Notes for the Practical lesson in Internal Medicine

Hypothyroidism (1) & Thyroiditis (2)

A. Shleenkova, E. Luta, L. Bogun, M. Yabluchansky
V.N. Karazin National University Medical School' Internal Medicine Dept.

Plan of the Notes

- Hypothyroidism(1)
- Thyroiditis (2)
- Clinical Endocrinology' Tests
- Recommended literature

1) Hypothyroidism

What is Hypothyroidism?

1) Hypothyroidism

- Hypothyroidism (from *hypo-* meaning under or reduced, plus *thyroid)*, often called underactive thyroid or low thyroid function and sometimes hypothyreosis, is a common disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormones
- It can cause a number of symptoms, such as poor ability to tolerate cold, a feeling of tiredness, and weight gain
- In children, hypothyroidism leads to delays in growth and intellectual development, which is called cretinism in severe cases

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3063534/

1) Hypothyroidism

Which thyroid hormones do you know?

1) Hypothyroidism: thyroid hormones

- Thyroid gland plays a central role in the metabolism of iodine
- Iodine trapping is the first step in the metabolism of iodine
- Synthesis and secretion of thyroglobulin is the second step
- The third step is the oxidation of iodide with iodination of tyrosine and formation thyroxine (T4) hormone and triiodothyronine (T3) hormone
- In the blood stream, T4 and T3 may circulate in the bound or free form; whereas 99 percent of T4 and T3 circulate in the bound form, less than 1 percent circulates in an unbound (biologically active) form
- About 80 percent of circulating T3, the most active thyroid hormone is derived from peripheral deiodination of T4 hormone

