Thyroid diseases. Syndrome of thyrotoxicosis, definition, classification. Aetiology, pathogenesis, basic clinical symptoms. Thyrotoxical crisis. A syndrome of hypothyrosis, definition, classification. Aetiology, pathogenesis, basic clinical symtoms. Hypothyroid coma.

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THYROTOXICOSIS SYNDROME

* Thyrotoxicosis is the state caused by increased level of thyroid hormones and their toxic effect on all tissues.

* Thyrotoxicosis syndrome includes a diffusive toxic goiter (DTG or Graves-Bazedov disease) and multinodal toxic goiter (with thyroid autonomy) and toxic adenoma (Plummer disease).

ETIOLOGY OF DTG

DTG is autoimmune disease.

Genetical (hereditary) factors:

The carriage of chromosomal locuses contributes to autoimmune diseases: DR3, DR4 Etc.

Trigger factors:

1. Persistent infections of a lymphoid nasopharyngeal ring.
2. Immune system disturbances caused by stresses.

PATHOGENESIS OF DTG

* Cytokines initiated by etiological factors, then:
* Changing of the ratio of T-lymphocytes subpopulations (increasing of T-helpers, decreasing of T-supresors)
* Producing of thyroid stimulated antibodies (Ab) are similar with thyroid stimulated hormone (TSH)
* Thyroid stimulated Ab occupied TSH receptors of thyrosites and stimulate increasing production of thyroid hormones
* Thyroid stimulated Ab are named TSH receptor antibodies (TSHr-Ab)

PATHOGENESIS OF DTG

* Hypertrophy of thyrosites, which are enlarged and got the cylindrical form.
* Magnification of thyroid gland vascularization.
* Lymphoid infiltration occurrence («false nodules»), includes lymphocytes, macrophages, plasmatic cells.

ETIOLOGY AND PATHOGENESIS OF THE MULTINODAL TOXIC GOITER

* Iodine deficiency leads to activating mutations of TSH receptor gene
* Formation of thyroid autonomy (without TSH regulation according to feedback mechanism)
* Development of unifocal, multifocal and disseminated thyroid autonomies
* Stable and progressive thyrotoxicosis

PATHOGENESIS OF THYROTOXICOSIS

Primary hyperthyroidism means that pathological process injured the thyroid gland with thyroid hormones hyperproduction.

* Increasing of free fractions of T3 and T4 concentration in blood serum.
* Decreasing of TSH level in blood serum.

Secondary hyperthyroidism means that pathological process located in the hypophisis with TSH hyperproduction and increased free T3 and free T4 levels.

METHABOLISM DISORDERS AT THYROTOXICOSIS

High level of thyroid hormones brokes carbohydrate, lipid and protein metabolism.

* Carbohydrate metabolism disorders:

1. Depression of aerobic glycolysis
2. Depression of glucose absorption
3. Temporary insulin resistance which reducing together with thyrotoxicosis compensation
4. Activation of gluconeogenesis.

All items lead to hypoglycemia.

METHABOLISM DISORDERS AT THYROTOXICOSIS

* Protein metabolism disorders:

1. Defective reception of aminoacids
2. Aminoacids appointed to carbohydrate synthesis (gluconeogenesis)
3. Decreasing of biosynthesis of protein and cyclic nucleotides
4. Catabolism of plastic proteins

METHABOLISM DISORDERS AT THYROTOXICOSIS

* Lipid metabolism disorders:

1. Incresing of catabolism of fats
2. Wieght loss
3. Reducing of cholesterol synthesis (hypocholesterolemia)
4. Lipothyroxidation is sharply raised.

CLINICAL SYPMTOMS OF THYROTOXICOSIS

* Complaints to tachycardia, weight loss, sleeplessness, and body shiver.

Clinical observation

1. Skin is wet, warm, velvety. There can be a hyperpigmentation areas.
2. Thyroid gland is often enlarged with hard elastic or juicy parenchyma. There can be substernal location of thyroid gland.
3. Muscular system: proximal myopathy caused by innervation disturbance of muscles.

CLINICAL SYPMTOMS OF THYROTOXICOSIS

4. Bone system: diffusive osteoporosis occurred because of bone proteins catabolism and loosing of calcium.

5. Cardiovascular system: tachycardia, there can be arrhythmia (a ciliary arrhythmia, exstrasystoles), complicated of cardiac failure. Blood pressure (systolic is raised, diastolic is depressed).

6. Elementary tract: peristalsis exceeding, diarea, hepatomegaly.

CLINICAL SYPMTOMS OF THYROTOXICOSIS

7. Ophthalmic symptoms: Gloss of eyes, tremor of eyelashes are symptoms of thyrotoxicosis. Other ophthalmic symptoms (exophtalm, eyelid hyperpigmentation, scleras hypervascularisation etc.) are related to autoimmune ophtalmopathy.
8. Nerve system: Emotional lability, irritability, tearfulness, Marie symptom (finger shiver) and a symptom of «a cable pole».
9. Sexual system: female - dysmenorrhea and amenorrhea, male – libido is raised, and potency is reduced, spermatogenesis is not broken.

