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Editorial

Comments on the 2019 ESC guidelines on diabetes, prediabetes, and cardiovascular disease

Comentarios a la guía ESC 2019 sobre diabetes, prediabetes y enfermedad cardiovascular

Joint Working Group of the SEC and SEEN for the 2019 ESC guidelines on diabetes, prediabetes, and cardiovascular diseases, Expert Reviewers for the 2019 ESC guidelines on diabetes, prediabetes, and cardiovascular diseases, and the SEC Guidelines Committee◇

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INTRODUCTION

In line with the clinical practice guideline policy of the Spanish Society of Cardiology (SEC),[1] the current article presents the novel, relevant, and conflicting aspects of the 2019 joint update of the European Society of Cardiology (ESC) and European Association for the Study of Diabetes (EASD) on the management of cardiovascular disease in patients with diabetes mellitus (DM) and prediabetes.[2]

These, the third guidelines jointly drafted by the ESC and EASD, are justified by recent advances, most of which are related to treatment. Although common to all guidelines, we would nonetheless like to stress that the aim of the recommendations is to support health care professionals, because these are the people ultimately responsible for clinical decision-making for each patient receiving treatment.

The guidelines are designed to be more practical and clear and include new sections, such as recommendation tables, that summarize the fundamental and novel aspects with respect to previous editions, ordered according to the level of supporting evidence. The guidelines use the well-known levels of evidence (A, B, and C) and classes of recommendations (I, IIa, IIb, and III).

METHODS

At the suggestion of the SEC Guidelines Committee and the coordinators assigned to these guidelines, a group of expert cardiologists and endocrinologists was selected to review the document. The objective was to comment on the nature and timeliness of the guidelines, analyze the methodology, and highlight the novelties (Table 1) and the positive, questionable, or omitted aspects. With these evaluations, a joint document has been prepared and reviewed by cardiologists appointed by the Clinical Cardiology, Cardiovascular Risk and Cardiac Rehabilitation, Ischemic Heart Disease, Catheterization, and Heart Failure sections of the SEC, as well as by the Spanish Society of Endocrinology and Nutrition (SEEN).

DIAGNOSIS OF DIABETES AND PREDIABETES

This aspect is relevant because no changes have been made to the consensus, with the baseline blood glucose or glycated hemoglobin (HbA1c) level still recommended for DM diagnosis and the oral glucose tolerance test only for doubtful cases and for the diagnosis of impaired glucose tolerance (IGT). The guidelines recognize that there are certain barriers to the correct evaluation of HbA1c. For its correct interpretation, it may be useful to consider other causes besides those listed[2] (hemoglobinopathies and hemolytic or iron deficiency anemias) because people can be iron deficient without having anemia, Graves disease, or severe hepatic and kidney disease.[3] It should also be remembered that HbA1c might not be affected by these clinical conditions in people with DM.

The guidelines stress the need to repeat the test to confirm the diagnosis. Notably, the American Diabetes Association guidelines[4] indicate that the confirmatory diagnosis of DM, in the absence of unequivocal hyperglycemia, requires 2 different methods in the same sample or a repeated test in different samples.

CARDIOVASCULAR RISK ASSESSMENT IN PREDIABETES AND DIABETES

One of the main novelties of these guidelines is the reclassification of cardiovascular risk in DM (Table 7 of the guidelines[2]). The document introduces the major feature of sex differences (higher relative risk and earlier major cardiovascular events in women with DM). That is, women are no longer are considered to be protected against premature cardiovascular disease (CVD). There is a final recommendation Table[2] for the use of laboratory, electrocardiographic, and diagnostic imaging tests to evaluate cardiovascular risk in asymptomatic patients with DM; this table is highly detailed and useful for evidence grading.

Noteworthy controversial aspects include the amalgamation of type 1 DM (T1DM) and type 2 DM (T2DM), which is particularly counterproductive in this section and may lead to misunderstandings. The concept of prediabetes is exclusively applicable to T2DM.

