The Adequate Control of Type 2 Diabetes Mellitus

in an Elderly Age

The Clinico-diagnostic Manifestations of Diabetes Mellitus

Overview

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The composition of the population in terms of age has changed dramatically over the past decades. The portion of the elderly in the demographic structure has considerably increased. According to the most recent statistical data the number will be still increasing.

In spite of the achievemnets in diabetology, the prevention of the diabetes and the treatment among the aging and aged population are connected with difficulties. According to some researchers the diabetes of the aged population is age-related pathology and belongs to adaptation (compensation) diseases.

As it is known the frequency of the reduction of the tolerance of the organism to the carbohydrates increases with the age. The postprandial blood sugar level among the elderly and the aged population returns to the initial index slowly compared to young people. After the age of 50 the blood sugar level increases in every ten years, especially before a meal (0,05mmols/l) and after a meal (0,5 mmols/l) due to two factors: by the genetically determined defect of the secretion of insulin and the insulin resistance of the peripheral tissues among the aging and aged population. The latter may be conditioned by a large number modified risk factors- the decrease of physical activity, the reduction of the muscular mass, obesity, the foods containing high glycemic index and others.

According to statistics, diabetes in the aged population develops slowly and that is the reason why it is so difficult to detect the first signs of this disease. The following factors are characteristic to the disease: the fluctuation of the carbohydrate metabolism index: normalization, remission, regression and the development of the pathological conditions. In the initial stage the patient doesn't feel the disease and s/he often considers that the doctor diagnosed this disease "erroneously". Diabetes in the aging population is considered the "mild" though not "meek" form of the disease, as the complications are found quite often. Diabetes at this age is an extremely poorly- managed disease in terms of control.

Diabetes in the aging population is manifested most often as a result of psychic or physical trauma, acute respiratory diseases, myocardial infarction, hypertension crisis or cerebro-vascular accident. According to a number of authors, diabetes is observed in the aged population more seldom than in the aging population while it may not be found among the long-livers at all.

The fact that the majority of the elderly is unaware of their own disease is of great concern. This is the reason why they don't get any treatment. Epidemiological studies of different countries show that the actual number of type 2 diabetes exceeds the number of those registered two/four times.

According to the specialists, the reason for the late diagnosis of diabetes among the elderly patients is the blurred clinical picture. The typical symptoms of diabetes, such as: polydipsia, polyuria, the itch of the skin, and others are not revealed, while non-specific signs like weakness, lethargy, headache, the deterioration of sight and memory provides the basis for incorrect diagnosis and inappropriate treatment respectively.

The data by M.V. Shestakova (1999) about the condition of patients after the age of 65 before diagnosing diabetes are of great interest.

Cardio-vascular system	Arterial hypertension- 50% Myocardial infarction-10% Cerebro-vascular accident-5%
feet	Neuropathic foot-30% Ulcer on feet-8% The amputation of the foot-5%
eyes	Cataract-50% Proliferative retinopathy-5% Blindness-3%
kidneys	Proteinic-10% Renal failure-3% Infection-45%

As one can see from this chart, actually every other elderly patient suffers from arterial hypertension (crises are not infrequent), visual impairment (cataract), infections related to urinary tract. Neuropathic changes in feet can be idntified in almost every third person.

In many different countries the programs aimed at diagnosing type 2 diabetes are successful. It is necessary to work out and set up diabetes screening control program in Georgia to prevent complications. The dissemination of the information on diabetes and the preventive measures to avoid complications are of equal importance.

According to World Healthcare Organization, the beginning of the third millennium, is distinguished by the increasing life expectancy among the elderly population, including diabetics. In order to justify this tendency, the elderly patients should get timely and adequate medical treatment. But this is not the case due to subjective, as well as objective reasons, not only in Georgia, where the situation is alarming, but in foreign countries too. For instance, in England after the age of 60, 15% of patients received unsystematic treatment, while 8 % of them were without any treatment. In Germany 16 % of such patients were left untreated.

In contrast to the situation where the basic principles of treatment of the middle-aged patients are widely recognized, there exist different opinions in the sphere of management of diabetes of the elderly population. Some doctors consider that intensive care is undesirable among the elderly, while Danish researches revealed the fact that half of the diabetic patients are after 65 and their average life expectancy is prolonged by approximately ten years. They hold the opinion that such patients need widely acknowledged therapeutic intervention. However, when the assumed life expectancy is short, for instance, during the severe somatic pathologies, less demanding criteria for low glycemic level- 10, 0 mmols/l.may be worked out.

