REVIEW

Сахарный диабет 2 типа у лиц пожилого возраста – решенные и нерешенные вопросы

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Численность пожилых людей с сахарным диабетом 2 типа (СД2) будет неуклонно увеличиваться. Тактика ведения данной категории пациентов должна быть индивидуальной и включать адекватную коррекцию гипергликемии для предотвращения долгосрочных микрососудистых осложнений, при этом также – предупреждение гипогликемии, снижение сердечно-сосудистой смертности и сохранение качества жизни. В данной статье кратко изложены основные сведения о патофизиологии углеводного обмена, клинических особенностях диабета и применения сахароснижающих препаратов у пожилых пациентов. Особое внимание уделено обзору целей гликемического контроля, предлагаемых некоторыми клиническими руководствами.
Ключевые слова: *сахарный диабет 2 типа; пожилые; сахароснижающая терапия; гипогликемия; вариабельность гликемии; качество жизни*

Diabetes type 2 diabetes in the elderly – solved and unsolved questions

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The number of elderly persons with diabetes mellitus type 2 is expected to progressively increase. Management of this category of patients should be individualised and include the adequate correction of hyperglycaemia, prevention of long-term complications, prevention of hypoglycaemia, reduction of cardiovascular mortality and preservation of quality of life. This article summarises basic information on the pathophysiology of carbohydrate metabolism, peculiarities of the course of diabetes and use of antidiabetic drugs in the elderly. Special attention is paid to reviewing the goals of glycaemic control and proposed clinical guidelines.
Keywords: *diabetes mellitus; elderly; hypoglycemic therapy, hypoglycemia; glycemic variability; quality of life*

Background

The rapid ageing of the global population is one of the most significant demographic, social, economic and political changes of our times. According to the United Nations (UN), the proportion of people aged 60 years and above would double between 2007 and 2050, and the actual number of people in this age group would increase by a factor of three, reaching 2 billion in 2050 [1]. This problem requires fundamental changes in the health care system to provide comprehensive care, considering the special needs of the elderly. In 2015, the World Health Organization (WHO) published its world report on ageing and health, in which the authors emphasise the acute urgency of this problem and recommend that large-scale studies of elderly people be conducted to identify the level of functional ability, specific health status, health demand and need for care and support for maintaining 'healthy ageing' [2].

The increased prevalence of type 2 diabetes mellitus (T2DM) is a consequence of the ageing population. According to the International Diabetes Federation (IDF), there are 415 million adults in the age group of 20–79 years in the world who have diabetes, and the prevalence of diabetes in individuals who are above the age of 65 years is 20% [3]. Currently in Russia, according to the state register of diabetes patients, 4.095 million patients with diabetes were recorded as of January 2015, constituting 2.8% of the population. Over a 5-year period, the growth of DM prevalence in Russia rose to 23% (930,000 patients) [4]. According to Russian researchers, the prevalence of T2DM increased after the age of 50 years, from 3.0% in the age group of 41–50 years to 10.6% in the age group of 51–60 years, reaching the highest level of 12.6% in people above the age of 70 years [5].

According to the classification adopted by the WHO European Regional Office in 1963, elderly is defined as being 60–74 years of age, senile as 75–89 years and long-living as 90 years or more. Until now, this classification system has been used. In most American and European studies, elderly is defined as age 65 and older, but other age groups are also considered, such

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as age 50 and older, age 60 and older and age 80 and older. The American Diabetes Association (ADA) and the American Gerontology Society (AGS) define elderly as over 65 years.