The degree of cardiovascular risk given to each entity differs; in addition, each entity has a different clinical manifestation. Although the baseline blood glucose level is very useful for DM/

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Table 1
Novel and noteworthy aspects of the new guidelines

Diagnosis of diabetes and prediabetes
With no notable novelties except the insistence of the need to repeat the test to confirm the diagnosis (on another day)
Cardiovascular risk assessment
Reclassification of cardiovascular risk in DM in a visually appealing and simple table, similar to that of the cardiovascular prevention guidelines of 2016, with very high-risk patients (established cardiovascular disease or target organ damage or 3 additional risk factors or long-term T1DM), high-risk patients (DM duration $\geq$ 10 years without target organ damage and with an additional risk factor), and moderate-risk patients. Patients with DM are never considered low risk
The guidelines introduce the useful aspect of differences according to sex (higher excess relative risk of vascular events in women with DM) and loss of the protective effect in women against premature cardiovascular risk
Final table of recommendations, comprehensive and useful for evidence grading, on the use of laboratory, electrocardiogram, and diagnostic imaging tests for cardiovascular risk evaluation in asymptomatic patients with DM
Prevention of cardiovascular disease
Lifestyle changes are recommended to delay/prevent the progression of pre-DM to DM
Total smoking cessation (systematic medical advice and discouraged use of electronic cigarettes)
Glycemic control
Self-monitoring of blood glucose levels is recommended for optimal control of T2DM (emphasis on hypoglycemia prevention)
BP control
Lower BP control targets are recommended than in previous guidelines: SBP of 120 to 130 mmHg and DBP of 70 to 80 mmHg
Lipid control
LDL-C target values are based on the cardiovascular risk profile: $<$100, $<$70, and $<$55 mg/dL or at least a 50% reduction (in moderate-, high-, or very high-risk cardiovascular risk, respectively)
Although statins are maintained as the cornerstone of lipid-lowering therapy, combination therapy (ezetimibe + simvastatin) is recommended if statins fail to reduce the LDL-C to $<$55 mg/dL, as well as the use of PCSK9 inhibitors in those intolerant to statins or with elevated LDL-C values despite maximum combination therapy
Glycemic control therapies
A class I indication is awarded to SGLT1 inhibitors and GLP1-RAs due to their beneficial cardiovascular effects in patients with high and very high cardiovascular risk (almost all)
Metformin is reserved for intermediate-risk obese patients
Coronary heart disease
The guidelines extensively discuss the myocardial revascularization possibilities but coronary artery bypass grafting is the technique of choice, particularly in complex situations (SYNTAX score $\geq$ 22)
The importance is highlighted of risk factor control, and dual antiplatelet therapy can be recommended for up to 3 years (aspirin and low-dose ticagrelor) in patients without contraindication or bleeding risk
Heart failure
New recommendation of the use of SGLT2 inhibitors to prevent and treat heart failure
Arrhythmias
DM is an independent risk factor for AF. Recommendation to preferably anticoagulate patients with CHA_2DS_2-VASc $\geq$ 2 with direct oral anticoagulants
Aortic and peripheral artery disease
Recommended treatment with aspirin and low-dose rivaroxaban if patient has symptomatic lower extremity artery disease
Patients should be advised how to care for their feet (inform and educate patients/relatives in adequate self-care and injury prevention)
Early identification of tissue loss or infection and referral to a multidisciplinary team (annual symptom evaluation and neuropathy examination; ABI for the diagnosis of peripheral artery disease in patients with DM)
Chronic kidney disease
SGLT2 inhibitors recommended to limit the progression of chronic kidney disease
Nursing care
Structured group education programs are recommended for patients with DM to improve DM understanding, glycemic control, disease management, and patient empowerment
Patient-centered care is recommended to facilitate shared control and decision-making

ABI, ankle-brachial index; AF, atrial fibrillation; BP, blood pressure; CHA_2DS_2-VASc, congestive heart failure, hypertension, age $\geq$ 75 years (doubled), diabetes mellitus, stroke (doubled), vascular disease, and female sex; DBP, diastolic blood pressure; DM, diabetes mellitus; LDL-C, low-density lipoprotein-cholesterol; pre-DM, prediabetes; SBP, systolic blood pressure; SGLT2, sodium-glucose cotransporter-2; T1DM, type 1 DM; T2DM, type 2 DM.