DIAGNOSTICS OF THYROTOXICOSIS

* Laboratory tests of thyroid hormones level in a blood serum (FT_4, TSH and FT_3 if it`s necessary)
* Autoantybody tests (TSHr-Ab concentration) as a confirmation of DPG.
* Ultrasonography of thyroid gland (thyroid enlargement, nodules or false nodules)
* Radioisotopes test with ^{99}Te makes possible to diagnose «hot nodules» (toxical adenoma or thyroid autonomy)
* Fine needle biopsy of nodules (malignancy suspicious)

TREATMENT OF THYROTOXICOSIS

* Thyrostatics (Imidazols & propyltyouracils)
* β-adrenoblockers (selective, possible unselective)
* Potassium drugs
* Vitamin D and Calcium (Osteoporosis)
* hepatoprotectors

HYPOTHYROIDISM

* Hypothyroidism means thyroid hormones deficiency.
* Hypothyroidism is shared to:

1. Primary hypothyroidism which caused by pathological process in thyroid gland

2. Central hypothyroidism which caused by hypophisis or hypothalamus lesion

* Researchers share central hypothyroidism for secondary (hypophisis lesion) and tertiary (hypothalamus)

ETIOLOGY OF HYPOTHYROIDISM

1) **Primary hypothyroidism:**

a. Congenital

* aplasia or hypoplasia of thyroid gland
* enzymes deficiency of T3 and T4 synthesis

b. Acquired

* autoimmune thyroiditis
* thyroidectomy
* radioiodine treatment

ETIOLOGY OF HYPOTHYROIDISM

2) **Central hypothyroidism**

a. Congenital

* aplasia or hypoplasia of hypophisis
* hemorages in newborn baby`s hypophisis (during labour)

b. Acquired

* inflammatory diseases of hypophisis and hypothalamus
* neuroinfections
* hypophisis ischemia of pregnants during labour
* hypophisis tumors
* hypophisis operations
* radiations exposure of hypophisis
* Dofamin-agonists drugs leading to decreasing of TSH

PATHOGENESIS OF HYPOTHYROIDISM

1. Etiological factors of primary hypothyroidism lead to decreasing of T_3 & T_4 hormones level and increasing of TSH according to feedback regulation.
2. According to etiological factors of secondary hypothyroidism TSH is decreased and T_3 & T_4 levels are decreased too.

PATHOGENESIS OF HYPOTHYROIDISM

Thyroid hormones deficiency changes metabolism of proteins, lipids & carbohydrates.

1. Protein metabolism:

* Formation of hydrophilic proteins – mukoproteids which draw water and lead to oedema. The severe form of hypothyroidism was named myxedema.
* Synthesis of albumins is reduced.

2. Lipides metabolism:

* Lipids catabolism is decreased.
* Synthesis of cholesterol and LDLP is increased.

3. Carbohydrates metabolism:

* Reducing of carbohydrates absorption in elementary tract.
* Possible hypoglycemia.

CLINICAL SYMPTOMS OF HYPOTHYROIDYSM

* Complains to weight gain, chilliness, memory depression, obstipation.

Clinical observation:

1. Skin is dry, cold and thick, eyelids oedema.
2. Face is pale with yellowish shade.
3. Voice is rasping, speech is complicated because of an oedema of vocal chords and tongue. Tongue is big with replicas of dents.
4. Respiratory system - motility of lungs and respiratory volume are decreased, respiratory hypoxia, vulnerability to respiratory disease with relapse.

CLINICAL SYMPTOMS OF HYPOTHYROIDYSM

* Cardiovascular system - myocardial weakness, bradycardia, syst. BP is decreased and diast. BP is increased or can be normal. Hydropericardium can be find out using cardiosonography.
* Gastrointestinal tract - enzymes activity is decreased, oedema of mucoze, motility is decreased, appetite loss, constipations.
* Nerve system - encephalopathy with intelligence depression, memory depression, paresthesias, lumboischalgias.

DIAGNOSTICS OF HYPOTHYROIDYSM

* Laboratory tests of thyroid hormones level in a blood serum (free T_4 & TSH).
* Autoantibody tests (TPO-antibody as a confirmation of thyrocites cytolysis as marker of autoimmune thyroidites.
* Ultrasonography of thyroid gland (decreasing of thyroid volume, hypoechogenecity).

TREATMENT OF HYPOTHYROIDYSM

Replacement therapy with L-Thyroxin

* The started dose: 12,5-25 mcg per day
* Therapeutic dose: 1-1,5 mcg per kilo daily
* Thyroid hormones test – every month until compensation state, then – one time per 6 mounths.