당뇨병 치료의 최신 경향

(Traditional Glucose-centric to the New Cardiorenal-metabolic Approach for the Treatment of Type 2 Diabetes)

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Agenda

- 환자 특성에 따른 혈당 조절 목표
- 당뇨병 약제 선택
- 당뇨병 환자의 혈압 및 LDL 콜레스테롤 조절

Glucose-lowering studies confirmed benefit on microvascular complications but mixed results on macrovascular outcomes NIDDM

Study	Baseline HbA1c (%)	Control vs intensive HbA1c at study end (%)	Mean duration of diabetes at baseline (years)	Micro-vascular		CV disease		Mortality	
UKPDS[1,2]	7.1 (mean)	7.9 vs 7.0	Newly diagnosed	↓	↓	↔	↓	↔	↓
ACCORD[3,4]	8.1 (median)	7.5 vs 6.4	10.0	↓*		↔		↑	
ADVANCE[5,6]	7.5 (mean)	7.3 vs 6.5	8.0	↓	↔†	↔	↔	↔	↔
VADT[7]	9.4 (mean)	8.4 vs 6.9	11.5	↓	?	↔	↓	↔	↔
Kumamoto[8]	9.0 (mean)	9.4 vs 7.1	6/10	↓					

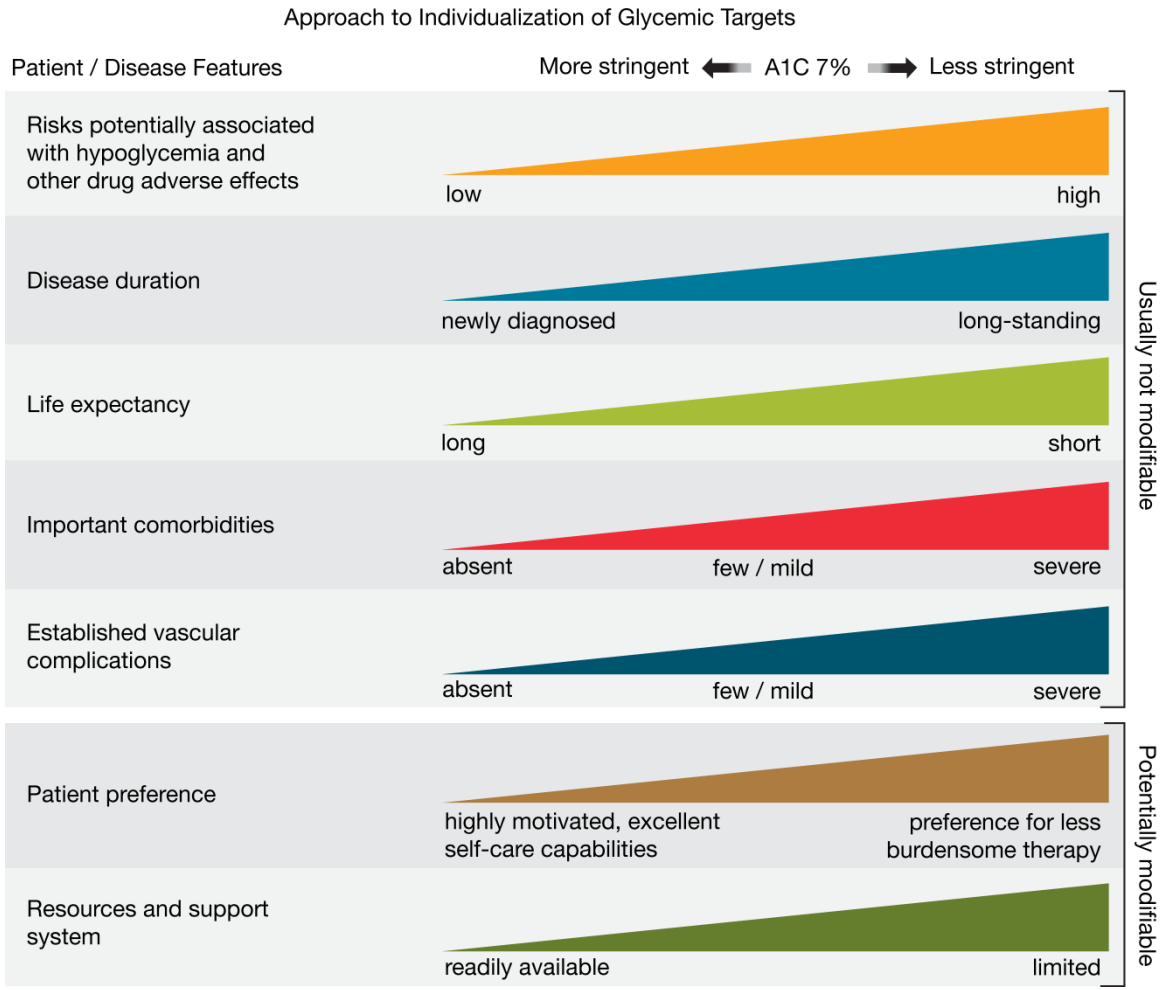
Long-term follow-up

Comparison of trials should be interpreted with caution due to differences in study design, populations and methodology.
*No change in primary microvascular composite but significant decreases in micro-/macroalbuminuria; †No change in major clinical microvascular events but significant reduction in ESKD (p=0.007)

1. UKPDS Group. Lancet 1998;352:837. 2. Holman RR et al. N Engl J Med 2008;359:1577. 3. Genuth S & Ismail-Beigi F. Clin Endocrinol Metab 2012;97:41.
4. Ismail-Beigi F et al. Lancet 2010;376:419. 5. Patel A et al. N Engl J Med 2008;358:2560.
6. Zoungas S et al. N Engl J Med 2014;371:1392. 7. Hayward RA, et al. N Engl J Med 2015;372:2197. 8 Diabetes Res Clin Pract. 1995 May;28(2):103-17.

