

Classification of Diabetes Mellitus

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Summary

Diabetes mellitus is a disorder characterized by high blood glucose level. Several classifications of diabetes have existed. Only one type of classification must be considered to avoid confusion. Classification has importance because different type of diabetes has different treatment.

Key Words: Diabetes mellitus, Classification

Introduction

World Health Organization has declared that diabetes is a global epidemic disease.¹ It has been estimated that nearly 7 % of the world's population suffers from diabetes.²

Diabetes mellitus is a chronic metabolic disorder characterized by high blood glucose level (hyperglycemia) due to insulin deficiency and/or insulin resistance.³ During diabetes mellitus there is dysfunction of metabolism of carbohydrates and lipids. The major complications of diabetes and associated conditions include ischaemic heart disease, retinopathy, nephropathy, neuropathy, hypertension and cataracts.⁵

Several classification of diabetes have existed, based on different criteria; some use clinical features, others etiology, and some the presumed natural history of diabetes.

CLINICAL CLASSIFICATION

Clinically Diabetes mellitus is divided into two main classes:⁶

GRWOTH-ONSET DIABETES:

This form effects children and young adults, and appears to be due to an absolute failure of pancreas to secrete insulin. Polyuria, polydipsia and polyphagia are characteristic symptoms.

MATURITY-ONSET DIABETES:

This form occurs typically in middle-aged and elderly subjects, and is usually associated with obesity.

CLASSIFICATION BY INSULIN

Diabetics can be separated into two groups based on their requirements for insulin:⁷

INSULIN DEPENDENT DIABETES MELLITUS (IDDM):

It occurs in about 90% of persons with diabetes (Figure 1).⁸ It is also called juvenile onset diabetes or Type 1 diabetes mellitus.³ The patient needs insulin for his normal metabolism.

NON-INSULIN DEPENDENT DIABETES MELLITUS (NIDDM):

It occurs in about 10% of persons with diabetes (Figure 1).⁸ It is also called maturity onset diabetes or Type 2 diabetes mellitus.³ The disease can not be treated with insulin and patient needs some medicines for treatment.

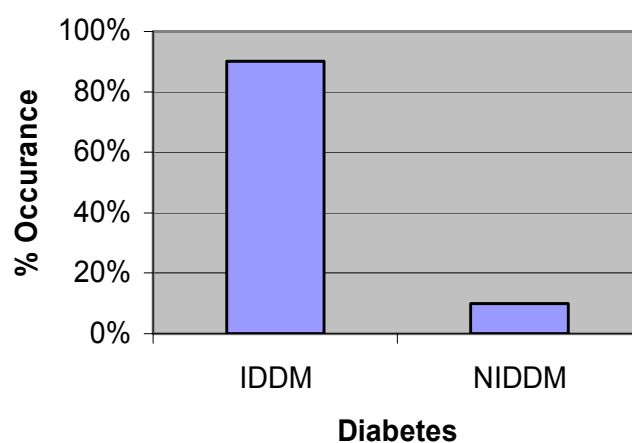


Figure 1: Percentage occurrence of IDDM and NIDDM

CLASSIFICATION BY ETIOLOGY

Diabetes mellitus can also be classified on the basis of etiology:⁹

- Hereditary diabetes mellitus
- Diabetes mellitus associated with other endocrine disorders
- Diabetes mellitus associated with pancreatic disease

Hereditary diabetes mellitus:

This is common type. The gene is present in about 25 % of population, but only 2-3 % actually develop the disease. The gene is linked with Human Leukocytes Antigens (HLAs).

Diabetes mellitus associated with other endocrine disorders:

Diabetes is encountered with Cushing's syndrome, acromegaly and pheochromocytoma.

Diabetes mellitus associated with pancreatic disease:

Diabetes is occasionally encountered as a complication of chronic pancreatitis, cystic fibrosis and total pancreatectomy.

