Cost-utility analysis of semaglutide versus dulaglutide in patients with type 2 diabetes requiring treatment with a GLP-1 receptor agonist

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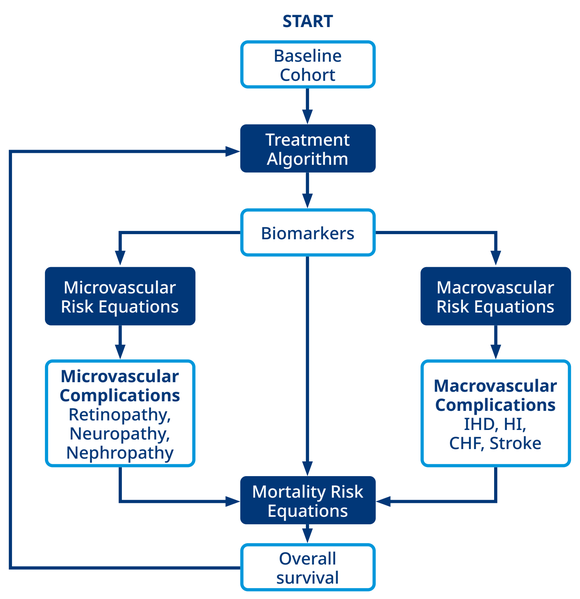
Introduction

- Recent statistics show that in South Korea about 13.8% of adults aged >30 years have been diagnosed with diabetes [1].
- Treatment of type-2 diabetes (T2DM) aims to improve quality of life and prevent or delay complications, in particular micro- and macrovascular pathologies. Microvascular complications include eye and kidney diseases, while heart failure and stroke are classified as macrovascular complications [2].
- Despite clear guidelines and numerous management options, approximately 71.7% of patients in South Korea require treatment intensification due to poor diabetes management, defined as insufficient control of glycated haemoglobin (HbA_{1C}) levels [1].
- Glucagon-like peptide-1 (GLP-1) receptor agonists (RAs) are among the drugs used in the treatment of T2DM in adults whose HbA_{1C} levels are not sufficiently controlled on either metformin and sulfonylurea, or insulin with or without metformin.
- Our objective was to evaluate the cost-utility of semaglutide in comparison with dulaglutide, both administered as subcutaneous injection once weekly, in patients with T2DM requiring treatment intensification with a GLP-1 RA in South Korea.

Methods

- A cost-utility analysis was conducted from the perspective of the South Korea's public healthcare system, according to the Health Insurance Review and Assessment Service (HIRA) guidelines and based on the Institute for Health Economics Diabetes Cohort Model (IHE-DCM).
- Markov health states are used to represent micro- and macrovascular complications (Figure 1) [3].
- The primary outcome was the incremental cost-effectiveness ratio (ICER, or cost per quality-adjusted life-year[QALY]) for semaglutide vs dulaglutide.
- The analysis was performed separately for patients whose diabetes was inadequately controlled
  - on metformin and sulfonylurea (oral group)
  - on insulin, alone or in combination with metformin (insulin group)
- A 40-year time horizon and discounting of 4.5% were applied.
- Clinical data were derived from the SUSTAIN-5, SUSTAIN-7 and AWARD-9 trials, and adverse event risks from the UK Prospective Diabetes Study data [4-7].
- Cost items were identified by reviewing diabetes treatment guidelines, clinical trials, and published economic evaluations.
- Only direct healthcare costs were included, such as consultation fees, medication costs, and treatment costs for diabetes complications and adverse events.

Figure 1: Diagram overview of the IHE-DCM model for type 2 diabetes [3]



- Costs were calculated using health-insurance-price-related data, statistical data, and related literature.

Results

- In both the oral and insulin groups, semaglutide led to modest QALY gains (Table 1, Table 2 and Table 3).
- In both oral groups, semaglutide (0.5 mg and 1 mg, respectively) was associated with higher treatment costs vs dulaglutide (0.75 mg and 1.5 mg, respectively), which were partially offset by savings in the treatment of micro- and macrovascular complications (Table 1 and Table 2).
- In the oral drug group, semaglutide resulted in an incremental cost-effectiveness ratio (ICER) of 25,017,011 million KRW for the low-dose group (Table 1) and 24,993,532 million KRW for the high-dose group (Table 2).

Table 1: Pairwise comparison for the low-dose group in patients on metformin and sulfonylurea (oral group)

	Semaglutide 0.5 mg	Dulaglutide 0.75 mg	Semaglutide 0.5 mg vs dulaglutide 0.75 mg
QALYs	10.173	10.075	0.098
Treatment cost	27,640,554	24,663,699	2,976,855
Microvascular cost	13,605,090	14,075,201	-470,111
Macrovascular cost	15,701,139	15,759,998	-58,859
Total cost	56,946,783	54,498,899	2,447,884
ICER			**25,017,011**

All costs are reported in KRW.

Table 2: Pairwise comparison for the high-dose group in patients on metformin and sulfonylurea (oral group)

	Semaglutide 1 mg	Dulaglutide 1.5 mg	Semaglutide 1 mg vs dulaglutide 1.5 mg
QALYs	10.255	10.108	0.146
Treatment cost	34,366,532	30,099,655	4,266,877
Microvascular cost	13,351,726	13,734,007	-382,281
Macrovascular cost	15,550,119	15,776,926	-226,807
Total cost	63,268,377	59,610,588	3,657,789
ICER			**24,993,532**

All costs are reported in KRW.

- In the insulin group, in addition to a small QALY gain, semaglutide at 1 mg was associated with lower drug costs, as well as lower costs for the management of micro- and macrovascular complications (Table 3).
- Therefore, in the insulin group, treatment with 1 mg semaglutide was found to dominate dulaglutide (at 1.5 mg) when added to basal insulin (Table 3).

Table 3: Pairwise comparison for the group of patients on insulin, with or without metformin (insulin group)

	Semaglutide 1 mg	Dulaglutide 1.5 mg	Semaglutide 1 mg vs dulaglutide 1.5 mg
QALYs	9.189	9.044	0.144
Treatment cost	27,773,599	33,505,637	-5,732,039
Microvascular cost	18,076,129	19,190,024	-1,113,896
Macrovascular cost	10,035,870	11,220,384	-1,184,514
Total cost	55,885,597	63,916,046	-8,030,448
ICER			**Dominant**

All costs are reported in KRW.

Conclusion

- The introduction of semaglutide is likely to be considered a cost-effective alternative to dulaglutide for treatment intensification in patients insufficiently controlled on metformin plus sulfonylurea in both dose groups analysed, at a commonly accepted threshold of 25 million KRW/QALY.
- Compared with dulaglutide, semaglutide would lead to both cost-savings and clinical benefits in patients on basal insulin requiring treatment intensification with a GLP-1 RA.

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References:

(**1**) Jung, C.H., et al., Diabetes Metab J, 2021. 45(1): p. 1-10; (**2**) Hur, K.Y., et al., Diabetes Metab J, 2021. 45(4): p. 461-481; (**3**) Johansen, P., et al., Pharmacoecon Open, 2019. 3(4): p. 537-550; (**4**) Pozzilli, P., et al., Diabetes Obes Metab, 2017. 19(7): p. 1024-1031; (**5**) Rodbard, H.W., et al., J Clin Endocrinol Metab, 2018. 103(6): p. 2291-2301; (**6**) Pratley, R.E., et al., The Lancet Diabetes & Endocrinology, 2018. 6(4): p. 275-286; (**7**) Hayes, A.J., et al., Diabetologia, 2013. 56(9): p. 1925-33