환자 특성에 따른 혈당 조절 목표

- KDA: < 6.5% for T2DM adults, < 7.0% for T1DM adults
- ADA: < 7.0% for T1&T2DM adults, periprandial glucose 80-130mg/dL, peak postprandial glucose<180mg/dL



- 고령, 긴 당뇨병 유병기간, 진행된 심혈관 질환 동반, 짧은 기대여명, 중증 저혈당의 위험에 따라 혈당 조절 목표를 높이 설정

Diabetes Care. 2022;46(Supplement_1):S97-S110. doi:10.2337/dc23-S006

환자 특성에 따른 혈당 조절 목표

Patient characteristics/ health status	Rationale	Reasonable A1C goal‡	Fasting or preprandial glucose	Bedtime glucose	Blood pressure	Lipids
Healthy (few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.0–7.5% (53–58 mmol/mol)	80–130 mg/dL (4.4–7.2 mmol/L)	80–180 mg/dL (4.4–10.0 mmol/L)	<130/80 mmHg	Statin, unless contraindicated or not tolerated
Complex/intermediate (multiple coexisting chronic illnesses* or two or more instrumental ADL impairments or mild-to-moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0% (64 mmol/mol)	90–150 mg/dL (5.0–8.3 mmol/L)	100–180 mg/dL (5.6–10.0 mmol/L)	<130/80 mmHg	Statin, unless contraindicated or not tolerated
Very complex/poor health (LTC or end-stage chronic illnesses** or moderate-to-severe cognitive impairment or two or more ADL impairments)	Limited remaining life expectancy makes benefit uncertain	Avoid reliance on A1C; glucose control decisions should be based on avoiding hypoglycemia and symptomatic hyperglycemia	100–180 mg/dL (5.6–10.0 mmol/L)	110–200 mg/dL (6.1–11.1 mmol/L)	<140/90 mmHg	Consider likelihood of benefit with statin

This table represents a consensus framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes. The patient characteristic categories are general concepts. Not every patient will clearly fall into a particular category. Consideration of patient and caregiver preferences is an important aspect of treatment individualization. Additionally, a patient's health status and preferences may change over time. ADL, activities of daily living; LTC, long-term care. ‡A lower A1C goal may be set for an individual if achievable without recurrent or severe hypoglycemia or undue treatment burden. *Coexisting chronic illnesses are conditions serious enough to require medications or lifestyle management and may include arthritis, cancer, heart failure, depression, emphysema, falls, hypertension, incontinence, stage 3 or worse chronic kidney disease, myocardial infarction, and stroke. "Multiple" means at least three, but many patients may have five or more (66). **The presence of a single end-stage chronic illness, such as stage 3–4 heart failure or oxygen-dependent lung disease, chronic kidney disease requiring dialysis, or uncontrolled metastatic cancer, may cause significant symptoms or impairment of functional status and significantly reduce life expectancy. Adapted from Kirkman et al. (3).

Diabetes Care 2023;46(Suppl. 1):S216–S229

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- 당뇨병 환자의 혈압 및 LDL 콜레스테롤 조절

Algorithm 1 | 당뇨병 치료 시작

생활습관교정 교육 및 모니터링

Q. 심각한 고혈당 (A1C > 9.0%)과 함께 고혈당으로 인한 증상 (다음, 다뇨, 체중 감소 등)이 동반되어 있는가?
- YES → **Algorithm 3** 주사제 중 인슐린
- NO ↓

Q. 기저 질환으로 심부전[1], 죽상경화심혈관질환[2] 혹은 만성신장질환[3]이 동반되어 있는가?
- YES → **Algorithm 4** 동반질환
- NO ↓

Q. (현재 A1C) – (목표 A1C) > 1.5% ? 혹은 A1C > 7.5% ?
- YES → **Algorithm 2** 병용요법
- NO ↓

Metformin / Other

조기병용요법 (Algorithm 2 참조)

추적관찰

Q. 목표 A1C에 도달하였는가?
- NO → Algorithm 2 병용요법
- YES ↓

현재 치료 유지
저혈당, 부작용, 금기가 있을 경우 약물 조정

[1] Particularly heart failure with reduced ejection fraction (HFrEF, clinical diagnosis of HF and LVEF ≤ 40%).

[2] A history of an acute coronary syndrome or myocardial infarction, stable or unstable angina, coronary heart disease with or without revascularization, other arterial revascularization, stroke, or peripheral artery disease assumed to be atherosclerotic in origin.

[3] eGFR < 60 mL/min/1.73 m² or urine albumin creatinine ratio ≥30 mg/g.