pre-DM screening, the HbA1c level should also be considered. In addition to differences in sex and time of onset, DM also affects the risk of distinct cardiovascular events differently[5]; thus, it would have been interesting to consider it. In contrast to other recent guidelines, the epidemiological evidence, and the stated objective of the guidelines themselves, the document states that prediabetes is not associated with increased cardiovascular risk. The clearest screening-related recommendation (I C) is possibly the performance of resting ECG in DM patients diagnosed with hypertension or suspected of having CVD. Such a general recommendation in this highly prevalent population should be supported by clear evidence, which is not provided in the guidelines.

Finally, the guidelines do not recommend systematic screening for CVD in asymptomatic patients with DM. However, positive results have been achieved with different imaging techniques. This may support the current discretional use of screening tests for silent ischemia without cost-effectiveness criteria.

PREVENTION OF CARDIOVASCULAR DISEASE

Lifestyle

There are no major changes in lifestyle recommendations compared with the previous guidelines, except for a new recommendation (I A) stressing the need for patients to adopt lifestyle changes to delay or avoid the progression of prediabetes to established DM. The standard recommendations of lifestyle modifications for patients with diabetes gathered in these guidelines regarding smoking, exercise, weight loss, and diet are the same recommendations as those for cardiovascular prevention. Curiously, a slight cardiovascular benefit is associated with coffee in patients with DM. A recommendation class is missing for bariatric surgery in obese patients with prediabetes or DM, given its ability to reduce events in this population.

Glycemic control

Strict glycemia control (HbA1c $< 7\%$) continues to be recommended for patients with DM to reduce the risk of microvascular complications (I A recommendation) and, with slightly less evidence, macrovascular complications (II A recommendation). Individualized HbA1c targets remain, based on DM duration, comorbidities, and age, and a somewhat obvious recommendation is introduced, namely to avoid hypoglycemia (I C). One novelty is the recommended use of blood glucose self-monitoring or continuous monitoring systems to improve glycemic control.

Blood pressure

Compared with the ESC 2013 guidelines,[6] the target blood pressure has been changed from 140/85 mmHg for all patients to lower targets that are individualized according to patient profile, particularly age, diabetic nephropathy, and stroke risk. In general, the systolic blood pressure target is 120 to 130 mmHg, with the possible consideration of up to 140 mmHg in patients older than 65 years; regardless of age, the diastolic pressure should be < 80 mmHg but no lower than 70 mmHg. Lifestyle modifications and drug therapy are recommended for all patients with pressure values $>$ 140/90 mmHg. Also recommended is the use of combination therapy as first-line treatment for most patients and of any drug therapy except beta-blockers, as long as there is an established indication, such as ischemic heart disease or heart failure. In particular, the guidelines recommend that patient treatment begin with combination therapy with a renin-angiotensin system inhibitor, such as an angiotensin-converting enzyme inhibitor (ACEI), or angiotensin receptor blocker (ARB), in conjunction with a calcium antagonist or thiazide diuretic. Renin-angiotensin system blockers (ARBs or ACEIs) are recommended over diuretics or beta-blockers in patients with pre-DM. The guidelines stress the usefulness of blood pressure self-monitoring (BPSM) and ambulatory blood pressure monitoring (ABPM) for the treatment of hypertension in patients with DM.

Although the value is mentioned of the new GLP1 receptor antagonists (GLP1-RAs) and sodium-glucose cotransporter 2 (SGLT2) inhibitors, the guidelines do not specify how they should be included in the treatment algorithm for diabetic patients with hypertension and how they should be managed in relation to the other antihypertensive therapies.

Lipids

Low-density lipoprotein-cholesterol (LDL-C) target values are established based on cardiovascular risk profile (defined in Table 7 of the guidelines[2]). These are < 100, < 70, and < 55 mg/dL or at least a 50% reduction in patients with moderate, high, or very high cardiovascular risk, respectively (I A in moderate- and high-risk patients and I B in very high-risk patients), with secondary high-density lipoprotein-cholesterol (HDL-C) targets < 95 mg/dL in very high-risk and < 100 mg/dL in high-risk patients (I B).

