
بسم الله الرحمن الرحيم
بسم الله الرحمن الرحيم

DIABETES MELLITUS AND INSULIN THERAPY *

DR Elsayed Ibrahim
lecturer of Internal medicine
Faculty of medicine –Helwan University

INTRODUCTION

- Diabetes is group of metabolic disorders characterized by hyperglycemia due to defect in insulin secretion ,insulin action or both.

TYPES OF DIABETES MELLITUS

- Type 1 diabetes mellitus
- Type 2 diabetes mellitus
- Gestational diabetes
- Others e.g drugs

ETIOLOGY OF DIABETES

1. Type 1: complete Beta cell destruction
2. Type 2 combination of insulin resistance and beta cell dysfunction

GESTATIONAL DIABETES

- Diagnosed during pregnancy (24_28 wks of gestation)
- Big baby ,still birth can complicate untreated cases
- resolve after birth ,but increased risk of developing type 2 D.M

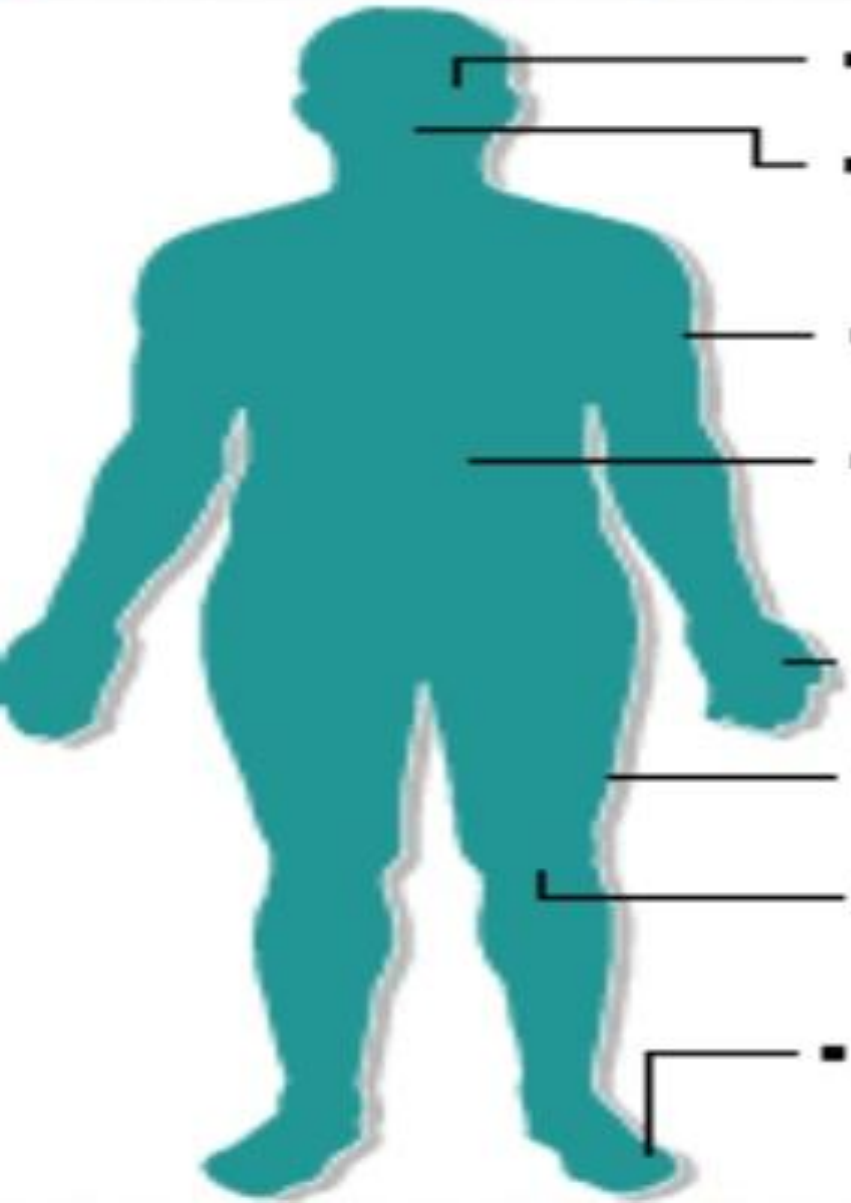
Differences between type-1 and type-2 Diabetes Mellitus

- Type 1
- Young age
- Normal BMI, not obese
- No immediate family history
- Short duration of symptoms (weeks)
- Can present with diabetic coma (diabetic ketoacidosis)
- Insulin required

- Type 2
- Middle aged, elderly
- Usually overweight/obese
- Family history usual
- Symptoms may be present for months/years
- Do not present with diabetic coma
- Insulin not necessarily required
- Previous diabetes in pregnancy

These differences are not absolute

Symptoms of Diabetes



- Blurry vision
- Increased thirst or the need to urinate
- Feeling tired or ill
- Recurring skin, gum, or bladder infections
- Dry, itchy skin
- Unexpected weight loss
- Slow-healing cuts or bruises
- Loss of feeling in the feet or tingling feet

Symptoms of new onset

- Polyurea
- Polydipsia
- Polyphagia
- Weight loss
- Fatigue

Symptoms

Hypoglycemia

- Tremor
- Headache
- Pallor
- Dizziness
- Paresthesia
- Loss of coordination
- Anxiety
- Mood confusion
- seizure

Hyperglycemia

- Polyurea
- Polydipsia
- Dry mouth
- Ketoacidosis (shortness of breath)
- Hyperosmolar hyperglycemic non ketotic syndrome(fever,confusion, weakness)

INVESTIGATION

- Fasting blood sugar
- Post prandial blood sugar
- HbA1C
- Lipid Profile – To diagnose dyslipidaemia

- RBS can be done only if the patient follows up for the diagnostic tests after a meal

FASTING BLOOD SUGAR

. Person to be tested should be on normal diet for at least3 days prior to testing.

