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Diabetes Mellitus

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ABSTRACT

"Diabetes mellitis" is a one of the most common non communicable diseases .India faces several challenge in diabetes management ,including a rising prevalence in urban and rural area, lack of disease awareness among the public ,limited facilitate high cost of treatment ,suboptimal and rising prevalence of diabetic complication. Insulin therapy for diabetes mellitus is commonly administered by subcutaneous route, up to 4 times a day. There is an increase in the prevalence of type 1 diabetes also, but main cause of diabetes epidemic in cause of type 2 diabetes mellitus, which is more than 90% of all diabetes cases. Type 2 diabetes is a serious and chronic disease resulting a complex inheritance-environmental interaction along with other risk factor such as obesity and inactive life cycle.

Introduction

DIABETES MELLITUS is a metabolic complaint, in which glucose position in the blood is much advanced than normal (hyperglycemia) and hence this condition is also generally appertained to as sugar complaint. The disfigurement in this condition is that, either the pancreas doesn't produce enough insulin or it produces sufficient insulin, but the cells of the body are unfit to use the insulin duly. Insulin, a hormone released from the pancreas, controls the quantum of glucose in the blood. Glucose in the bloodstream stimulates the pancreas to produce insulin. Insulin allows glucose to move from the blood into the cells. Once inside the cells, glucose is converted to energy, which is used incontinently, or the glucose is stored as fat or glycogen until it's demanded. The situations of glucose in the blood vary typically throughout the day. They rise after a mess and return to normal within about 2 hours after eating. Once the situations of glucose in the blood return to normal, insulin product diminishments. The variation in blood glucose situations is generally within a narrow range, about 70 to 110 milligrams per deciliter (mg/ dL) of blood in healthy people. However, the situations may increase more, If people eat a large quantum of carbohydrates. People aged than 65 times tend to have slightly advanced situations, especially after eating. Insulin is like a key which opens the body cell doors to allow glucose to enter. In the absence of enough insulin, glucose cannot enter the cells and remains in the blood sluice in high quantities (hyperglycemia). still, or if the cells stop responding typically to insulin, the performing high situations of glucose in the blood and the shy quantum of glucose in the cells together produce the symptoms and complications of diabetes, If the body doesn't produce enough insulin to move the glucose into the cells.

Mechanism

The body's response to blood sugar requires the co-ordination of an array of mechanisms. Failure of any one component involved in insulin regulation, secretion, uptake or breakdown can lead to the build-up of glucose in the blood.

β-cells damage: Destruction or damage to the β-cells, lead to increased levels of blood glucose.

Classification of Diabetes Mellitus

The firstly most accepted classification of diabetes mellitus was published by WHO in the year 1980. There are two major types of diabetes: Primary and Secondary

[I] Primary or Idiopathic Diabetes Mellitus

It is most common with unknown cause of diabetes. It is further divides into

- Type 1 Diabetes (5-10%) • Type 2 Diabetes (90-95%)
- Gestational Diabetes.

[2] Secondary Diabetes Mellitus

1. **Type I Diabetes Mellitus (Insulin Dependent Diabetes Mellitus (IDDM) Or Juvenile Diabetes):-**

This type of diabetes mellitus is also called autoimmune diabetes. This mainly occur in children and young ;the onset is usually sudden and life threatening. It results from the body's failure of insulin production by β-cells of the islets of Langerhans in the pancreas, leading to insulin deficiency. Treatment with insulin injection is required.

2. **Type II Diabetes Mellitus (Non– Insulin-Dependent Diabetes Mellitus, Or Adult/Maturity Onset Diabetes Mellitus):**

This form of diabetes, which accounts for 90%. The progressive insulin secretory defect on the background of insulin resistance.

People with this type of diabetes frequently are resistant to the action of insulin. The long term complications in blood vessel, kidney, eyes, and nerves occur in both type and are the major causes of illness and death from diabetes. The cause factor includes; obesity, sedentary life style, genetic factor ,increasing age ,such patient are at increased risk of developing macro vascular and micro vascular complication.

3. **Gestational Diabetes Mellitus;-**

Diabetes can occur temporarily during pregnancy, and it occurs in 2% to 10% of all pregnancies. Significant hormonal changes during pregnancy can lead to blood sugar elevation in genetically predisposed individuals. Blood sugar elevation during pregnancy is called gestational diabetes.

Gestational diabetes usually sorts out once the baby is born. However, 35% to 60% of women with gestational diabetes will in time develop type II diabetes over the next 10 to 20 years, especially in those who require insulin during pregnancy and those who remain overweight after their delivery.

[2] Secondary Diabetes:

It is the type of diabetes mellitus and have definite cause of hyperglycemia. Secondary diabetes refers to elevated blood sugar levels from another medical condition. Secondary diabetes may develop when the pancreatic tissue responsible for the production of insulin is destroyed by disease, such as chronic pancreatitis (inflammation of the pancreas by toxins like excessive alcohol), trauma, or surgical removal of the pancreas.

Some Common Sign and Symptom of Diabetes Included:

- Increase blood sugar level ,and loss of glucose in the urine
- Increase thirst ,frequent urination and unexplained weight loss
- Blurred vision, slow healing cuts and sores
- Hunger and Fatigue, dry mouth ,itching skin

Effect of Diabetes:

Poor Control of Diabetes Can Lead To An Increased Risk Of Following Diseases:

Ketoacidosis: - Accumulation and Growth of Ketone cause decrease of blood PH, a condition is known as Ketoacidosis. without treated quickly, ketoacidosis cause death.