Statins are maintained as the first-line treatment. For young asymptomatic patients with no vascular damage, the therapy may be delayed until they reach the age of 30 years (IIb). In younger persons, it should be individualized according to LDL-C values and the presence of target organ damage. It should be avoided in pregnant patients or those planning pregnancy. Adverse effects are rare, with the exception of myopathy, and are generally associated with drug interactions, elevated doses, or gemfibrozil combination. They are less common with pravastatin and low-dose rosuvastatin. DM development due to statin use is more frequent in older patients and limited to those with a predisposition. Based on the IMPROVE-IT study (simvastatin+ezetimibe), combination therapy is recommended if high-strength statins at maximum tolerated dose fail to reduce LDL-C to < 55 mg/dL (I B). Intensification of statin therapy before the combination therapy still receives a IIa C recommendation.

Studies with the proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors alirocumab and evolocumab have shown a marked decrease in LDL-C that is associated with a reduction in cardiovascular events. These drugs are recommended for statin-intolerant patients or those who have elevated LDL-C values despite maximum combination therapy with ezetimibe (I A). Fibrates are limited to patients with hypertriglyceridemia and low HDL-C levels (IIa B). Gemfibrozil should be avoided due to the risk of myopathy.

Antiplatelet agents

Primary prevention

In patients with low or moderate risk, aspirin slightly reduces the incidence of events but significantly increases the rates of bleeding, particularly gastrointestinal, in both sexes. It may be considered for high- or very high-risk patients without contraindications (II A; previously IIb C). This recommendation is

notable in light of recent clinical trials that seem to show the opposite association. The more extensive use of proton pump inhibitors could increase their benefit in primary prevention (IIa A).

Both diabetic status and height or weight can reduce the response to aspirin and clopidogrel. The benefit of antiplatelet regimen intensification in these patients is still unclear. It is unknown whether the effects of prophylactic antithrombotic therapy are similar in patients with prediabetes.

Secondary prevention

The corresponding section from the previous guidelines is repeated in the current document. There are no changes to this aspect.

Multifactorial approaches

The combination of reduced HbA1c, systolic BP, and lipids decreases cardiovascular events by 75%. The multifactorial approach to diabetic patients is hugely important and remains a IIa B recommendation. Nonetheless, it is still underused. The therapeutic targets are defined in Table 9 of the guidelines.[2]

The influence of sex on this type of approach remains to be evaluated.

MANAGEMENT OF CORONARY HEART DISEASE

This section covers aspects related to the medical therapy of diabetic patients with established CVD or with high or very high CVD risk, as well as aspects related to coronary revascularization.

Medical treatment

Aspects related to the usefulness of glycemic control in different situations are revised, as well as the choice of lipid-lowering therapy and the use of cardiovascular drugs. The main aspect with the clearest changes is the lipid-lowering therapy. Based on the results of recent cardiovascular safety trials, the use is prioritized of 2 large therapeutic groups and, of these, the drugs with relevant safety studies: SGLT2 inhibitors (empagliflozin, canagliflozin, and dapagliflozin) and GLP1-RAs (liraglutide, semaglutide, and dulaglutide).[7] Both drug groups are preferentially recommended for patients with established CVD or high/very high CVD risk, with special mention of the lower mortality observed with empagliflozin and liraglutide. The relevant trials are meticulously summarized in Table 10 of the guidelines,[2] although no reference is made to HbA1c-related inclusion criteria, the add-on design, and the background treatment characteristics.