Algorithm 4 | 동반질환

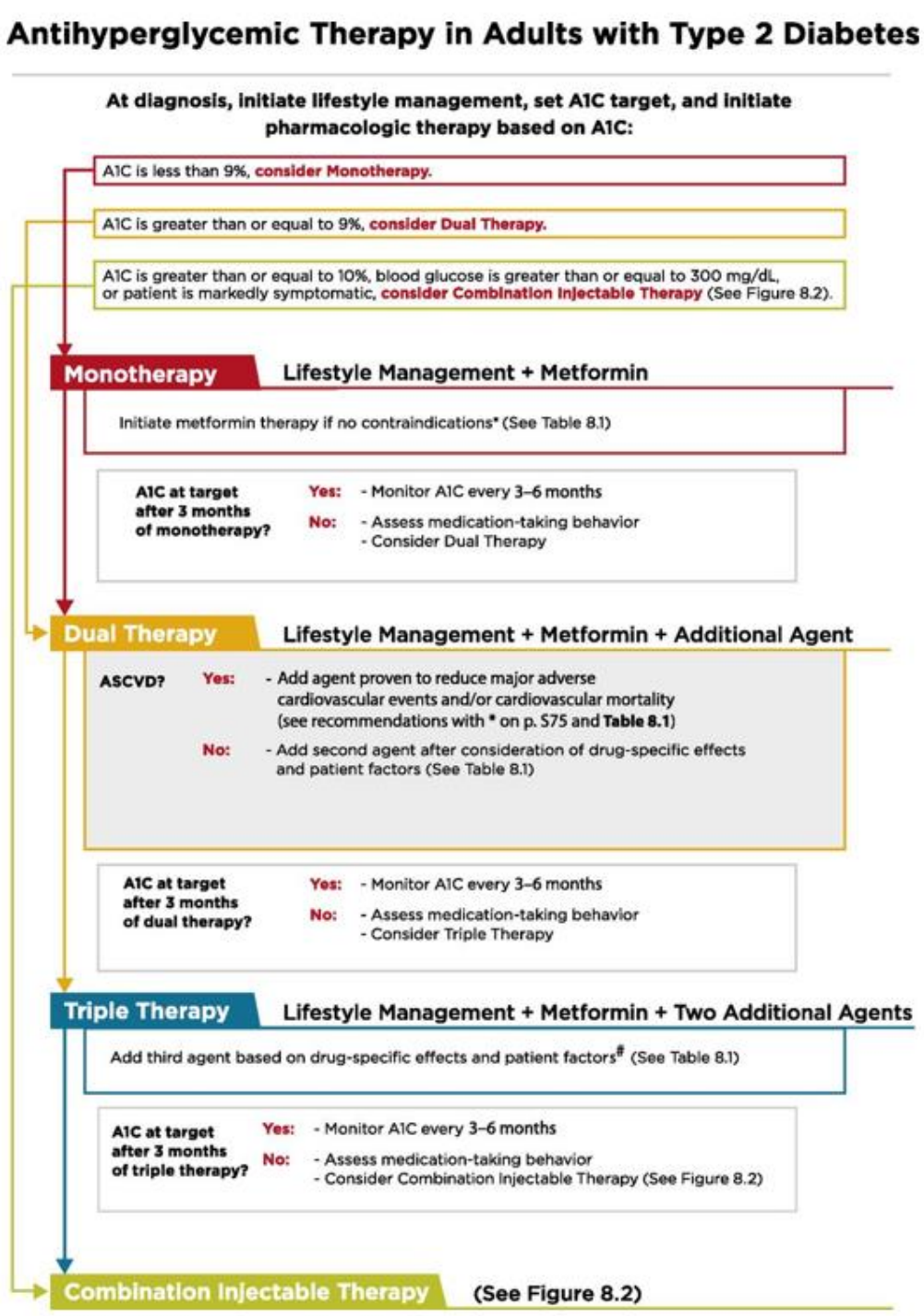
생활습관교정 유지 및 모니터링

심부전[1]	죽상경화심혈관질환[2]	만성신장질환[3]
Q. (현재 A1C) – (목표 A1C) > 1.5% 혹은 A1C > 7.5% ?	Q. (현재 A1C) – (목표 A1C) > 1.5% 혹은 A1C > 7.5% ?	Q. (현재 A1C) – (목표 A1C) > 1.5% 혹은 A1C > 7.5% ?
NO: SGLT2i[4] / SGLT2i[4] + Met / Met / Other (TZD 금기)	NO: Met / Other	NO: SGLT2i[5] / SGLT2i[5] + Met / Met / Other
YES: SGLT2i[4] + Met / SGLT2i[4] + Other / Met + Other / Others (TZD 금기)	YES: SGLT2i[5] + Met / GLP-1RA[6] + Met / TZD[7] + Met / Met + Other / Others	YES: SGLT2i[5] + Met / GLP-1RA[6] + Met / Met + Other / Others
추적관찰	추적관찰	추적관찰