Pathophysiology of glucose metabolism in elderly persons

The pathophysiology of glucose metabolism in elderly people has some peculiarities. Previously, it was thought that after the age of 50–60 years there is a decrease in the tolerance of glucose, and glycaemic indices increase with age, primarily due to insulin resistance. It is known that in healthy people, a decrease in the insulin sensitivity of tissues occurs with age. Older people, for various reasons (e.g. difficulty in mastication and financial difficulties), prefer cheaper food that has an excess of easily digestible carbohydrates and saturated fats and less complex carbohydrates. Concomitant cardiovascular, pulmonary and musculoskeletal diseases lead to hypodynamia in these people [6]. The term 'sarcopenic obesity' is often used to describe elderly patients. In recent years, international studies have indicated a significant contribution of sarcopenia to the development of insulin resistance. Reduced muscle mass leads to a deterioration of glycaemic control by reducing the absorption of glucose by muscles, which leads to increased insulin secretion and insulin resistance [7]. In addition to a decrease in the sensitivity of tissues to insulin, there is also a decrease in insulin secretion; most studies showed a decrease in the first phase of insulin secretion in elderly non-obese persons. Moreover, there is a decrease in the sensitivity of pancreatic beta cells to incretins. Probably, this is associated with the significant increase in postprandial blood glucose that occurs after the age of 50 years [8]. There is evidence that the secretion of glucose-dependent insulinotropic polypeptide (GIP) in elderly persons is comparable with that in younger people, and the secretion of glucagon-like peptide 1 (GLP-1) is reduced [9]. Recent studies show that glucose metabolism disorders are associated with ageing but are not a necessary component of it [10]. The hypothesis is that longevity is the result of continuous adjustment of the body systems, aimed at maintaining optimum physiological parameters. Several studies have examined the indices of glycaemia and lipid metabolism in persons over 90 years of age (healthy individuals and those with diabetes), and a progradient decrease in the levels of glucose and cholesterol with age was revealed in the examined centenarians [11,12]. The attitude of Odin regarding the clinical and pathophysiological features of DM in elderly (gerontal) persons is of interest. The author suggested the original division of elderly and senile diabetic female patients into 5 groups, depending on the ontogenetic phase of DM onset. The female patients stratified to these groups have specific clinical and pathophysiological features: the group with an onset of the menstrual phase of ontogenesis is characterised by active diabetic syndrome in combination with more common autoimmune diseases; the early postmenopausal group has the greatest clinical severity, which combines more frequent family diabetes with the largest number of macroangiopathy and the value of comorbid index on the background of activation of stress hormones (cortisol, growth hormone [GH]); the late postmenopausal group is clinically moderate, dyslipidemic and the most insulin-resistant, 'protected' by the highest incidence of family longevity and activation of protective physiological mechanisms on the level of dehydroepiandrosterone sulfate and autoantibodies to islet cells; the early involutive group is characterised by relative clinical mildness, ontogenetic effects on glycaemia and the incidence of oncopathology, the highest level of metabolic triggers of atherosclerosis in the level of uric acid and homocysteine with activation of the protective role of autoantibodies to thyroglobulin; and the late involutive group has the most clinically mild diabetes, normal body weight, maximum insulin sensitivity and minimum atherogenic index [13].

Peculiarities of the clinical course of t2dm in elderly persons

T2DM in elderly persons has clinical, laboratory and psychosocial peculiarities. The greatest difficulties in timely diagnosis of diabetes in elderly persons result from the paucisymptomatic course of the disease: there are no complaints about thirst, frequent urination, or body weight loss. T2DM in elderly persons is characterised by a prevalence of nonspecific complaints about weakness, fatigue, dizziness, disorder of attention, memory and other types of cognitive dysfunction. Laboratory diagnosis of T2DM in elderly persons is also hindered because of the nature of the pathophysiology of carbohydrate metabolism: lack of fasting hyperglycaemia in 60% of patients; the prevalence of isolated postprandial hyperglycaemia in 50%–70% of patients; and an increasing renal glucose excretion threshold with age [14]. Therefore, it is necessary to identify T2DM in old age actively, i.e. to screen regularly for DM detection in high-risk groups. When assessing cases of new-onset T2DM in the elderly, it was found that in 65% of cases normal fasting glucose was determined (WHO criteria less than 6.1 mmol/l) during oral glucose tolerance testing. Therefore, the oral glucose test is particularly recommended for screening DM in the elderly [5,15]. The diagnostic criteria for DM in the elderly do not differ from those set forth by the WHO (1999) for the population as a whole. The diabetes course in elderly persons often complicates the polymorbid geriatric syndrome, which includes a set of cognitive impairments, the infirmity of old age, depression, functional disorders and falls [16].

Cognitive impairments adversely affect the course of DM and its complications, aggravating significantly

the patient training in techniques and methods of self-control, following the doctor's recommendations. After analysing the studies, which, in addition to the presence of diabetes, took into account additional factors of dementia progression in the elderly (arterial hypertension, depression, cardiovascular diseases, cerebrovascular diseases, etc.), it must be concluded that diabetes is an independent risk factor for cognitive impairment in old age. The clinical significance and high incidence of cognitive disorders in T2DM determined the position of a number of authors who propose the inclusion of cognitive impairments among the complications of T2DM [17]. A depressive state in elderly patients may lead to deterioration in the control of blood glucose, noncompliance with a therapeutic regimen, functional disorders, deterioration in quality of life and mortality [18].