AAll experts are unanimous in adhering to the opinion that the elderly person must retain cognitive functions, i.e. memory, learning ability and the ability to perceive recommendations adequately. Thus, among the majority of the elderly patients whose assumed life expectancy exceeds ten years and who are distinguished by the retention of their intellect, the criteria of the optimal compensation of diabetes approximate to the ideal ones, as the main purpose of the treatment is to avoid or prevent the development of vascular complications.

As for the old patients with less life expectancy and easily identifiable cognitive disorders, the aim of the treatment is to relieve the symptoms of hyperglycemia and to avoid the hypoglycemic reactions, which is possible by the less strict control of glucose level in the blood.
According to the recommendations of the European Working Group studying type 2 diabetes, the main criteria to maintain intellect and prolong the life span for more than 10-15 years among the elderly are the following:

- Prepandrial glycemy < 6,7 mmols/l
- HbA1c < 7,5 %

It is not necessary to achieve normoglycemia in an old age. However, It is essential to avoid the conditions of hypo and hyperglycemia.
The main danger for the elderly is hypoglycemia, which can be developed as a result of the excess dosage of medications or the decreased speed of its extraction from the body. Hyperglycemia can be the reason for hypertension crisis, the spasm of coronary arteries, myocardial infarction, the provocative factor for the sudden loss of sight.
The most common disease among the elderly are diabetic cardiopathy, caused by hyperglycemia, and the increased utilization of fatty acids. The pathological changes of the vascular walls, the disorder of the blood circulation and hypoxia worsen the situation of this system.
The development and progression of diabetic cardiopathy depend on a number of reasons:

- The poor compensation of diabetes
- The duration of the disease
- Diabetic complications
- Obesity, especially abdominal
- Arterial hypertension
- Smoking
- Dislipidemia, the increase of the atherogenic index
- Hypodynamia

During diabetes diabetic autonomous neuropathy-cardio-vascular form may be revealed by the following symptoms: sinus tachycardia, extrasystole, orthostatic arterial hypotonia, cardialgia.

One of the problems of diabetes is the late diagnosis of ischemic disease. During diabetes stenocardy occurs without any symptoms, attacks are painless, which is connected with impaired nervous cells and the development of cardiac neuropathy. The well-developed forms of this complication is known under the name of denervated heart. Cardiac neuropathy increases the threshhold of the pain, that is the reason why the decrease in the blood supply of myocardium doesn't always result in pain. The loss of sensitivity to pain means the lack of the limiting factor during the strain and accordingly, increases the risk of development of myocardial infarction, namely painless myocardial infarction is one of the causes of mortality in diabetics.

During the prolonged and poorly compensated diabetes, cardiovascular system functions in the special regime. Therefore, sinus tachycardia and extrasistole reduce the resistance of the body to physical strain.
Orthostatic hypotension is one of the most dangerous complications of autonomous neuropathy. Its symptoms are-weakness, dizziness, fainting due to the fast change of the body from horizontal to vertical position.
Orthostetic hypotension is considered to occur when the arterial pressure falls by 30 mm Hg during the process of the change of the body position from horizontal to vertical one. In 1999 the American Academy of Neurology recommended considering the reduction of arterial pressure by 20 mmHg as the diagnostic criterion for postural hypotension.
The reason for the development of diabetic encephalopathy is the degradation of brain cells. Two ways of pathogenic disorders which are characteristic to this complication are: 1. metabolic disorder caused by hyperglycemia and 2.hemodynamics disorder, which is rather common in the elderly patients with arterial hypertension and atherosclerosis. Thus, in the old population diabetic encephalopathy is of mixed vascular-metabolic nature.

In the initial stages diabetic encephalopathy is demonstrated by neurotic conditions- asthenic, obsessive-phobic and hysterical syndromes. The patients are concerned about their own medical condition. They are afraid of hypoglycemic reactions, the amputation of limbs, infarction, and cerebro-vascular accident. Sometimes they have strong reactions. In addition, their memory, attention and thinking are affected. Dementia can be developed as well.
It is proven that diabetic complications develop when diabetes is decompensated for a long time. These complications are of increasing nature, which deteriorates the quality of life and decreases the life span.
If diabetes is well- controlled and the glucose level approximates to the norm, diabetic complications may be alleviated and moreover, may stop progressing completely.
The results of large - scale research in Great Britain reveal that even 1% drop in the HbA1c decreases the development of angiopathies by 35%, fatal infarction- by 18%, mortality by diabetes – by 25 %.
The recent multi-centre studies (UKPDS, DECODE, Kumatovo Study, Helsinki policemen study, and others) show convincing results with regard to the role of hyperglycemia in the process of the development of diabetic complications. For instance, chronic hyperglycemia and the increase in glycated haemoglobin (> 7%) increases the risk of fatal infarction four or five times. As for postprandial hyperglycemia (after two hours > 10 mmols/l) (in spite of the preprandial glycemic level) raises the risk of mortality related to cardio-vascular diseases two or more times.
In the elderly and old population clinically characteristic are the following:

- Nonsymptomatic development. Polydipsia and Polyuria are not present.
- The prevalence of non-specific complaints-weakness, dizziness, deterioration of cognitive functions
- The main symptoms of clinical picture are: visual disorder, tropical ulcers on the feet and the symptoms of the cardio-vascular diseases.

The symptoms of diabetes are disguised by the clinical signs of various concurrent pathologies. It should be noted that the diabetes in the elderly is characterized by the peculiarities of laboratory diagnostics: 70 % of such patients have normoglycemia before a meal and isolated hyperglycemia after a meal (> 11,1 mmols/l). Such postprandial crises of glycemy are of vital importance in terms of mortality risk related to heart and blood vessels.

The main aims of treatment

Therefore, in the process of treatment of the elderly it is desirable to give preference to the medications restoring the physiological profile of the insulin secretion, which decreases the danger of the development of postprandial hyperglycemia.
The main goals in the treatment of type 2 elderly diabetics are the following:

- Good metabolic control: the removal of the symptoms of hyperglycemia and dyslipidemia
- Preventive measures of acute complications-hypoglycemy and diabetes decompensation
- Preventive measures of late complications
- Preventive measures of cardio-vascular complications
- Medications shouldn’t affect metabolic index.
- Geriatric aspects should be taken into account.

In order to identify diabetic complications it is important to carry out additional studies in conjunction with the specialists- neuropathologist, oculist and cardiologist . The target will be achieved only by the joint efforts. It is of great importance to conduct electrocardiogram,

echocardiographic, electroneuromyographic and other tests in the dynamics with the purpose of early diagnostics of complications and their timely treatment.
The basis of the effective control of diabetes mellitus and accordingly the preventive measures of cardio-vascular pathology are the following:

- The observance of the doctor's recommendations
- The strict observance of the diet and the taking of medications
- Self-control of glycemy, glucozurie and arterial hypertension
- Check-ups by the specialists

The control of diabetes in the elderly unites the complex measures:

- Educational programs-in the treatment of the elderly patients they are of primary importance.
- The inclusion of the family members is also assumed.
- The main topic is the self-control of glycemy and preventive measures of hypoglycemia. Sugar blood level can be tested on a daily or weekly basis considering every specific case.
- It should be remembered that the elderly diabetic's course of treatment and lifestyle should be adapted to his or her own individual characteristics.

The European group singled out the guidelines for the elderly diabetics' treatment:

- The improvement of the patient's general condition
- The avoidance of severe and chronic complications
- The decrease in mortality

References

1. **UKPDS Group. UK Prospective Diabetes Study 17: A nine-year update of a randomized, controlled trial on the effect of improved metabolic control on complications in non-insulin-dependent diabetes mellitus. Ann. Intern Med 1996; 124: 136-45**
2. **Shestakova M.V. Journal of Diabetes Mellitus. N 4, 1999, pp.18-20**
3. **The materials of VI European Congress on Clinical Gerontology. Moscow. 2002.**
4. **Buchanan TA, Xiang AH, Peters RK et al. Preservation of pancreatic beta cell function and prevention of type 2 diabetes by pharmacological treatment of insulin resistance in high-risk Hispanic women. Diabetes 2002; 51:2796-803.**
5. **Hu G., Giao Q., Yuomilehto J et al. Plasma insulin and cardiovascular mortality in non-diabetic European men and women: a meta:analysis of data from eleven prospective studies. The DECODE Insulin Study Group. Diabetologia; 47:1245-56. 2004.**
6. **3. Stern M, Williams K., Gonzalez C., Villalpando C et al. Does the metabolic syndrome improve identification of individuals at risk of type 2 diabetes And/or cardiovascular disease? Diabetes care 2004; 27 (11): 2676-81.**

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