Q. 목표 A1C에 도달하였는가?

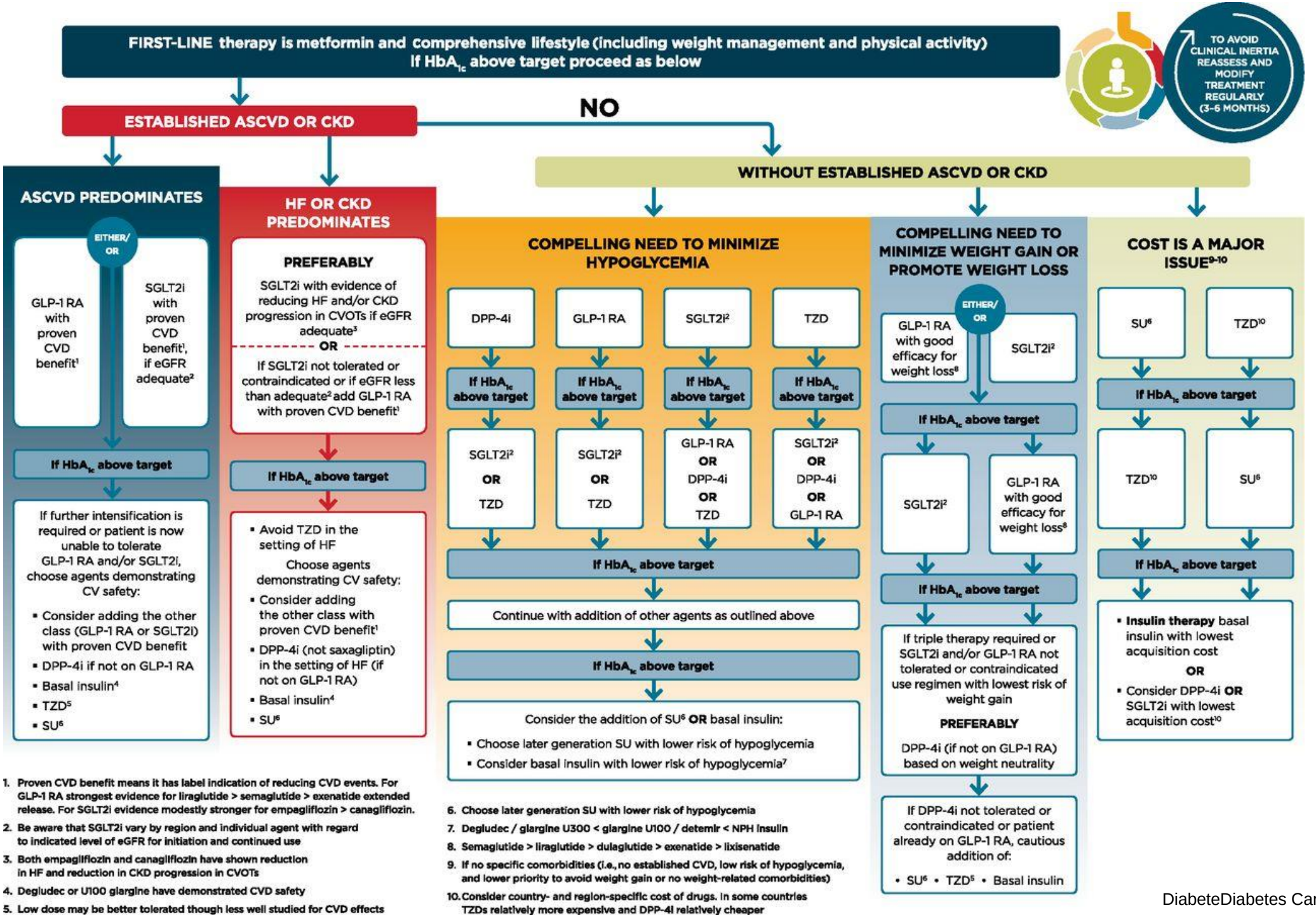
- YES → 현재 치료 유지
  저혈당, 부작용, 금기가 있을 경우 약물 조정
- NO → 동반질환별로 우선 권고되는 약물 추가 병용
  혹은 금기가 없는 타계열 약물 추가 병용

1) HFrEF (LVEF ≤ 40%)
2) Acute coronary syn or MI, stable or unstable angina, CHD, other arterial revascularization, stroke, PAOD assumed to be atherosclerotic in origin
3) eGFR < 60 mL/min/1.73m², or uACR ≥ 30 mg/g
4) Dapagliflozin, empagliflozin, ertugliflozin
5) Dapagliflozin, empagliflozin
6) Dulaglutide, liraglutide, semaglutide
7) Pioglitazone



2018년 ADA guideline

Diabetes Care. 2017;41(Supplement_1):S73-S85.



1. Proven CVD benefit means it has label indication of reducing CVD events. For GLP-1 RA strongest evidence for liraglutide > semaglutide > exenatide extended release. For SGLT2i evidence modestly stronger for empagliflozin > canagliflozin.
2. Be aware that SGLT2i vary by region and individual agent with regard to indicated level of eGFR for initiation and continued use
3. Both empagliflozin and canagliflozin have shown reduction in HF and reduction in CKD progression in CVOTs
4. Degludec or U100 glargine have demonstrated CVD safety
5. Low dose may be better tolerated though less well studied for CVD effects
6. Choose later generation SU with lower risk of hypoglycemia
7. Degludec / glargine U300 < glargine U100 / detemir < NPH insulin
8. Semaglutide > liraglutide > dulaglutide > exenatide > lixisenatide
9. If no specific comorbidities (i.e., no established CVD, low risk of hypoglycemia, and lower priority to avoid weight gain or no weight-related comorbidities)
10. Consider country- and region-specific cost of drugs. In some countries TZDs relatively more expensive and DPP-4i relatively cheaper

2019년
ADA guideline

DiabeteDiabetes Care. 2018;42(Supplement_1):S90-S102.

USE OF GLUCOSE-LOWERING MEDICATIONS IN THE MANAGEMENT OF TYPE 2 DIABETES

HEALTHY LIFESTYLE BEHAVIORS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES); SOCIAL DETERMINANTS OF HEALTH (SDOH)

TO AVOID THERAPEUTIC INERTIA REASSESS AND MODIFY TREATMENT REGULARLY (3–6 MONTHS)

Goal: Cardiorenal Risk Reduction in High-Risk Patients with Type 2 Diabetes (in addition to comprehensive CV risk management)*

+ASCVD†

Defined differently across CVOTs but all included individuals with established CVD (e.g., MI, stroke, any revascularization procedure). Variably included: conditions such as transient ischemic attack, unstable angina, amputation, symptomatic or asymptomatic coronary artery disease.

+Indicators of high risk

While definitions vary, most comprise ≥55 years of age with two or more additional risk factors (including obesity, hypertension, smoking, dyslipidemia, or albuminuria)

+ASCVD/Indicators of High Risk

GLP-1 RA# with proven CVD benefit — EITHER/OR — SGLT2i§ with proven CVD benefit

If A1C above target

- For patients on a GLP-1 RA, consider adding SGLT2i with proven CVD benefit or vice versa
- TZD^

+HF

Current or prior symptoms of HF with documented HFrEF or HFpEF

+HF

SGLT2i§ with proven HF benefit in this population

+CKD

eGFR <60 mL/min per 1.73 m² OR albuminuria (ACR ≥3.0 mg/mmol [30 mg/g]). These measurements may vary over time; thus, a repeat measure is required to document CKD.