Thus, the main guideline algorithm recommends the use of SGLT2 inhibitors or GLP1-RAs in all patients with T2DM with established CVD or high/very high CVD risk, whether in monotherapy for patients without previous treatment or as add-on to the background therapy, independently of other considerations such as glycemic control status. The recommendations are independent of glycemic control, in contrast to the recommendations of the American Diabetes Association (ADA)[4] and the inclusion criteria of the trials on which they are based. The use of metformin predominated in the trials used as a basis for the algorithms and the effect of these "new" drugs on cardiovascular events may be independent of the presence of metformin. However, the usefulness is forgotten of the background treatment in the comprehensive approach to the disease and the algorithm assumes that its value can be completely replaced by the new recommended drugs. Finally, the use of SGLT2 inhibitor or GLP1-RA monotherapy may be considered controversial. Treatment of hyperglycemia should begin with a HbA1c target $\leq$ 7.0% in most people, as recommended in the ADA guidelines.[4] There is a notable absence of explicit references in the algorithm to measures related to weight control or lifestyle: it is specifically focused on drug therapy. Another notable aspect is that the algorithm ignores the background lipid-lowering therapy for diabetic patients with an already established therapy and established CVD or high or very high CVD risk.

The guidelines stress the role of antithrombotic therapy as the cornerstone of secondary prevention, opening the door, in line with the previous recommendations for dual antiplatelet therapy and myocardial revascularization, to a prolonged antiplatelet therapy of up to 3 years after an acute myocardial infarction in selected patients, as well as the use of low-dose rivaroxaban.

Myocardial revascularization

Compared with the coronary revascularization-related recommendations in previous guidelines, the current document advises the same technical aspects for patients with and without DM regarding the use of drug-eluting stents and radial access by default for percutaneous coronary intervention (PCI), as well as the use of the internal mammary artery in coronary revascularization surgery.[8]

Based on previous studies, optimal medical therapy should be considered by default for stable patients, except when the symptoms cannot be controlled or there are large areas of ischemia or proximal anterior descending artery or left main coronary artery disease. If revascularization is necessary, the coronary anatomy is amenable to PCI or surgical revascularization, and the surgical mortality risk is estimated to be low, the revascularization strategy for diabetic patients can be structured as follows: *a)* PCI is not recommended for patients with left main coronary artery disease and a high SYNTAX score or for patients with 3-vessel disease and an intermediate or high SYNTAX score; *b)* surgical coronary revascularization is favored, although PCI is a reasonable alternative, for patients with left main coronary artery disease and an intermediate SYNTAX score; *c)* PCI and revascularization surgery are comparable alternatives in patients with left main coronary artery disease and a low SYNTAX score, as well as in those with 2-vessel disease that includes involvement of the proximal anterior descending artery; and *d)* PCI is favored in patients with 1- or 2-vessel disease without involvement of the proximal anterior descending artery, as well as surgical revascularization in those with 3-vessel disease, even when the SYNTAX score is low. In these contexts, their alternatives are awarded a IIb recommendation. Curiously, the guideline recommendations do not consider a significant proportion of real-life patients, particularly those with acute coronary syndrome.

HEART FAILURE AND DIABETES

This section is probably the one with the most changes from the 2013 guidelines.[6] The results of SGLT2 inhibitor studies has redirected the recommendations for the prevention and management of heart failure (HF) in patients with DM.[9]

Regarding the epidemiological characteristics, compared with the 2013 guidelines,[6] emphasis is still placed on the close relationship between HF and DM, as well as the negative effects of the combination of these 2 entities on hospitalizations, cardiovascular mortality, and all-cause mortality. The prevalence of HF in patients with DM is estimated to exceed 30%, assuming that underdiagnosis persists, which demonstrates the lack of understanding of the cause and pathophysiology of diabetic cardiomyopathy.

A new classification of HF is introduced based on the ejection fraction: preserved (HFpEF), intermediate, and reduced (HFrEF). In addition, effort is now being expended to indicate the secondary pathophysiological implications of the different HF phenotypes on DM. The current data give proportions of 25% to HFrEF and 75% to HFpEF.

In terms of HF treatment in patients with DM, the only change is the incorporation of angiotensin receptor-neprilysin inhibitors as therapies that improve prognosis in patients with HFrEF and DM, as in patients with HFrEF without DM; in addition, angiotensin receptor-neprilysin inhibitors improve glycemic control and delay the need for insulinization.

