcomes.[5-10]

SUMMARY

SGLT2 inhibitors and GLP-1 receptor agonists are effective therapeutic options for managing type 2 diabetes, offering benefits beyond glucose control.[1-4] Both classes improve glycaemic parameters and support weight reduction. SGLT2 inhibitors provide robust heart failure and renal protection, while GLP-1 receptor agonists reduce major cardiovascular events and promote significant weight loss.[2,6,10] They are generally well tolerated, with manageable adverse effects.[1,3,7] Integrating these agents early, particularly in patients with cardiovascular or renal comorbidities, represents a shift toward comprehensive, organ-protective diabetes management.[5,9]Overview of SGLT2 Inhibitors and GLP-1 Receptor Agonists in Type 2 Diabetes is shown Table 1.

Table 1. Overview of SGLT2 Inhibitors and GLP-1 Receptor Agonists in Type 2 Diabetes

Feature	SGLT2 Inhibitors	GLP-1 Receptor Agonists
Primary Mechanism	Promote urinary glucose excretion to lower blood sugar	Enhance insulin secretion and inhibit glucagon, slow gastric emptying
Effect on Weight	Modest weight reduction (2–3 kg)	Significant weight reduction (4–12%)
Cardiovascular Effects	Reduce heart failure hospitalizations and cardiovascular mortality	Reduce major cardiovascular events such as MI, stroke, and CV death
Renal Effects	Slow progression of chronic kidney disease, reduce albuminuria	Moderate renal protection, mainly via reduction in albuminuria
Common Side Effects	Genital infections, hypotension, rare ketoacidosis	Nausea, vomiting, diarrhea, rare pancreatitis
Recommended Use	Early therapy in T2DM with heart failure or kidney disease	Early therapy in T2DM with cardiovascular disease or obesity
Overall Benefit	Organ-protective, glycaemic and renal benefits	Organ-protective, glycaemic and cardiovascular benefits

CONCLUSION

SGLT2 inhibitors and GLP-1 receptor agonists represent a major advancement in the management of type 2 diabetes, offering benefits beyond glucose lowering.[1-4] Both classes improve weight, provide cardiovascular and renal protection, and are generally well tolerated. Their early and targeted use, particularly in patients with high cardiometabolic risk, reflects a shift toward comprehensive, organ-protective diabetes therapy.[6,8,9]

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