+CKD (on maximally tolerated dose of ACEi/ARB)

PREFERABLY

SGLT2i§ with primary evidence of reducing CKD progression

Use SGLT2i in people with an eGFR ≥20 mL/min per 1.73 m²; once initiated should be continued until initiation of dialysis or transplantation

— OR —

GLP-1 RA with proven CVD benefit if SGLT2i not tolerated or contraindicated

If A1C above target, for patients on SGLT2i, consider incorporating a GLP-1 RA or vice versa

If additional cardiorenal risk reduction or glycemic lowering needed

Goal: Achievement and Maintenance of Glycemic and Weight Management Goals

Glycemic Management: Choose approaches that provide the efficacy to achieve goals:

Metformin OR Agent(s) including COMBINATION therapy that provide adequate EFFICACY to achieve and maintain treatment goals

Consider avoidance of hypoglycemia a priority in high-risk individuals

In general, higher efficacy approaches have greater likelihood of achieving glycemic goals

Efficacy for glucose lowering

Very High:
Dulaglutide (high dose), Semaglutide, Tirzepatide

Insulin

Combination Oral, Combination Injectable (GLP-1 RA/Insulin)

High:
GLP-1 RA (not listed above), Metformin, SGLT2i, Sulfonylurea, TZD

Intermediate:
DPP-4i

Achievement and Maintenance of Weight Management Goals:

Set individualized weight management goals

General lifestyle advice: medical nutrition therapy/eating patterns/ physical activity

Intensive evidence-based structured weight management program

Consider medication for weight loss

Consider metabolic surgery

When choosing glucose-lowering therapies:

Consider regimen with high-to-very-high dual glucose and weight efficacy

Efficacy for weight loss

Very High:
Semaglutide, Tirzepatide

High:
Dulaglutide, Liraglutide

Intermediate:
GLP-1 RA (not listed above), SGLT2i

Neutral:
DPP-4i, Metformin

If A1C above target

Identify barriers to goals:

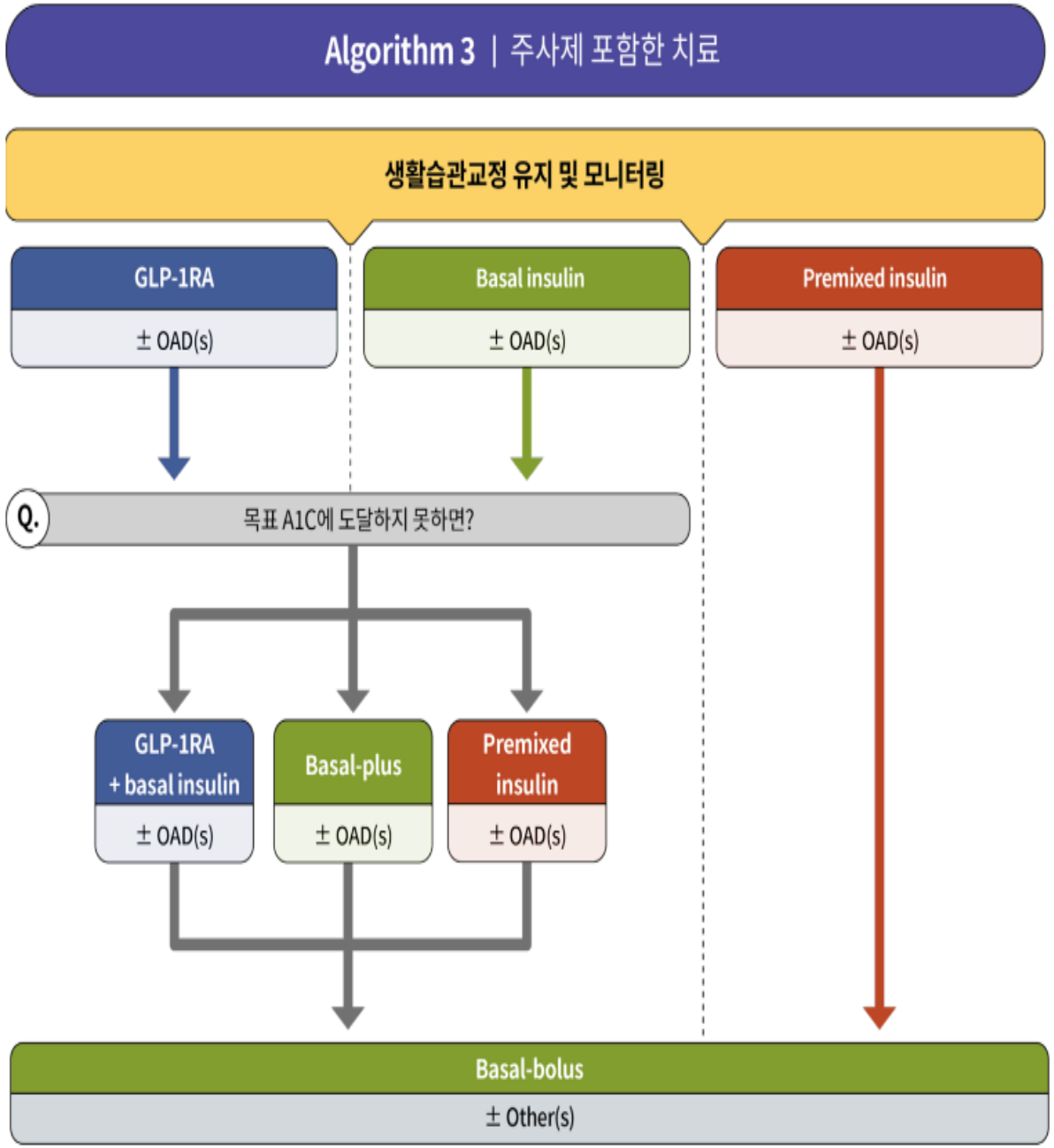
- Consider DSMES referral to support self-efficacy in achievement of goals
- Consider technology (e.g., diagnostic CGM) to identify therapeutic gaps and tailor therapy
- Identify and address SDOH that impact achievement of goals

* In people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin;† A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details; ^ Low-dose TZD may be better tolerated and similarly effective; § For SGLT2i, CV/renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HHF, and renal outcomes in individuals with T2D with established/high risk of CVD; # For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CVD.