In analysing comorbidities in elderly patients with DM, a high prevalence of diseases of the cardiovascular system (94.37%; cerebrovascular disease [50.66%]) is revealed. The main causes of death were acute cerebrovascular accidents (ACAs; 28.8%), postinfarction cardiosclerosis (23.18%), acute/recurrent myocardial infarction (19.54%) and malignant tumours (14.57%) [19].

Particular attention of the researchers and clinicians is paid to the problem of hypoglycaemia in elderly patients with DM [20–23]. The true incidence of hypoglycaemia in the elderly is difficult to determine due to differences in its definition; moreover, most studies took into account only recognised hypoglycaemia. The hypoglycaemic state of an elderly patient with DM is characterised by obscure symptoms, and the outcome is less favourable than it is in young people with diabetes. Symptoms of hypoglycaemia in elderly patients may develop at lower blood concentrations of glucose than in younger patients. In elderly patients, neurological disorders often develop (confused mental state, delirium, dizziness, weakness and falling) in the background of hypoglycaemia than adrenergic (palpitations, trembling and hunger). These symptoms can be mistaken for signs of cerebrovascular ischemia and, as a consequence, hypoglycaemia is not adequately identified and treated. The action of counterinsular hormones in the case of hypoglycaemia is different in elderly people with DM. In the case of insulin-induced hypoglycaemia in elderly people with T2DM, lower levels of glucagon and growth hormone but higher levels of adrenaline and cortisol were found, compared to age-matched healthy volunteers [24]. This could result in prolongation of hypoglycaemia. In addition to the acute adverse effects of hypoglycaemia, such as falls with injuries and cardiovascular accidents, a hypoglycaemic episode can have long-term effects [20,21,25]. Recurrent hypoglycaemia can have a significant psychological impact, and it is a risk factor for dementia development [26]. In addition to the effects of age-related physiological changes, longer DM experience, renal dysfunction, decline in cognitive function, weakness and lack of self-control make the elderly more vulnerable to hypoglycaemia. It should also be noted that, in elderly people and in their relatives and guardians, awareness about hypoglycaemia is lacking [27]. Each of the risk factors for hypoglycaemia should be considered when choosing from among the options of diabetes treatment. Minimising the risk of hypoglycaemia is one of the major priorities in DM treatment in elderly persons [20].

Continuous glucose monitoring (CGM) in the study of glycaemic control in elderly persons has been used in several studies in recent years. In a study of glycaemic control in 337 elderly patients with T2DM using CGM, it was found that female sex, duration of diabetes and the level of glycated haemoglobin are important factors in the variability of glycaemia, while age has no association with the glycaemia variability in these patients [28]. However, highly varying glycaemia is a more significant indicator of the adverse effect of diabetes on cognitive function in the elderly than an average glycaemia level [29]. A study by Chinese scientists reveals a direct positive correlation between high glycaemia variability and the presence and severity of CVD in patients with T2DM [30]. The results of the study of glycaemic control in elderly patients with T2DM (median age 71 years) who are treated with insulin therapy in a hospital environment with the use of CGM, indicate a high frequency of hypoglycaemic states in this category of patients (72%), and a predictor of hypoglycaemia was found to be glycaemia variability, in addition to age and duration of diabetes [23].

Senile patients are often destined to loneliness, social isolation, helplessness and poverty. An elderly person has fewer resources to psychologically overcome the disease. Patients with T2DM treat their disease not as a way of life but as a disease. Their attitude towards DM itself, its symptoms and its treatment is generally more negative than that of young patients with T1DM [31,32]. Diabetic elderly patients have a significant decrease in quality of life compared to age-matched controls on the scales of physical, role-physical and role-emotional functioning, viability, psychological health and general health. Thus the quality of life level progressively decreases as age increases [14]. Also, the education level, cardiovascular disease and the degree of retinopathy affect the quality of life of elderly people with T2DM [33].