As already mentioned, the most important change has been the introduction of SGLT2 inhibitors as first-line therapy for patients with DM and HF, with level of evidence I A due to HF hospitalization reductions with empagliflozin, canagliflozin, and dapagliflozin and cardiovascular and all-cause mortality reductions with empagliflozin. Benefits have recently been reported with dapagliflozin (after publication of the guidelines). Metformin remains second-line treatment (IIa C), and GLP1-RAs are newly awarded a IIb A recommendation due to the neutral effect in HF of liraglutide, dulaglutide, and semaglutide, as well as their ability to reduce cardiovascular risk. Glitazones are contraindicated because they can increase fluid retention. Regarding the dipeptidyl peptidase-4 (DPP4) inhibitors, saxagliptin has a class III recommendation due to increased HF hospitalizations in the SAVOR study, and the other drugs in this group appear to have a neutral effect on HF.

Notably, the recommendations of these guidelines are in line with the position of the SEC,[6] published months before, with SGLT2 inhibitors deemed the first-line drugs for patients with DM and CVD and particularly for those with HF.

ARRHYTHMIAS

The guidelines describe DM as an independent risk factor for atrial fibrillation, particularly in young patients. This association increases the risks of death, HF, and stroke. Accordingly, atrial fibrillation screening should be performed using pulse palpation, ECG, or Holter monitoring. Patients with a CHA_2DS_2-VASc embolic risk score ≥ 2 should be anticoagulated (I A) and direct oral anticoagulants are preferred to vitamin K antagonists, with doses adjusted to renal function.

The diagnosis and management of ventricular arrhythmias (extrasystole and sustained and nonsustained ventricular tachycardias) do not differ from those in patients without DM. However, both DM and prediabetes increase the risk of sudden cardiac death. After an acute myocardial infarction, the need must be evaluated for an implantable cardioverter-defibrillator and, in patients with HF, the possibility of resynchronization therapy, with or without defibrillator, once the medical therapy has been optimized using beta-blockers, inhibitors of the renin-angiotensin-aldosterone axis (including sacubitril/valsartan), and mineralocorticoid receptor antagonists. The impact of the new antidiabetic drugs on sudden cardiac death remains unknown.

AORTIC AND PERIPHERAL ARTERY DISEASE

In the new document, cerebrovascular disease is not included as a section, although carotid atherosclerotic disease is mentioned and recommendations are made, as in the previous guidelines. The recommendations for aneurysm screening are the same as those in patients without DM.

An annual clinical assessment is recommended to screen for lower extremity peripheral artery disease. However, a new recommendation is that of measurement of the ankle-brachial index alone at diagnosis and every 10 years if normal. The guidelines repeatedly refer to the specific and recently published SEC guidelines on peripheral artery disease,[10] without delving as deeply as the 2013 guidelines; we consider it an attempt to not duplicate content. In addition, the document includes the evaluation of amputation risk using the WIFI (Wound, Ischemia, and Foot Infection) classification, which enables appropriate risk stratification.

Regarding treatment, the guidelines once again show the lack of specific evidence in patients with DM supporting the various revascularization treatment strategies, as well as the importance of a multidisciplinary team approach. The treatment targets for patients with this complication reflect the guidelines' view that these patients are at very high risk. In addition, antiplatelet therapy is recommended for patients with lower extremity peripheral artery disease who do not have a contraindication. Indeed, for chronic symptomatic lower extremity artery disease, low-dose rivaroxaban (known as the vascular dose) and aspirin should be combined if the bleeding risk is not high.

Finally, it is important to note that carotid ultrasound screening is not recommended to detect the risk of future cerebrovascular disease. However, regarding this vascular imaging technique, the authors do specify that measurement of the intimal-medial thickness is not recommended; instead, the detection of carotid and femoral plaque is noted to contribute to risk stratification in patients with DM and moderate and high risk.

CHRONIC KIDNEY DISEASE

Notably, whereas the previous guidelines included retinopathy as a microvascular complication, this edition specifically includes chronic kidney disease alone. Accordingly, there are no specific treatment recommendations for diabetic retinopathy; however, due to recent data on the possible nephroprotective properties of the new antidiabetic agents (SGLT2 inhibitors and GLP1-RAs), chronic kidney disease receives greater attention in the current guidelines.