2023년 ADA guideline

Diabetes Care. 2022;46 (Supplement_1):S140-S157.

	Efficacy[1]	Hypoglycemia	Weight change[2]	CV effects		Renal effects		Oral/SQ	Cost	Clinical considerations
				Effect on MACE	HF	Progression of DKD	Dosing/use considerations*			
Metformin	High	No	Neutral (potential for modest loss)	Potential benefit	Neutral	Neutral	• Contraindicated with eGFR <30 mL/min per 1.73 m^2	Oral	Low	• GI side effects common; to mitigate GI side effects, consider slow dose titration, extended release formulations, and administration with food • Potential for vitamin B12 deficiency; monitor at regular intervals
SGLT2 inhibitors	Intermediate to high	No	Loss (intermediate)	Benefit: canagliflozin, empagliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin, ertugliflozin	Benefit: canagliflozin, dapagliflozin, empagliflozin	• See labels for renal dose considerations of individual agents • Glucose-lowering effect is lower for SGLT2 inhibitors at lower eGFR	Oral	High	• DKA risk, rare in T2DM: discontinue, evaluate, and treat promptly if suspected; be aware of predisposing risk factors and clinical presentation (including euglycemic DKA); discontinue before scheduled surgery (e.g., 3–4 days), during critical illness, or during prolonged fasting to mitigate potential risk • Increased risk of genital mycotic infections • Necrotizing fasciitis of the perineum (Fournier gangrene), rare reports: institute prompt treatment if suspected • Attention to volume status, blood pressure; adjust other volume-contracting agents as applicable
GLP-1 RAs	High to very high	No	Loss (intermediate to very high)	Benefit: dulaglutide, liraglutide, semaglutide (SQ) Neutral: exenatide once weekly, lixisenatide	Neutral	Benefit for renal endpoints in CVOTs, driven by albuminuria outcomes: dulaglutide, liraglutide, semaglutide (SQ)	• See labels for renal dose considerations of individual agents • No dose adjustment for dulaglutide, liraglutide, semaglutide • Monitor renal function when initiating or escalating doses in patients with renal impairment reporting severe adverse GI reactions	SQ; oral (semaglutide)	High	• Risk of thyroid C-cell tumors in rodents; human relevance not determined (liraglutide, dulaglutide, exenatide extended release, semaglutide) • Counsel patients on potential for GI side effects and their typically temporary nature; provide guidance on dietary modifications to mitigate GI side effects (reduction in meal size, mindful eating practices [e.g., stop eating once full], decreasing intake of high-fat or spicy food); consider slower dose titration for patients experiencing GI challenges • Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected
GIP and GLP-1 RA	Very high	No	Loss (very high)	Under investigation	Under investigation	Under investigation	• See label for renal dose considerations • No dose adjustment • Monitor renal function when initiating or escalating doses in patients with renal impairment reporting severe adverse GI reactions	SQ	High	• Risk of thyroid C-cell tumors in rodents; human relevance not determined • Counsel patients on potential for GI side effects and their typically temporary nature; provide guidance on dietary modifications to mitigate GI side effects (reduction in meal size, mindful eating practices [e.g., stop eating once full], decreasing intake of high-fat or spicy food); consider slower dose titration for patients experiencing GI challenges • Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Evaluate for gallbladder disease if cholelithiasis or cholecystitis is suspected
DPP-4 inhibitors	Intermediate	No	Neutral	Neutral	Neutral (potential risk, saxagliptin)	Neutral	• Renal dose adjustment required (sitagliptin, saxagliptin, alogliptin); can be used in renal impairment • No dose adjustment required for linagliptin	Oral	High	• Pancreatitis has been reported in clinical trials but causality has not been established. Discontinue if pancreatitis is suspected • Joint pain • Bullous pemphigoid (postmarketing): discontinue if suspected
Thiazolidinediones	High	No	Gain	Potential benefit: pioglitazone	Increased risk	Neutral	• No dose adjustment required • Generally not recommended in renal impairment due to potential for fluid retention	Oral	Low	• Congestive HF (pioglitazone, rosiglitazone) • Fluid retention (edema; heart failure) • Benefit in NASH • Risk of bone fractures • Weight gain: consider lower doses to mitigate weight gain and edema
Sulfonylureas (2nd generation)	High	Yes	Gain	Neutral	Neutral	Neutral	• Glyburide: generally not recommended in chronic kidney disease • Glipizide and glimepiride: initiate conservatively to avoid hypoglycemia	Oral	Low	• FDA Special Warning on increased risk of CV mortality based on studies of an older sulfonylurea (tolbutamide); glimepiride shown to be CV safe (see text) • Use with caution in persons at risk for hypoglycemia
Insulin **Human**	High to very high	Yes	Gain	Neutral	Neutral	Neutral	• Lower insulin doses required with a decrease in eGFR; titrate per clinical response	SQ; inhaled	Low (SQ)	• Injection site reactions • Higher risk of hypoglycemia with human insulin (NPH or premixed formulations) vs. analogs
Analogs								SQ	High	



GLP-1RA, glucagon-like peptide-1 receptor agonist ; OAD, oral anti-diabetic drug.

