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Comparison of GLP-RAs on glucose excursion, insulin and glucagon secretions and gastric emptying.

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Objective: Short- and long-acting glucagon-like peptide 1 receptor agonists (GLP-1RAs) have different actions on insulin and glucagon secretions and gastric emptying, which results in different outcomes of glycemic control. However their contributions to glycaemia in response to short- and long-acting agents have not been fully evaluated in clinical setting. Materials and methods: We performed meal tolerance test before and 12 weeks after initiation of the long-acting GLP-1RA liraglutide (Lira) or the short-acting GLP-1RA lixisenatide (Lixi) in Japanese type 2 diabetes patients, prescribed less than or equal to one medication (Lira, n=6; age 49.0±11.4; duration 8.2±9.2 years; ΔGST 3.1±0.5ng/ml / Lixi, n=7; age 48.0±6.7; duration 5.6±5.5 years; ΔGST 2.7±1.1ng/ml). Plasma glucose, insulin, and glucagon were measured and gastric emptying was measured using 13C breath test for 4hours after solid test meal. Results: After 12wks administration, HbA1c and bodyweight were significantly improved in both groups (HbA1c(%): Lira, 9.0±0.8 to 6.6±1.1; Lixi, 7.7±1.0 to 6.3±0.4/BW(kg): Lira, 81.9±12.1 to 75.9±9.0; Lixi, 91.0±26.4 to 89.3±27.1). Gastric emptying was delayed in Lixi but not in Lira group (T1/2(min): Lira, 35.6±16.2 to 30.5±9.6 min; Lixi, 24.1±3.5 to 76.3±35.0). Postprandial insulin secretion was significantly enhanced in Lira but not in Lixi group (IRI-AUC0-240(uIU/dl・min): Lira, 8391±3400 to 9628±3782; Lixi, 14413±4326 to 6566±3825).Conclusion: These results partially support the notion that long-acting agents improve glycemic control through enhanced insulin secretion and that short-acting agents do so through delayed gastric emptying.