GLP-1 Receptor Agonists in Obstructive Sleep Apnea: New fronteirs in Metabolic and Respiratory medicine

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Obstructive Sleep Apnea (OSA) is a growing global health concern, affecting nearly one billion adults worldwide[1]. It is characterised by repetitive upper airway collapse during sleep resulting in intermittent hypoxia, oxidative stress, and systemic inflammation all of which contribute to cardiovascular and metabolic morbidity. A key driver of OSA is obesity, which not only increases upper airway fat deposition but also alters neuromuscular control and ventilatory regulation[2]. Despite the efficacy of continuous positive airway pressure (CPAP) therapy, its real world use is limited by poor adherence[3]. This necessitates exploration of adjunctive pharmacologic therapies that target upstream risk factors particularly obesity and insulin resistance.

Among emerging therapies, glucagon-like peptide-1 receptor agonists (GLP-1 RAs) originally developed for type 2 diabetes mellitus have shown impressive benefits in weight reduction, cardiometabolic health, and potentially OSA severity. Drugs such as liraglutide, semaglutide, and tirzepatide have demonstrated significant weight loss in large randomized trials[4,5].

A post hoc analysis of the SCALE Sleep Apnea trial demonstrated that treatment with liraglutide 3.0 mg in obese individuals with moderate-to-severe OSA (without diabetes) led to a significant reduction in Apnea–Hypopnea Index (AHI) compared to placebo, independent of CPAP use[6]. More recently, the SURMOUNT-OSA trial evaluated tirzepatide, a dual GIP/GLP-1 receptor agonist, in patients with moderate-to-severe OSA and obesity. The study reported a marked decrease in AHI and body weight, with improvements in oxygen saturation and subjective sleepiness scores (Epworth Sleepiness Scale)[7].

These findings support the hypothesis that GLP-1 RAs improve OSA not merely through weight loss but also via mechanisms including reduction in pharyngeal fat deposition, improving airway patency and decreased systemic inflammation. These mechanisms may enhance neuromuscular function of the airway and possible central effects on ventilatory control though this remains under investigation[8].

GLP-1 RAs represent a novel adjunctive strategy in OSA management, particularly in patients with obesity-related OSA who are non-adherent to CPAP. Importantly, these agents also confer cardiovascular and renal protection, which may offset long-term complications of untreated OSA[9].

However, several limitations remains like the long term sustainability of OSA improvement and post weight loss is unclear. Cost and access, particularly in low resource settings like Nepal, pose barriers to widespread use. There is a need for direct head to head trials comparing GLP-1 RAs with traditional therapies and their impact on cardiovascular outcomes in OSA populations.

GLP-1 receptor agonists hold promise as a dual action therapy for OSA and obesity, targeting both the structural and metabolic contributors to sleep-disordered breathing. While not a replacement for CPAP, they may serve as a vital adjunct or alternative in select populations. Further research is essential to establish long-term efficacy, cost-effectiveness, and real-world integration into multidisciplinary OSA care models. As we move toward personalized medicine, therapies like GLP-1 RAs exemplify a shift from symptom management to disease modification a promising advance in the treatment of OSA.

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