



DIABETES MELLITUS: CHRONIC COMPLICATIONS

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INTRODUCTION

In the years before the onset of DM2 symptoms, despite insulin resistance being observed, there is an increase in insulin secretion, that is, compensatory hyperinsulinemia, maintaining normal glycemic concentrations until dysfunctions occur in beta cells and inability to control glycemia leading to thus to the diagnosis of DM2 (CEFALU, 2001).

Different researchers have observed that subjects with insulin resistance show changes in energy metabolism. Braun et al. (2004) showed that in overweight women the insulin resistant group oxidized less carbohydrates than the control group. Blaak et al. (2000) observed in type 2 diabetics, obese, a reduction in the oxidation of plasma fatty acids, but without differences in the total oxidation of fats and carbohydrates, when compared to the control group. In another study Borghouts et al. (2002) studied non-obese type 2 diabetic patients. In this study, no changes were found in the oxidation of fats or carbohydrates. It should be noted in the last two studies cited that the subjects were type 2 diabetic, therefore, hyperglycemic.

RESUME

Diabetes Mellitus (DM) is considered today as one of the biggest public health problems. It is estimated that in 2030 approximately 366 million people will have some type of DM (WILD et al., 2004). Type 2 DM (DM2) is caused mainly by insulin resistance, defined by Hunter and Garvey (1998) as "a clinical condition in which a normal or elevated concentration of insulin is observed that produces an attenuated biological response", manifesting itself 10-20 years before the symptoms of DM2 are observed.

LITERATURE REVISION

Diabetes Mellitus

According to the Brazilian Diabetes Society (2003) Diabetes Mellitus (DM) is a syndrome of multiple etiology, resulting from the lack of insulin and / or the inability of insulin to adequately exert its effects. It is characterized by chronic hyperglycemia and is frequently accompanied by dyslipidemia, arterial hypertension and endothelial dysfunction. Chronic hyperglycemia of diabetes is associated in the long term with damage,

dysfunction and failure of various organs such as eyes, kidneys, nerves, heart and veins.

The American Diabetes Association (2004) classifies DM into five distinct groups: type 1, type 2, other specific types of DM, gestational DM and impaired glucose tolerance.

Type 1 DM, formerly described as insulin-dependent or diabetes-onset in youth, shows a prevalence of only 5 to 10% of cases resulting from autoimmune or, less commonly, idiopathic beta cell destruction, usually causing absolute insulin deficiency and tendency to ketoacidosis. According to Gross et al. (2002) the peak incidence of type 1 DM occurs from 10 to 14 years of age, followed by a progressive decrease in incidence up to 35 years, in such a way that cases of type 1 diabetes beginning after this age are uncommon. However, individuals of any age can develop type 1 DM.

Type 2 DM, formerly called non-insulin-dependent or maturity diabetes, corresponds to approximately 90 to 95% of cases. Type 2 DM comprises individuals who have insulin resistance and commonly have relative insulin deficiency. The vast majority of patients are obese (a factor that in itself can lead to insulin resistance). The age of onset of type 2 diabetes is variable, although it is more frequent after 40 years of age, with a peak incidence around 60 years (GROSS et al., 2002).

The other types of diabetes include genetic defects in the beta cell, genetic defects in the action of insulin, diseases of the exocrine pancreas, endocrinopathies, diabetes induced by drugs and chemical agents, infections, unusual forms of immunomediated diabetes, other genetic syndromes associated with diabetes.

Gestational DM is defined as some degree of glucose intolerance with onset or with a first diagnosis during pregnancy and usually occurs during the third trimester of pregnancy. Gestational DM occurs in approximately 4% of pregnancies in the United States, corresponding to an average of 135,000 cases annually.

The impaired glucose tolerance corresponds to an intermediate group of subjects who, despite the fact that glucose concentrations do not meet the criteria for

diagnosing DM (which will be discussed below), are elevated to be considered normal.

The diagnosis of the different types of DM can be made through the fasting, casual glucose value or the oral glucose tolerance test (TTG) which consists of the ingestion of 75g of glucose dissolved in water, being assessed the plasma glucose before ingestion, and 2 hours later. The diagnostic criteria are shown in Table 1.

Table 1: Plasma glucose values (in mg / dl) for the diagnosis of DM and its preclinical stages.

Category	Fast	2h After 75g DE Glucose	Casual**
Normal blood glucose	<110	<140	
Glucose tolerance decreases	□ 110 e < 126	□ 140 e < 200	
Diabetes Mellitus	□□ 126	□□ 200	□□ 200 (with classic symptoms)***

- * jejum é definido como a falta de ingestão calórica por no mínimo oito horas.
- ** glicemia plasmática casual é definida como aquela realizada a qualquer hora do dia, sem se observar o intervalo desde a última refeição.
- *** os sintomas clássicos de DM incluem poliúria, polidipsia e perda inexplicada de peso.
- fasting is defined as a lack of caloric intake for at least eight hours.
- ** Casual plasma glucose is defined as that performed at any time of the day, without observing the interval since the last meal.
- *** The classic symptoms of DM include polyuria, polydipsia and unexplained weight loss.

SOURCE: Brazilian Diabetes Society (2003)

A study by WILD *et al.* (2004) that aimed to estimate the number of people with DM in 2000 and for the year 2030 based on data from some countries and extrapolated to the 191 member countries of the World Health Organization shows data alarming. The prevalence of DM in the world was estimated at 2.8% in 2000 and 4.4% in 2030. The total number of people with DM was projected at 171 million in 2000 and will be approximately 366 million in 2030.

Malerbi and Franco (1992) showed that DM affected about 7.6% of the Brazilian population between 30 and 69 years of age. Of the DM patients, about 50% of the patients were unaware of the diagnosis and 24% of the patients, admittedly with DM, did not undergo any type of treatment.

Currently, about 12 million Brazilians have DM. It is estimated that of these, 7.8 million individuals have a confirmed diagnosis and 4 million are undiagnosed. According to data from the Ministry of Health (Datasus), during 1997, the diabetes mortality rate in Brazil was 17.24%, representing 27,515 individuals who died specifically due to diabetes (MELO *et al.*, 2003).

Chronic Complications

Chronic DM complications are mainly responsible for the morbidity and mortality of diabetic patients. Cardiovascular diseases represent the main cause of death (52%) in type 2 diabetic patients. Several risk factors, subject to intervention, are associated with the greater cardiovascular impairment observed in diabetic patients. Among them are the presence of Diabetic Nephropathy and Arterial Hypertension (GROSS and NEHME, 1999).

According to the same authors, Diabetic Nephropathy affects about 40% of diabetics and is the main cause of kidney failure in patients who enter hemodialysis programs. Of these, about 40% die in the first year of treatment, mainly from cardiovascular disease.

In the case of arterial hypertension, its prevalence in type 2 DM patients is higher than in the general population, especially in young patients. At 45 years of age, approximately 40% of patients with type 2 DM are hypertensive and this proportion rises to 60% at 75 years of age.

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