

# Diabetes mellitus, dyslipidemia, obesity

## Diabetes mellitus (DM)

- **Type 1** – Selective destruction of  $\beta$ -cells of Pancreas (autoimmunity, LADA) – *absolute lack of insulin*
- **Type 2** – Insulin resistance with a *relative deficiency of insulin*
- **Secondary** – Pancreatogenic (surgical removal of pancreas, destruction by inflammation, tumor, injury) – *insufficient or no insulin secretion*
- **Gestational** – Hyperglycemia during pregnancy (excessive size of the fetus)

**Impaired glucose tolerance** (IFG – impaired **fasting** glucose 5,6 – 6,9 mmol/l, IPG – impaired **postprandial glycemia** after 2 hours 7,8 – 10,9 mmol/l) **DM (2)**.

- The disease is characterized by hyperglycemia
- Physiological range of glycemia 3,9–5,5 mmol/l
- Determination of glycemia, insulin, C-peptide, glycated hemoglobin (HbA1c), possibly antibodies (anti GAD, ICA) – **differential diagnosis DM**.

### Diagnostic criteria

- Fasting glycemia > 7 mmol/l, postprandial glycemia after 2 hours > 11 mmol/l.

### Examination of the patient for diabetic complications

- Macrovascular (Stroke, acute M.I., ischemic diseases of the lower limbs)
- Microvascular (retinopathy, nephropathy, neuropathy)

### Anamnesis, examination

- Polydipsia — excessive thirst associated with excessive fluid intake
- Polyuria — excessive urination
- Recurrent bacterial and fungal infections — Urogynecological, respiratory, skin;
- Complications of DM — ophthalmic, neurological, nephrological, vascular, cardiological.

### Therapy

Dietary measures – basic therapeutic modality:

1. Normalization of fasting and postprandial glycemia (Regulation of carbohydrate content in the food and rate of carbohydrate absorption – glycemic index)
2. Achieving optimal levels of lipids in blood (TAG, HDL)
3. Ensuring sufficient energy supply
4. Prevention and treatment of late complications

### Diet

- 5 – 6 meals per day – second dinner
- Bread units (interchangeable unit)
  - 1 BU corresponds to 10 – 12 g of carbohydrates = 2 cubes of sugar (Reducing diabetic diet to 175 g of carbohydrates per day = 16 BU = 32 cubes of sugar)
- Differences in the diet for type 1 and type 2 DM

### Pharmacotherapy

- **Oral antidiabetics**
  - Influencing the insulin resistance – Biquanides, Thiazolidinediones (glitazones)
- **Secretagogues** – Derivatives of sulfonylurea, Non-sulfonylureas (glinides)
  - Inhibition of digestive enzymes in the GIT ( $\alpha$ -glucosidase, lipase)
  - Dipeptidyl peptidase-IV inhibitors (gliptins)
- **Insulins** (human, recombinant, analogues)



# Dyslipidemia

- **Synonyms** – Dyslipoproteinemia, hyperlipidemia, hyperlipoproteinemia
- **Lipidogram (lipid profile)** – total cholesterol TC, triacylglycerols TAG, low density lipoprotein LDL, high density lipoprotein HDL, apolipoprotein B (apo B), apolipoprotein AI (apo AI)
- **Dyslipidemia** is characterized by an altered Cholesterol level and/or triacylglycerides and/or HDL cholesterol
- **Atherogenic lipid phenotype** – TAG, jLDLsd, J.HDL.

## Division

- Etiology
  - **Primary** – Genetic and lifestyle factors (composition and amount of food, smoking, alcohol, physical activity and body weight)
  - **Secondary** – Other diseases are involved in the development of dyslipidemia

From the clinical and therapeutic perspective, dyslipidemia is divided into three groups:

1. Isolated hypercholesterolemia
  - Increased total Cholesterol (TC), mostly in the LDL-cholesterol fraction (LDL-C), with a normal concentration of triacylglycerides (TAG);
2. Isolated hypertriacylglycerolemia
  - Increased TAG in combination with a normal cholesterol concentration (TC);
3. Combined hyperlipidemia
  - Simultaneously increased levels of both TC and TAG.

