The Effect of Glucagon-like Peptide-1 Receptor Agonists and Intragastric Balloon Placement on Weight Loss

A Network Meta-analysis of Randomized Controlled Trials

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BACKGROUND

Obesity has become a major public health challenge of the 21st century worldwide. Both intragastric balloons and glucagon-like peptide-1 receptor agonists (GLP-1RAs) have demonstrated promising outcomes of short-term weight loss. A network meta-analysis was conducted to compare efficacy of intragastric balloons and GLP-1RAs,

METHODS

Sources: Pubmed, Scopus

Populations: Overweight or obese patients with or without diabetes

Interventions: Single GLP-1RAs and intragastric balloon placement

Control: lifestyle modification with/without placebo

Outcome: Total body weight loss at 6 month

STATISTICAL ANALYSIS

The relative treatment effect will be estimated from a multivariate meta-analysis with a consistency model.

The probability of being the best treatment according to each outcome will be estimated and ranked using the surface under the cumulative ranking curve (SUCRA). The consistency assumption was checked using a design-by-treatment interaction model.

A comparison-adjusted funnel plot was used to assess publication bias.

Table 1 Study characteristics

Author	Year	Intervention	Treatment duration	Follow-up duration	Age (mean +/- SD)	BMI (mean +/- SD)	%male
Abu Dayyeh	2021	Spatz balloon	32 wk	56 wk	44.4(8.9)[I], 44(8.9)[C]	35.8(2.6)[I], 35.8(2.7)[C]	12.5
Sullivan	2018	Obalon balloon	24 wk	48 wk	42.7(9.6)[I], 42.5(9.3)[C]	35.2(2.7)[I], 35.5(2.7)[C]	11.9
Courcoulas	2017	ORBERA balloon	24 wk	48 wk	38.7(9.37)[I], 40.8(9.61)[C]	35, N/A	10.2
Ponce	2015	Spatz balloon	24 wk	48 wk	43.8(9.5)[I], 44(10.2)[C]	35.3(2.8)[I], 35.4(2.6)[C]	5
Fuller	2013	ORBERA balloon	6 mo	12 mo	43.4(9.4)[I], 48.1(7.3)[C]	36(2.7)[I], 36.7(2.9)[C]	33.3
Wilding	2021	Semaglutide 2.4 mg	68 wk	68 wk	46(13)[I], 47(12)[C]	37.8(6.7)[I], 38(6.5)[C]	25.9
Whicher	2021	Liraglutide 3 mg	6 mo	6 mo	42.7(11.3)[I], 45.4(10.7)[C]	37.5(6.9)[I], 41(6.7)[C]	51.1
Wadden	2021	Semaglutide 2.4 mg	68 wk	68 wk	46(13)[I], 46(13)[C]	38.1(6.7)[I], 37.8(6.9)[C]	19
Nahra	2021	Cotadutide 100/200/300 mcg	54 wk	54 wk	57.6(9.9)[I1], 57.3(9.9)[I2], 56.3(10.2)[I3], 55.5(9.8)[I4], 57.3(9.5)[C]	35(5.7)[I1], 34.9(5.4)[I2], 35.2(5.4)[I3], 35.4(6.1)[I4], 34.2(5.1)[C]	46.3
Lau	2021	Liraglutide 3 mg Cagrilintide 0.3/0.6/1.2/2.4/4.5 mg	26 wk	26 wk	52.3, 10.6	37.8, 7	38
Davies	2021	Semaglutide 1/2.4 mg	68 wk	68 wk	55, 11	35.7, 6.3	49.1
Alba	2021	Liraglutide 3 mg Efinopegdutide 5/7.4/10 mg	26 wk	26 wk	46.3, 11.7	40.5, 4.1	24.9
Wadden	2020	Liraglutide 3 mg	56 wk	56 wk	45.4 (11.6)[I], 49 (11.2)[C]	39.3 (6.8)[I], 38.7 (7.2)[C]	16.7
Tronieri	2020	Liraglutide 3 mg	52 wk	52 wk	46.7, 12.2	38.8, 4.8	23.9
Garvey	2020	Liraglutide 3 mg	56 wk	56 wk	55.9 (11.3)[I], 57.6 (10.4)[C]	35.9 (6.5)[I], 35.3 (5.8)[C]	47.7
Khoo	2019	Liraglutide 3 mg	26 wk	52 wk	40.7, 9.1	33.2, 3.6	90
le Roux	2017	Liraglutide 3 mg	160 wk	160 wk	47.5 (11.7)[I], 47.3 (11.8)[C]	38.8 (6.4)[I], 39 (6.3)[C]	24
Blackman	2016	Liraglutide 3 mg	32 wk	32 wk	48.5	39.1	71.9
Wadden	2013	Liraglutide 3 mg	56 wk	68 wk	45.9 (11.9)[I], 46.5 (11)[C]	36 (5.9)[I], 35.2 (5.9)[C]	18.5
Jastreboff	2022	Tirzepatide 5/10/15 mg	72 wk	72 wk	44.9, 12.5	38, 6.81	32.5
Di Prosper	2021	Liraglutide 3 mg Efinopegdutide 5/7.4/10 mg	26 wk	26 wk	46.3, 11.7	40.5, 4.1	24.9
Rosenstock	2021	Tirzepatide 5/10/15 mg	40 wk	40 wk	54.1, 11.9	31.9, 6.6	52