If injectable therapy is needed to reduce A1C[1]

Consider GLP-1 RA or GIP/GLP-1 RA in most individuals prior to insulin[2]

INITIATION: Initiate appropriate starting dose for agent selected (varies within class)

TITRATION: Titrate to maintenance dose (varies within class)

If above A1C target

Add basal insulin[3]

Choice of basal insulin should be based on person-specific considerations, including cost. Refer to **Table 9.4** for insulin cost information. Consider prescription of glucagon for emergent hypoglycemia.

Add basal analog or bedtime NPH insulin[4]

INITIATION: Start 10 units per day OR 0.1–0.2 units/kg per day

TITRATION:

- Set FPG target (see Section 6, "Glycemic Targets")
- Choose evidence-based titration algorithm, e.g., increase 2 units every 3 days to reach FPG target without hypoglycemia
- For hypoglycemia determine cause, if no clear reason lower dose by 10–20%

Assess adequacy of basal insulin dose

Consider clinical signals to evaluate for overbasalization and need to consider adjunctive therapies (e.g., basal dose more than ~0.5 units/kg/day, elevated bedtime–morning and/or post–preprandial differential, hypoglycemia [aware or unaware], high variability)

- If above A1C target and not already on a GLP-1 RA or dual GIP and GLP-1 RA, consider these classes, either in free combination or fixed-ratio combination, with insulin.
- If A1C remains above target:

Add prandial insulin[5]

Diabetes Care. 2022;46(Supplement_1):S140-S157

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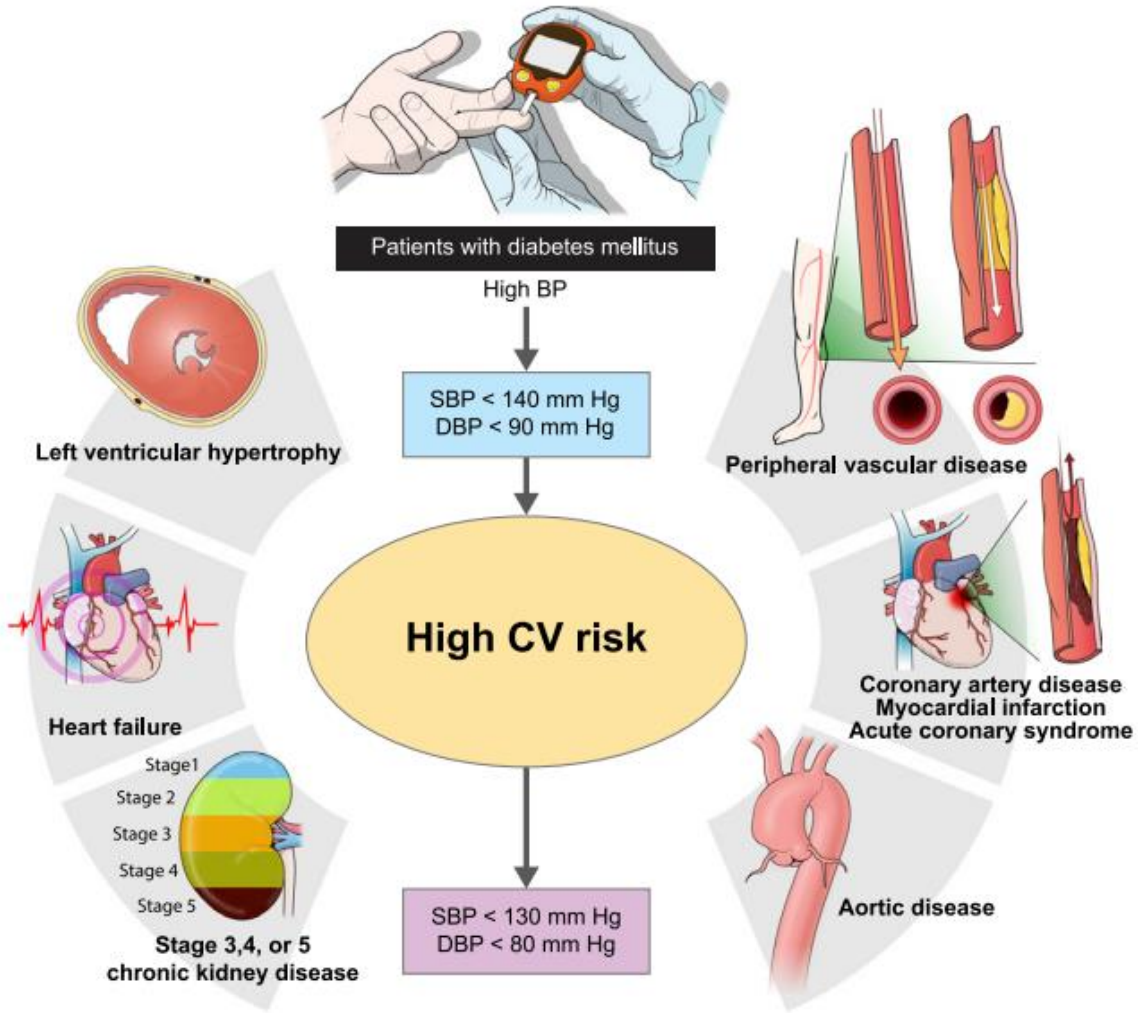
Optimal target blood pressure (BP)

