INPLASY

Effects of glucagon-like peptide-1 receptor agonist on bone mineral density and bone turnover markers: A meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 June 2024 and was last updated on 13 June 2024.

INTRODUCTION

Review question / Objective Do GLP-1 receptor agonists affect bone mineral density (BMD) and bone turnover markers?

Rationale Despite the bone protective effects of GLP-1RAs in vitro and in vivo, the clinical effects in humans have not been clearly demonstrated. Furthermore, weight loss after GLP-1RAs can have unintended consequences on bone health. The relatively long latency period for bone fracture causes difficulty in analyzing causality with drugs. Instead, the effect of GLP-1RAs on bone health can be identified early using BMD or bone turn markers.

Condition being studied Type 2 diabetes or obesity.

METHODS

Search strategy Studies investigating the effects of GLP-1RAs on BMD or bone turnover markers were searched in PubMed, Embase, and Scopus. Search queries were determined in consideration of Population, Intervention, Comparison, Outcomes and Study design (PICOS) criteria.

Participant or population Human.

Intervention GLP-1RA for more than four weeks.

Comparator Untreated control group or a group receiving a placebo.

Study designs to be included RCT design.

Eligibility criteria The criteria for selecting the studies were: 1) human studies, 2) included an experimental group receiving a GLP-1RA for more than four weeks, 3) incorporated an untreated control group or a group receiving a placebo, 4) reported at least one BMD or bone turnover markers, 5) RCT design.

Information sources PubMed, Embase, and Scopus.

Main outcome(s) BMD (femoral neck, total hip, lumbar spine), bone resorption (CTX, NTX, pyridinoline, deoxypyridinoline), or bone formation (P1NP, P1CP, bone ALP, osteocalcin) markers.

Quality assessment / Risk of bias analysis A revised Cochrane risk of bias tool for randomized trials (RoB2).

Strategy of data synthesis Effect size, a difference in effect between two groups, was presented as mean difference (MD). A combined effect size and its 95% CI were calculated as the weighted average of the study level effect sizes by generic inverse variance method through Review Manager version 5.4 (The Cochrane collaboration, London, United Kingdom) software.
A fixed-effect model or a random-effect model was used according to heterogeneity. When Higgins I2 was >75% or the P-value of the Cochran's Q test was <0.05, the random-effect model was utilized, otherwise the fixed-effect model was employed.

Subgroup analysis Subgroup analysis was conducted according to body mass index (BMI) of participants (≥30 kg/m2 and <30 kg/m2).

Sensitivity analysis In the sensitivity analysis, the robustness of results was evaluated by excluding one study of a different nature.

Language restriction None.

Country(ies) involved South Korea.

Keywords GLP1-RA; bone mineral density; bone turnover marker.

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