Objectives of glycaemic control of t2dm in elderly patients

Given that the study Action in Diabetes and Vascular Disease: Preterax and Diamicron Modified Release Controlled Evaluation–Observational Study (ADVANCE-ON), as opposed to the results of The Diabetes Control and Complications Trial (DCCT) and UK Prospective Diabetes Study (UKPDS), revealed no

Table 1

Recommended targets of glycaemic control for elderly persons [36, translated and completed]

Guideline	Characteristics of patients	Target value of glycated haemoglobin, %
Russian Association of Endocrinologists, 2011 [37]	The elderly (and/or the life expectancy [LE] is less than 5–10 years)	Up to 7.5
	The elderly (and/or the LE <5 years) with severe complications, the risk of hypoglycaemia	Up to 8.0
EDWPOP (2011) [38]	Single target	7.0–7.5
	The exact target should depend on existing cardiovascular diseases, the presence of complications and the ability to self-control. Debilitated, in need of constant care, with multisystem diseases, staying in geriatric homes, having dementia.	7.6–8.5
ADA, American Geriatrics Society Consensus Report (2012) [39]	Relatively healthy: several comorbidities, no cognitive or functional disorders	<7.5
	Complex/moderate: several coexisting chronic diseases or two or more impairments of daily activity with mild or moderate cognitive impairments	<8.0
	Very complex/poor health: with long-term treatment or with end-stage chronic disease, with moderate or severe cognitive impairments or an impairment of more than two kinds of daily activities	<8.5
ADA and EASD (2012) [40]	Relatively healthy, with long LE	<6.5–7.0
	With a history of severe hypoglycaemia, limited life expectancy, with complications, extensive comorbidity	7.5–8.0
IAGG, EDWPOP and International Task Force of Experts for Diabetes position statement (2012) [41]	Individual target taking into account multiple comorbidities, cognitive impairments and functional status	7–7.5
IDF (2013) [42]	Functionally independent	7.0–7.5
	Functionally dependent	7.0–8.0
	With dementia or with weakness (fragile)	Up to 8.5
	With LE of less than one year	Avoid hyperglycaemia symptoms

benefit of long-term maintenance of compensation of glucose metabolism in relation to the progression of cardiovascular outcomes in patients with T2DM, the question of the choice of targeted indicators of glucose metabolism in the elderly becomes particularly relevant [34,35].

Despite some differences in the targeted indicators, these guidelines point out that elderly people with T2DM are a heterogeneous group needing an individualised approach depending on the physical health, maintenance of cognitive functions, life expectancy (LE) and comorbidities of the individual. The clinical guidelines of the 2011 European Diabetes Working Party for Older People (EDWPOP) state that the training of a patient or caregiver is probably more important than strict glycaemic control [38]. The ADA together with the AGS in the 2011 recommendations suggests that the objectives of treatment be determined by the patient's characteristics and health status, not by age and that there be three subgroups of patients: relatively healthy, moderate health and poor health [39]. The IDF guidelines are similar, with the IDF working group proposing to distribute these patients into four groups: functionally independent, functionally dependent, patients with dementia or with weakness (fragile) and patients with LE less than one year [42].

The joint guidelines of the ADA and the European Association for the Study of Diabetes (EASD) point out that the treatment purposes of relatively healthy elderly patients with T2DM (without cognitive impairments, having long LE) should be the same as for younger ones, while for persons with limited LE, diabetic complications, or extensive comorbid disorders, less strict purposes are proposed [40]. The joint position of the International Association of Gerontology and Geriatric (IAGG), the EDWPOP and the International Task Force of Experts for Diabetes, published in 2012, highlights the fact that the main objective in the treatment of patients who require constant nursing care is the prevention of hypoglycaemia, acute metabolic complications, reduction of risk of infection, prevention of hospitalisation and polypharmacy inadmissibility [41]. All guidelines emphasise the importance of a good diet, physical activity and training elderly T2DM patients and their relatives.

Antihyperglycaemic therapy in elderly persons

Age alone is not a contraindication to the use of any medicinal preparations. However, when choosing a therapy, preparations that have a low risk of hypoglycaemia, provide cardiovascular safety, are safe to use with impaired renal function, have no effect on the state of the musculoskeletal system, and which are neutral in terms of drug interactions should be preferred [36].