## Therapy

### Lifestyle changes

- Restricted diet, no consumption of alcohol, smoking, physical activity

### Diet

- Limiting intake of fat to 60 g/day, cholesterol intake 300 mg/day (egg yolk contains 250 mg), consumption of fiber 30 g/day – 500 g of fruits and vegetables, processed foods.

### Pharmacotherapy

- Statins (atorvastatin, simvastatin, fluvastatin, rosuvastatin)
- Fibrates (fenofibrate)
- Ezetimibe
- Bile acid resins (Questran)
- Combination of medications (simvastatin/ezetimibe)

## Conclusion

Aiming to reach optimal levels of lipids, weight, and blood pressure to reduce the risk for cardiovascular diseases and mortality.

## Obesity

- Excessive storage of fat in the organism
- Classification according to quantity (BMI) and quality (android type, gynoid type)
- Physiologic amount of fat in women is 25–30 % and in men 20–25 %
- $BMI = \text{weight (kg)} / \text{height (m)}^2$ .

## Classification of body weight according to BMI

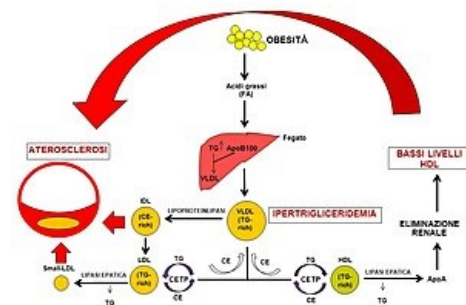
### Anthropometry

- Waist circumference – site of measurement: visible waist, respectively at the level of iliac crest and last rib
  - Physiologic value – men up to 94 cm, women up to 80 cm
- Measurement of skin folds – bicipital, tricipital, subscapular, suprailiac
- Bioelectrical impedance analysis for percentage of fat.

## Therapy



Insulin pen



Dyslipidemia

- Aiming to reduce weight by 5–10 % and maintaining this weight
- Significant reduction of risk for DM, hypertension, and cancer
- Reduction of risk for complications of obesity – diseases of the musculoskeletal system, dyspnea and sleep apnea syndrome.

### Diet therapy

- Restricted diet – regular meals, 5 – 6 times per day, regulated amount of proteins, less fat and sugar, limited amount of table salt (605 – 1770 kcal/day)
- Pharmacotherapy – Anti-obesity drugs: sibutramin, orlistat, rimonabant
- Physical activity – Exercise test (ergometry)

## Metabolic syndrome

### Raven syndrome, syndrome X

- According to IDF 2005: waist M 94 cm and more, F 80 cm and more, increased TAG, arterial hypertension, DM or impaired glucose tolerance
- Significant impact on quality of life, increased morbidity (complications of DM, dyslipidemia...), mortality (CVD)

### Anamnesis

- **Family history:** DM, endocrinopathies, CVD, Metabolic syndrome
- **Personal history:** co-morbidities – DM + complications, CVD, nephropathy, endocrinopathies, infections
- **Gynecological history:** deliveries, fetal weight (more than 4 kg), abortions
- **Addictions:** smoking, alcohol consumption, drugs
- **Pharmacological history:** corticoids, oral contraceptives, hormone replacement therapy, thyroid hormones, psychiatric drugs, oral antidiabetics, insulin

### Conclusion

- Complex approach – psychology, psychopathology, patient habits, background
- Adjustment of lifestyle – physical activity
- Diet therapy – planning of meals

## Links

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### Related articles

- Diabetes mellitus
- Dyslipidemia
- Obesity
- Metabolic syndrome

### Source

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