CLASSIFICATION BY WHO

World Health Organization (WHO) has adopted the Diabetes Mellitus Classification organized by Harris and Cahil.⁴

TYPE 1 OR INSULIN DEPENDENT DIABETES MELLITUS (IDDM):

It is caused by environmental factors such as viral infections and nutritional factors such as ingestion of cow's milk in early childhood.¹⁰

TYPE 2 OR NON-INSULIN DEPENDENT DIABETES MELLITUS (NIDDM):

It is a complex disease with many causes. Both genetic and environmental factors play important roles.¹¹

MATURITY ONSET DIABETES OF YOUNG (MODY):

It is characterized by young age at onset. Five distinct MODY genes have been identified that involved in the development of the disease.¹²

GESTATIONAL DIABETES MELLITUS (GDM):

Diabetes mellitus during pregnancy is known to have teratogenic effects on the foetus.¹³

CLASSIFICATION BY NIH

National Diabetes Data Group of National Institute of Health has developed a classification incorporating all currently available information:¹⁴

DIABETES MELLITUS (DM):

- Type 1 or Insulin Dependent Diabetes Mellitus (IDDM)
- Type 2 or Non-Insulin Dependent Diabetes Mellitus (NIDDM)
 - Obese NIDDM
 - Non-obese NIDDM
- Secondary Diabetes Mellitus: Diabetes Mellitus may occur secondary to certain diseases;

Pancreatic disease

Cushing's syndrome

Drug induced

Insulin receptor abnormalities

Certain genetic syndromes

IMPAIRED GLUCOSE TOLERANCE (IGT):

This is a disorder of glucose metabolism in which blood glucose level is higher than those of normal individuals but lower than those of diabetic patients.¹⁵

GESTATIONAL DIABETES MELLITUS (GDM):

Diabetes develops in 2%-3% of pregnant, previously non-diabetic women, most often in the last trimester of pregnancy.¹⁵

PREVIOUS ABNORMALITY OF GLUCOSE TOLERANCE (PREVAGT):

This term refers to individuals with normal glucose levels who formally were glucose intolerant or diabetic because of pregnancy, illness, obesity, or medications.¹⁵

POTENTIAL ABNORMALITY OF GLUCOSE TOLERANCE (POTAGT):

This syndrome occurs in individuals with an increased risk of future diabetes because of history of having had large babies (greater than 9 pounds), the presence of diabetes in identical twin, or similar factors.¹⁵

DISCUSSION AND CONCLUSION

Classification of diabetes is important because different types of the disease have different treatment. Thus we must diagnose the disease carefully. For example, Maturity-Onset Diabetes of Young (MODY3) is often mis-diagnosed as Insulin Dependent Diabetes Mellitus (IDDM) or Non-Insulin Dependent Diabetes Mellitus (NIDDM). Clinical awareness of family history of diabetes and mode of inheritance might help to identify MODY3 patients.¹⁶

As different classifications exist, this leads to confusion in terminology, and more importantly, to a lack of uniformity in the reporting of results by various investigators. Thus only one type of classification must be considered. We are in favour of the classification developed by National Diabetes Data Group of National Institute of Health (see table) as different types are separated more specifically.

TABLE: CLASSIFICATION OF DIABETES

1. DIABETES MELLITUS (DM): <ul style="list-style-type: none">• Type 1 or Insulin Dependent Diabetes Mellitus (IDDM)• Type 2 or Non-Insulin Dependent Diabetes Mellitus (NIDDM)<ul style="list-style-type: none">Obese NIDDMNonobese NIDDM• Secondary Diabetes Mellitus
2. IMPAIRED GLUCOSE TOLERANCE (IGT)
3. GESTATIONAL DIABETES MELLITUS (GDM)
4. PREVIOUS ABNORMALITY OF GLUCOSE TOLERANCE (PREVAGT)
5. POTENTIAL ABNORMALITY OF GLUCOSE TOLERANCE (POTAGT)

However the all types related to Abnormalities in Glucose Tolerance in the classification by National Institute of Health are not pure types of Diabetes Mellitus, and can be placed as sub-group of “Other Specific Types”. American Diabetes Association (ADA) has re-classified Diabetes Mellitus.¹⁷ The four main classes of diabetes listed by ADA are:

- Type 1: IDDM
- Type 2: NIDDM
- Other Specific Types
- Gestational Diabetes Mellitus

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