Cardiovascular Disease: - The breakdown of stored triglycerides causes weight loss.it also cause cerebrovascular insufficiency (excess acid is potent poison for brain), ischemic heart disease, peripheral vascular disease and gangrene.

Blindness: - A major complication of diabetes is loss of vision either due to cataracts or due to damage to blood vessels of the retina.

Kidney and Bladder Failure: -Severe kidney problems also may result from damage to renal blood vessels.

Other Complication Include: Gum disease, foot and leg infections, sexual dysfunction and complications of pregnancy.

Diagnosis: -

Blood sugar determination using a glucometer can be done at different times and the three common time points are: -

Fasting Plasma Glucose (FPG): Testing blood sugar levels after 8 hours of fasting, usually overnight fasting.

Postprandial Plasma Glucose (PPG): Testing blood sugar levels 2 hours after a meal (usually it is breakfast).

Random or Casual Sugar: Any time of the day irrespective of meal intake.

The interpretation of results is shown in table 1

Table 1: - The tests commonly done and their interpretation

Test	Normal	Borderline (IFG/IGT)	Diabetes
FPG	80-100	100-125	>126
2 hr PPG	Up to 140	140-199	>200

Oral Glucose Tolerance Test: - This test is done in diagnosis of confusion cases (i.e., cases were FPG and/or PPG are in the almost same range). In this test, one has to drink 75 g glucose (sugar) in water on empty stomach and blood sugar is to be tested after 2 hours

OGTT And Its Interpretation

Test	Normal	Borderline (IFG/IGT)	Diabetes
Result (2 hour value) (mg/dl) Interpretation	140 NGT	>140 but <200 IGT	>200 DM

NGT = Normal Glucose Tolerance;
IFG = Impaired Fasting Glucose (Pre diabetes);
IGT = Impaired Glucose Tolerance (Pre diabetes);
DM = Diabetes Mellitus; 25 - 40% patients with IGT progress to DM

Comparison of Blood Sugar Level in Normal and Diabetic Patient:-

Blood sugar test	Normal	Diabetes mellitus
Fasting blood glucose	80- 100 mg/dl	>120 mg/dl
2 hrs post lunch	130-160 mg/dl	>180 mg/dl

Management and Treatment: -
The major goal in treating diabetes is to keep blood sugar (glucose) levels as close to normal as possible, without causing abnormally low levels of blood sugar.
Type I diabetes is treated with insulin, exercise, and a diabetic diet.
Type II diabetes is treated first with weight reduction, a diabetic diet, and exercise.
Patients with type I diabetes mellitus require lifetime insulin therapy. Most require 2 or more injections of insulin daily, with doses adjusted on the basis of self-monitoring of blood glucose levels.
Now a days pharmacologic therapy is associated with improved glycaemic control and reduced long-term difficulty in type II diabetes.

Drug Classes Used For The Treatment Of Type II Diabetes Include The Following:-

Classes	Sub-Class		Drugs
Enhanced insulin secretion	K+ channel blocker	Sulfonylurea	1ST Generation-Tolbutamide, Chlorpropamide 2nd Generation- Glipalamide, Glipizide,
		Meglitinide	Repaglinide ,nateglinide
Overcome insulin resistance	Biguanides(Ampk activator)		Metformin,nateglinide
	Thiazolidinediones		Pioglitazone
Miscellaneous drugs	DPP-4 inhibitors		Sitagliptin,Saxagliptin
	GLP-1 analogue		Exentatide
	SGLT-2 Inhibitor		Dapagliflozin,Canagliflozin
	Dopamine D2 agonist Amylin Analogues		Bromocriptine Pramlintide
Retard Carbohydrate absorption			Acarbose,Miglitol, Voglibose

Insulin Therapy:- Some people who have type II diabetes need insulin therapy.In the previously insulin therapy was used as last hope, but today it is often prescribed sooner because of its benefits.

Regular monitoring of the blood and urine glucose level, during treatment is essential part of treatment. These results indicate the proper change required in the treatment.

The overdose of insulin or hypoglycaemic agent may result in hypoglycemia. Symptoms of hypoglycemia include: Anxiety, confusion, extreme hunger, fatigue, irritability, sweating or clammy skin and trembling hands which need immediate treatment.

Stem Cell Therapy:- Macrophages/monocytes may be important role in these chronic inflammation and insulin resistance in Type 2 diabetes patient.Stem cell educator therapy ,a novel technology ,is designed to control or reverse immune sysfunction

Antioxidant Therapy:-A variety of antioxidant like Vitamins,Supplements,Plant derivatived active substance and drugs with antioxidant effects,have been used for oxidative effects,have been used for oxidative stress treatment in type 2 diabetes patient antioxidant which play an important role in lowering the risk of developing diabetes and its problems.

Anti-Inflammatory Treatment:-The changes indicate that inflammation plays a important role in pathogenesis of Type 2 diabetes mellitus.

Dietary Management:- Appropriate calories value dietary management should be taken properly by both diabetic patient and non-diabetic person such as:

1. In all cases it is required to restricted carbohydrate intake.
2. Should obey as closely as possible
3. Food intake should be divided into regularly intermidate meals of similar size
4. Reduce total calories intake by decreasing both fat and carbohydrat

Conclusion: -

Diabetes mellitus is a serious issue in today life. The lifestyle and day today situation are play major role in occurring this type of serious difficulty.in this review we get some knowledge regarding diabetes mellitus.

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