Metformin remains the drug of choice for the treatment of diabetes in the elderly because of its

efficacy, low risk of hypoglycaemia and lack of influence on weight. It may also have a cardioprotective effect, but further studies are required. A meta-analysis of 13 randomised controlled studies evaluating the effects of metformin on cardiovascular morbidity and mortality in people with T2DM showed no cardioprotective effect. However, epidemiological analysis of 10,559 older participants (60–80 years) in the study Reduction of Atherothrombosis of Continued Health (REACH) revealed a general decline in the two-year mortality rate of people with atherothrombosis who received metformin, compared to patients who did not receive metformin [43]. There are studies proving that metformin reduces the risk of the emergence of weakness syndrome in elderly people with T2DM and the incidence of certain types of cancer, which is obviously related to the ability of metformin to influence the cellular ageing process [44]. There are also side effects of its use: gastrointestinal disorders, vitamin B12 deficiency and the aggravation of cognitive impairments. Also, the use of metformin is limited to renal function disorder. Recently, the options for metformin use have been expanding. Russian Association of Endocrinologists guidelines allow for the use of metformin when the glomerular filtration rate (GFR) is up to 45 ml/min, and most European guidelines recommend avoiding metformin when the GFR is less than 30 ml/min and to lower the dose if the GFR is less than 45 ml/min [36].

Thiazolidinediones (TZDs) are safe in the development of hypoglycaemia, but they have serious side effects that limit their use in the elderly. The main adverse effects are weight delay and influence on body weight. TZD was associated with an increased risk of congestive heart failure. Prolonged use of TZDs led to an increased risk of fractures in elderly women. Therefore, its use in the elderly is possible in cases of low risk of heart failure and the absence of osteoporosis or risk of falls [36].

In cases of inefficacy in metformin monotherapy, other groups of oral antihyperglycaemic drugs may be added, which increases the risk of hypoglycaemia. Sulfonylureas are most commonly used for the intensification of treatment. Glibenclamide has the greatest risk of hypoglycaemia, and the majority of clinical guidelines recommend against its use in people older than 60 years. Gliclazide, glipizide and glimepiride have a lower risk of hypoglycaemia and are recommended for the intensification of antihyperglycaemic therapy. The studies ADVANCE and ADVANCE-ON confirmed that therapy with modified-release gliclazide does not increase the incidence of cardiovascular events in T2DM patients with high cardiovascular risk [35]. Other sulfonylurea preparations (glimepiride and glipizide) do not have such robust evidence concerning cardiac safety, especially in elderly patients [46].

The advantages of glinides include rapid absorption, stimulation of insulin release within few minutes, rapid metabolism by the liver and excretion through the biliary system, not through the kidneys. They carry a lower risk of hypoglycaemia, as they are administered before meals for reduction of postprandial hyperglycaemia. Although glinides have their niche of application in elderly persons (with predominant postprandial hyperglycaemia, with irregular meals), the frequency of administration and high cost limit their use [36].

GLP-1 agonists may be used as the second and third lines of treatment in elderly patients with obesity (BMI > 35 kg/m2) with poor tolerance or inadequate response to the first-line drugs [36]. GLP-1 agonists are safe in terms of the risk of hypoglycaemia (not in combination with sulfonylureas), but they cause frequent side effects of the gastrointestinal tract and contribute to weight loss, which may be dangerous in debilitated elderly persons. On the other hand, there are reports about the positive impact of liraglutide therapy on the factor of muscle mass increasing with a parallel decrease in BMI and abdominal obesity [47]. It was also found that advanced age is associated with increased risk of the gastrointestinal side effects of liraglutide. There may be risks associated with the use of receptor agonists GLP-1, associated with reduction in the filtration function of the kidneys in patients with water deprivation; additional studies are currently being conducted on this [49].

Most guidelines are now considering the class of DPP-4 inhibitors as second-line drugs in case of poor tolerability of metformin, or when the high risk of hypoglycaemia excludes the use of sulfonylureas [36]. A few studies directly examined the safety and efficacy of DPP-4 inhibitors in elderly persons. Their efficacy was virtually equivalent, and a low risk of hypoglycaemia was demonstrated when used as monotherapy or in combination with other oral agents [49]. Except for linagliptin, which is essentially eliminated through the kidneys, a dose adjustment of these medications is necessary in renal failure. However, it should be noted that there are no long-term safety studies of drugs of this class. Some concerns about possible adverse cardiac effects of DPP-4 inhibitors were mentioned in the Saxagliptin Assessment of Vascular Outcomes Recorded in Patients with Diabetes Mellitus (SAVOR-TIMI). Saxagliptin caused significantly increased frequency of hospitalisation for heart failure [50]. The results of The Examination of Cardiovascular Outcomes with Alogliptin versus Standard of Care (EXAMINE) demonstrated the cardiac safety of alogliptin [51]. The findings of the TECOS study (Trial Evaluating Cardiovascular Outcomes with Sitagliptin) confirmed the profile of cardiovascular safety of sitagliptin: the use of this medication does not increase the risk of major adverse cardiovascular events or hospitalisation for heart failure [52]. The studies evaluating the cardiovascular safety of linagliptin are ongoing.