2. Test should be done after an overnight fast of 8-10 hours

Fasting blood sugar (mg/dl)	Diagnosis
Below 100	Normal
100 -126	Impaired fasting glucose
High	Diabetes

POST PRANDIAL BLOOD SUGAR

1. Following fasting blood sample ,patient is advised to have normal meal and return to clinic after 2 hours following meal.

Post prandial blood sugar	Diagnosis
Below 140mg/dl	Normal
140 -200 mg/dl	Impaired glucose tolerance
High 200 mg/dl	Diabetes

HbA1C

- Person to be tested should be on a normal diet for at least 3 days prior to testing.
- The test should be done after an overnight fast of 8 – 10 hours
- Draw a sample of blood after confirming fasting state of the patient.

HbA1C Levels	Diagnosis
4 - 6	Normal for those without diabetes
6.1-7	Target range for diabetics
>7	Poor control

Management of DM

- The major components of the treatment of diabetes are:

A	• **Diet and Exercise**
B	• **Oral hypoglycaemic therapy**
C	• **Insulin Therapy**

A. Diet

- Diet is a basic part of management in every case. Treatment cannot be effective unless adequate attention is given to ensuring appropriate nutrition.

- **Dietary treatment should aim at:**
  - ensuring weight control
  - providing nutritional requirements
  - allowing good glycaemic control with blood glucose levels as close to normal as possible
  - correcting any associated blood lipid abnormalities

Exercise

- Physical activity promotes weight reduction and improves insulin sensitivity, thus lowering blood glucose levels.
- Together with dietary treatment, a programme of regular physical activity and exercise should be considered for each person. Such a programme must be tailored to the individual's health status and fitness.
- People should, however, be educated about the potential risk of hypoglycaemia and how to avoid it.

Nutritional Management for Type I Diabetes

- Consistency and timing of meals
- Timing of insulin
- Monitor blood glucose regularly

Nutritional Management for Type II Diabetes

- Weight loss
- Smaller meals and snacks
- Physical activity
- Monitor blood glucose and medications

Diabtes oral medeications

Sulfonylureas
Meglitinides
Dipeptidyl-peptidase 4 (DPP-4) inhibitors
Biguanides(metformin)
Thiazolidinediones
Alpha-glucosidase inhibitors
Sodium-glucose co-transporter 2 (SGLT2) inhibitors
GLP-1 analogs

INSULIN THERAPY

What is Insulin? (1)

- Polypeptide hormone
- Beta-cells of islets of Langerhans in pancreas
- Profound effects on
  - carbohydrate, fat & protein metabolism
  - To some extent on water & electrolyte balance

- 2 chains
- 2 bonds
- Secreted as basal & meal related (2)
- Meal related in 2 phases

Common Insulin Regimens (1)

Split Mix Regimens

- Two injections (intermediate + soluble) per day
  - * before breakfast & before bedtime
- Proportion/dosage of insulins titrated based on BG profile
- Drawback
  - Mixing insulins is tedious and problematic
  - Inaccuracy of dose

Not preferred –more problems for patients

Common Insulin Regimens (4)

Basal Bolus

- Basal insulin at night and one rapid acting insulin immediately before each major meal (3 times).
- Basal insulin is titrated following FBG
- Rapid acting insulin is titrated by post meal BGs
- Drawback
  - Expensive
  - 4 times needle prick a day.

Most preferred –most fexible

Indications of insulin

Continuous Use

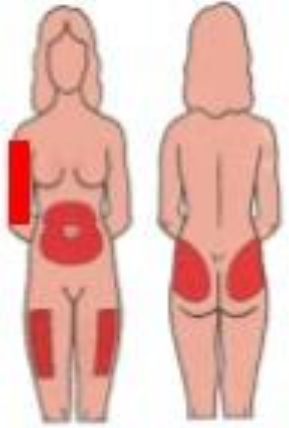
* Type 1 Diabetes
* Type 2 Diabetes with OHA failure
  - Primary - Secondary

Intermit

Life-saving in T1DM
Essential in T2DM

* Type
  - major surgery
  - pregnancy, labour and delivery
  - myocardial infarction
  - acute infections
  - Hypergycemic emergencies: DKA & HHS
* GDM

Insulin administration



Sites

- Abdomen (fastest absorption & most preferred)
- Buttocks
- Upper arm

(Intermediate)

- Thigh-lateral & anterior aspects (slowest)
- Rotate the site of injection around a selected area

Side effects of Insulin

5 Side effects

1. Hypoglycemia
2. Allergic Reactions –
   - Local redness, itching – self limiting, disappears with continuation of therapy
   - Systemic allergy – angioedema, anaphylaxis; rare, requires desensitization

1. Insulin lipoatrophy
2. Insulin lipohypertrophy
3. Insulin Edema & weight gain


THANK YOU