Clinical trial	Population	Intensive	Standard	Outcomes
ACCORD BP (35)	4,733 participants with T2D aged 40–79 years with prior evidence of CVD or multiple cardiovascular risk factors	SBP target: <120 mmHg Achieved (mean) SBP/DBP: 119.3/64.4 mmHg	SBP target: 130–140 mmHg Achieved (mean) SBP/DBP: 135/70.5 mmHg	• No benefit in primary end point: composite of nonfatal MI, nonfatal stroke, and CVD death • Stroke risk reduced 41% with intensive control, not sustained through follow-up beyond the period of active treatment • Adverse events more common in intensive group, particularly elevated serum creatinine and electrolyte abnormalities
ADVANCE (36)	11,140 participants with T2D aged ≥55 years with prior evidence of CVD or multiple cardiovascular risk factors	Intervention: a single-pill, fixed-dose combination of perindopril and indapamide Achieved (mean) SBP/DBP: 136/73 mmHg	Control: placebo Achieved (mean) SBP/DBP: 141.6/75.2 mmHg	• Intervention reduced risk of primary composite end point of major macrovascular and microvascular events (9%), death from any cause (14%), and death from CVD (18%) • 6-year observational follow-up found reduction in risk of death in intervention group attenuated but still significant (242)
HOT (37)	18,790 participants, including 1,501 with diabetes	DBP target: ≤80 mmHg Achieved (mean): 81.1 mmHg, ≤80 group; 85.2 mmHg, ≤90 group	DBP target: ≤90 mmHg	• In the overall trial, there was no cardiovascular benefit with more intensive targets • In the subpopulation with diabetes, an intensive DBP target was associated with a significantly reduced risk (51%) of CVD events
SPRINT (43)	9,361 participants without diabetes	SBP target: <120 mmHg Achieved (mean): 121.4 mmHg	SBP target: <140 mmHg Achieved (mean): 136.2 mmHg	• Intensive SBP target lowered risk of the primary composite outcome 25% (MI, ACS, stroke, heart failure, and death due to CVD) • Intensive target reduced risk of death 27% • Intensive therapy increased risks of electrolyte abnormalities and AKI
STEP (34)	8,511 participants aged 60–80 years, including 1,627 with diabetes	SBP target: <130 mmHg Achieved (mean): 127.5 mmHg	SBP target: <150 mmHg Achieved (mean): 135.3 mmHg	• Intensive SBP target lowered risk of the primary composite outcome 26% (stroke, ACS [acute MI and hospitalization for unstable angina], acute decompensated heart failure, coronary revascularization, atrial fibrillation, or death from cardiovascular causes) • Intensive target reduced risk of cardiovascular death 28% • Intensive therapy increased risks of hypotension

ACCORD BP, Action to Control Cardiovascular Risk in Diabetes Blood Pressure trial; ACS, acute coronary syndrome; ADVANCE, Action in Diabetes and Vascular Disease: Preterax and Diamicron MR Controlled Evaluation; AKI, acute kidney injury; CVD, cardiovascular disease; DBP, diastolic blood pressure; HOT, Hypertension Optimal Treatment trial; MI, myocardial infarction; SBP, systolic blood pressure; SPRINT, Systolic Blood Pressure Intervention Trial; STEP, Strategy of Blood Pressure Intervention in the Elderly Hypertensive Patients; T2D, type 2 diabetes.



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Diabetes Metab J 2022;46:667-674

Optimal target LDL-C

심혈관질환 위험도에 따른 LDL 콜레스테롤 및 non-HDL 콜레스테롤 목표치

위험도	LDL 콜레스테롤 (mg/dL)	non-HDL 콜레스테롤 (mg/dL)
관상동맥질환[1]*	< 55	< 85
죽상경화성 허혈뇌졸중 및 일과성 뇌허혈발작* 경동맥질환* 말초동맥질환* 복부대동맥류* 당뇨병(유병기간 10년 이상 또는 주요 심혈관질환 위험인자† 또는 표적장기손상을 동반한 경우)[2]	< 70	< 100
당뇨병(유병기간 10년 미만, 주요 심혈관질환 위험인자†가 없는 경우)	< 100	< 130
중등도 위험군(주요 심혈관질환 위험인자† 2개 이상)	< 130	< 160
저위험군(주요 심혈관질환 위험인자† 1개 이하)	< 160	< 190

	LDL 콜레스테롤 농도(mg/dL)					
	< 55	55-69	70-99	100-129	130-159	≥ 160
관상동맥질환[1]*	생활습관 교정 및 투약고려	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작
죽상경화성 허혈뇌졸중 및 일과성 뇌허혈발작* 경동맥질환* 말초동맥질환* 복부대동맥류* 당뇨병(유병기간 10년 이상 또는 주요 심혈관질환 위험인자† 또는 표적장기손상을 동반한 경우)[2]	생활습관 교정	생활습관 교정 및 투약고려	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작
당뇨병(유병기간 10년 미만, 주요 심혈관질환 위험인자†가 없는 경우)	생활습관 교정	생활습관 교정	생활습관 교정 및 투약고려	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작	생활습관 교정 및 투약시작
중등도 위험군(주요 심혈관질환 위험인자† 2개 이상)						
저위험군(주요 심혈관질환 위험인자† 1개 이하)						

*LDL 콜레스테롤 기저치 대비 50% 이상 감소 시키는 것을 동시에 권고
†연령(남자 ≥ 45세, 여자 ≥ 55세), 조기 심혈관 질환 발생 가족력, 고혈압, 흡연, 낮은 HDL 콜레스테롤 수치 (< 40 mg/dL)
1) 급성심근경색증은 기저치 LDL 콜레스테롤 농도와 상관없이 스타틴을 투약
2) 표적장기손상(알부민뇨, 만성콩팥병[추정사구체여과율 60 mL/min/1.73 m^2 미만], 망막병증, 신경병증, 좌심실비대) 또는 3개 이상의 주요 심혈관질환 위험인자†를 동반한 당뇨병의 경우: LDL 콜레스테롤 목표치 < 55 mg/dL 선택적 고려 가능

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