Chronic kidney disease, defined as an estimated glomerular filtration rate < 60 mL/min/1.73 m^2 or albuminuria that lasts 90 days or more, shows elevated prevalence in diabetic patients and is associated with high cardiovascular risk. The annual screening and evaluation of renal function requires determination of both the estimated glomerular filtration rate and the creatinine:albumin ratio.

The blood pressure targets for chronic kidney disease have been changed: a systolic blood pressure of a maximum of 130 mmHg is recommended, but not < 120 mmHg, and always individualized. For patients older than 65 years, the recommended values are 130 to 139 mmHg. For its treatment, the most strongly recommended drugs continue to be ACEIs/ARBs, particularly in patients with proteinuria, albuminuria, or left ventricular hypertrophy.

Optimization of glycemic control reduces nephropathy progression. However, a fall in the glomerular filtration rate increases the risk of adverse effects from oral antidiabetic agents

and limits their use. Recent clinical trials have obtained promising data on the neuroprotective properties of GLP1-RAs (liraglutide and semaglutide) and SGLT2 inhibitors (empagliflozin, canagliflozin, and dapagliflozin), although these clinical trials have some limitations, such as the exclusion of advanced chronic kidney disease or a primary outcome that did not consider nephroprotection. The CREDENCE study[11] was stopped prematurely due to a 30% reduction in the relative risk of the primary outcome variable (composite outcome of end-stage renal disease, serum creatinine concentration, and cardiovascular or renal death) in patients assigned to the canagliflozin group vs the placebo group in a high-risk population. Accordingly, although there is some evidence of nephroprotection with both pharmacological drugs, there are still gaps in the evidence, such as the effect of drug class, which will probably be resolved with new clinical trials.

PATIENT-CENTERED NURSING CARE

DM is a chronic disease that requires solid health behaviors, oriented toward specific understanding of the disease and its treatment. The benefits of DM and cardiovascular risk factor control are well defined and reported in these guidelines. However, patients still struggle to achieve and maintain lifestyle changes.[12]

Numerous studies have shown the effectiveness of training and support programs for self-management in patients with DM.[13] Even in patients with prediabetes, structured lifestyle-focused empowerment and education interventions have proven benefits on DM progression and cardiovascular risk factor control. However, more studies are required to determine the effects of these programs on CVD progression.

The guidelines stress a multifactorial approach to diabetic patients, beyond simple glycemic control. Patients should acquire understanding of healthy habits, self-care, and effective management of their therapeutic regimen. Nursing care should be focused on promoting self-care and healthcare education. The objective is to achieve better control of the disease that avoids delayed complications and improves the quality of life of patients and their family members.

Healthcare education programs are mainly implemented in primary care. However, we must not forget that DM is a chronic disease that is accompanied by comorbidities that require the use of hospital services. Diabetic patients can have various hospitalization events over time. In the hospital context, particularly at discharge, education of the patient/family is thus also a hospital nursing competence.

The recommendations of the guidelines concerning healthcare education have already been mentioned in other sections, but the empowerment aspects for the control of cardiovascular risk factors in diabetic patients are particularly interesting. Thus, the guidelines recommend the scheduling of individual and group training sessions, both coordinated and complementary, to improve DM understanding, glycemic control, and disease management. Self-management of the blood glucose concentration should be individualized according to the patient's DM type, treatment, and self-management capabilities for better T2DM control and to avoid hypoglycemia. The guidelines indicate that the role of the new glucose self-monitoring technologies remains to be defined. Patients and their relatives should be informed and educated to achieve self-care and prevent foot injuries. Annual assessment is recommended of the amputation risk through evaluation of the presence of wounds, ischemia, and infection. From the point of view of nursing, the treatment algorithms included in the guidelines that use the WIFI classification are useful and enable appropriate patient stratification.

CONFLICTS OF INTEREST

None declared.

APPENDIX. AUTHORS

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