Figure 1 A network graph presenting the evidence base for a hypothetical review

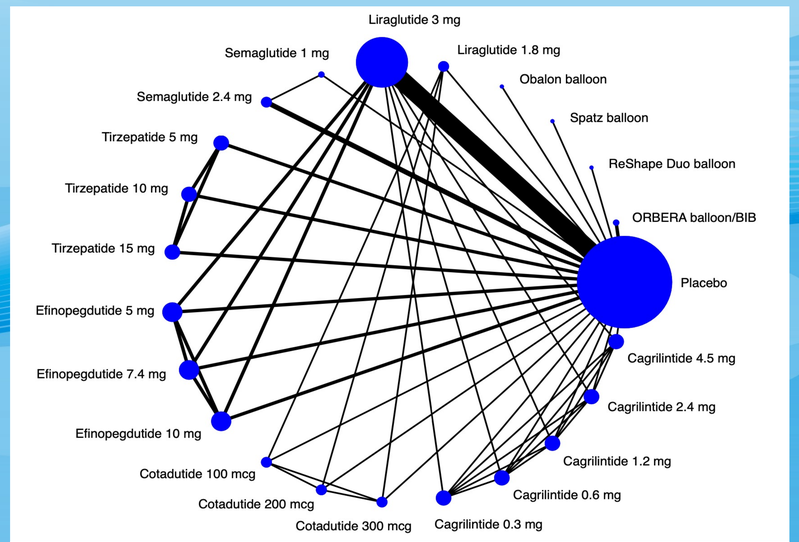


Table 2 Ranking

Interventions	Rank
Tirzepatide 15 mg	1
Efinopegdutide 10 mg	2
Tirzepatide 10 mg	3
ORBERA balloon/BIB (single)	4
Spatz balloon	5
Efinopegdutide 7.4 mg	6
Semaglutide 2.4 mg	7
Tirzepatide 5 mg	7
Cagrilintide 4.5 mg	8
Efinopegdutide 5 mg	9
Cagrilintide 2.4 mg	10
Cagrilintide 1.2 mg	11
Semaglutide 1 mg	12
Liraglutide 3 mg	13
ReShape Duo balloon	14
Cotadutide 300 mcg	15
Obalon Swallowable gas-filled intragastric balloon system	16
Cagrilintide 0.6 mg	17
Cagrilintide 0.3 mg	18
Cotadutide 100 mcg	19
Cotadutide 200 mcg	20
Liraglutide 1.8 mg	21
Control	22

CONCLUSION

- Both GLP-1RAs and intragastric balloons has demonstrated similar weight reduction efficacy in overweight or obese adults.
- Tirzepatide shows potential as a more favorable option among GLP-1RAs for its efficacy for weight reduction.
- ReShape Duo balloon has the highest risk for serious adverse complications when compared to other balloons and GLP1-RAs.