In a review of the studies from 1996 to 2014, Mikhail concluded that inhibitors of sodium-glucose cotransporter 2 (dapagliflozin) can be used as a

supplement therapy in relatively healthy elderly patients with T2DM suffering from obesity and uncontrolled arterial hypertension. These drugs should be avoided in debilitated patients with chronic kidney diseases and in combination with insulin or sulfonylureas [53]. Empagliflozin was shown to have a cardioprotective effect in the final study EMPA-REG outcomes [54].

In cases of the inefficacy of oral antihyperglycaemic drugs, insulin therapy is required. It is well known that the peakless insulin analogues have a greater physiological action profile and carry a lower risk of hypoglycaemia. In an American study of glycaemic control in elderly persons, when using glargine and protamine human insulin, it was found that glargine causes fewer cases of hypoglycaemia than protamine insulin, but this difference was not statistically significant [55]. Recent data indicate that the use of long-acting insulin can be safe and effective in elderly people with DM compared with other types of insulin. Thus, the advantages of treatment with insulin detemir were revealed compared to the therapy with neutral protamine Hagedorn insulin: lower risk of hypoglycaemia, decrease in intraindividual variability of fasting glycaemia values and less weight gain in elderly patients [56]. In the study ORIGIN, glargine demonstrated cardiovascular safety [57]. A meta-analysis of studies on the use of degludec insulin in elderly persons showed a lower frequency of hypoglycaemia episodes compared to glargine, especially at night time. [58] The ongoing study DEVOTE (Degludec Cardiovascular Outcomes Trial) will enable the assessment of cardiovascular risks associated with degludec insulin therapy. EDWPOP and other European guidelines recommend the peakless analogues for persons in geriatric homes and those who are in need of constant care [38] and the initiation of insulin therapy with insulin of medium-duration action with a lower risk of hypoglycaemia. The progressive depletion of beta cells and increase in postprandial glycaemia causes prescription of prandial insulin. The use of prandial insulin in elderly persons with intensified insulin therapy can significantly increase the risk of errors leading to hypoglycaemia. Rapid-acting insulin analogues are preferred as they pose a better pharmacokinetic profile and greater ease of use [36]. The study INITIATE proved that the use of biphasic insulin NovoMix 30 with independent dose titration is effective and safe for patients of age 65 years and older, as well as for younger patients. In the study IMPROVE TM, the therapy with insulin NovoMiks 30 was indicated as either the start of insulin therapy or the transfer from treatment with other antihyperglycaemic drugs, including insulin. The frequency of severe hypoglycaemic episodes decreased significantly in the total cohort of elderly patients and in groups of preceding treatment with tableted medications and insulin in combination with tableted antihyperglycaemic drugs [59]. In the study DURABLE, the safety and efficacy of the mixture of insulin lispro 25 in elderly persons was evaluated compared to glargine. The therapy with lispro 25 showed a more pronounced reduction in the level of glycated haemoglobin, but it led to greater weight gain and frequency of hypoglycaemia compared to glargine [60]. In these studies of premixed insulin analogues, in most cases the treatment of elderly persons was carried out until the target of glycated haemoglobin of about 7% was reached. The studies lasted for about six months, i.e. the long-term effects of the therapy were not evaluated.

Polypragmasy is very common in the treatment of elderly persons with T2DM. According to Noale, prescriptions for more than five medications were registered in 57.1% of elderly patients with T2DM who received oral medications [61]. Polypragmasy is associated with noncompliance with dosing schedules, drug interactions and side effects of medications.

Conclusion

T2DM occurs more frequently in elderly persons. Nowadays, in order to specify targeted indicators of glycaemia, the therapeutic approach and the choice of anti-hyperglycaemic therapy in debilitated elderly people with T2DM, the evidence is not enough. Current recommendations emphasise that optimisation of glycaemic control in an elderly person with diabetes should be individualised. The management of this category of patients is an extremely urgent and difficult task, including for health care in general.

Additional information

Conflict of interest and funding

The authors declare no conflicts of interest.

Contribution of the authors.

T.V. Saprina - concept, editing and final approval of the article; N.M. Faizulina - writing the text of the article.

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