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3063534/

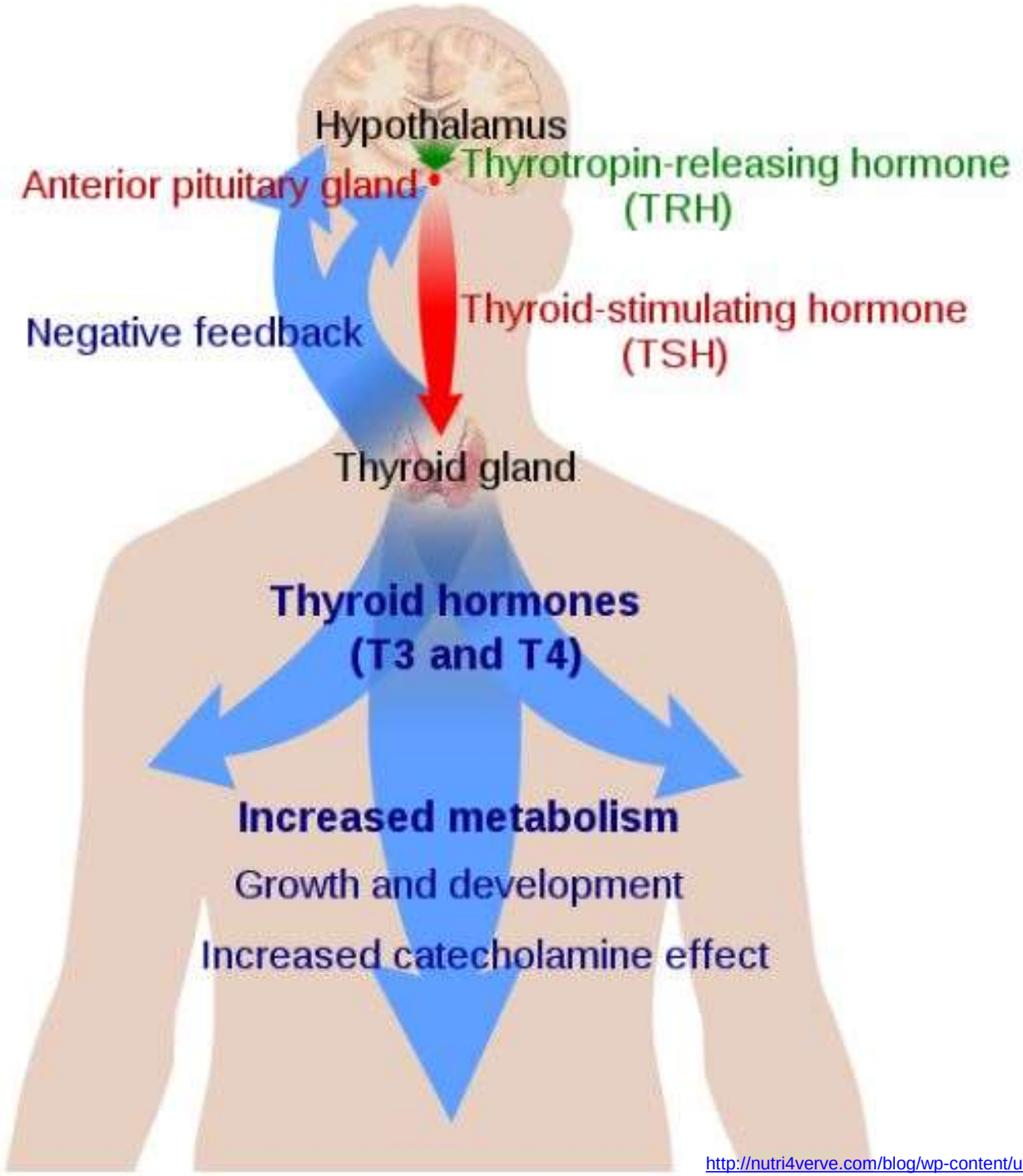
1) Hypothyroidism

How thyroid hormones secretion is regulated?

1) Hypothyroidism: feed-back in thyroid secretion regulation by pituitary gland through TSH

- Thyroid secretion is regulated by pituitary gland through TSH which operates on a feed-back mechanism tuned to T4 level in blood
- A fall in T4 level stimulates the pituitary to increase its TSH secretion which in turn stimulates the thyroid gland to release T4 in circulation to maintain normal level of the hormone in blood
- Thyroid gland secretes 80 micrograms of iodine in the form of T3 and T4 hormones per day; 40 micrograms of iodine secreted appear in extracellular fluid (ECF) per day
- T3 and T4 are metabolized in liver which releases about 60 mg of iodine into ECF and 20 mg of iodine into the bile to be excreted in stools
- On an average, 480 mg of iodine get excreted in urine and 20 micrograms in stools per day

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3063534/



http://nutri4verve.com/blog/wp-content/uploads/2013/07/Thyroid2.png

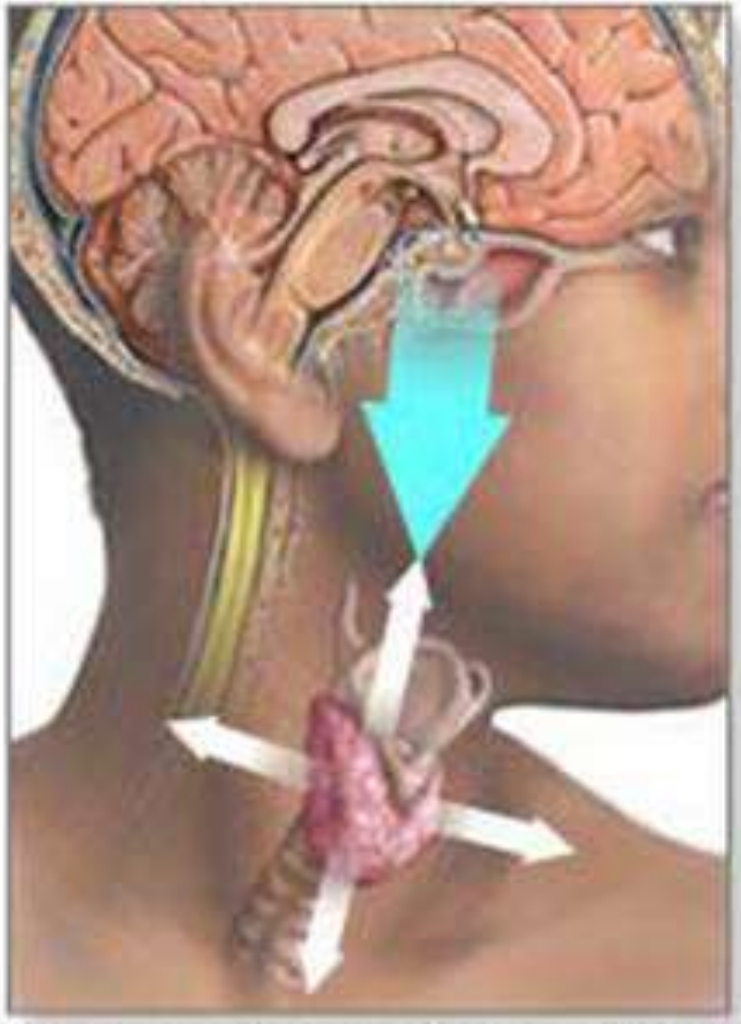
1) Hypothyroidism

What are causes of hypothyroidism?

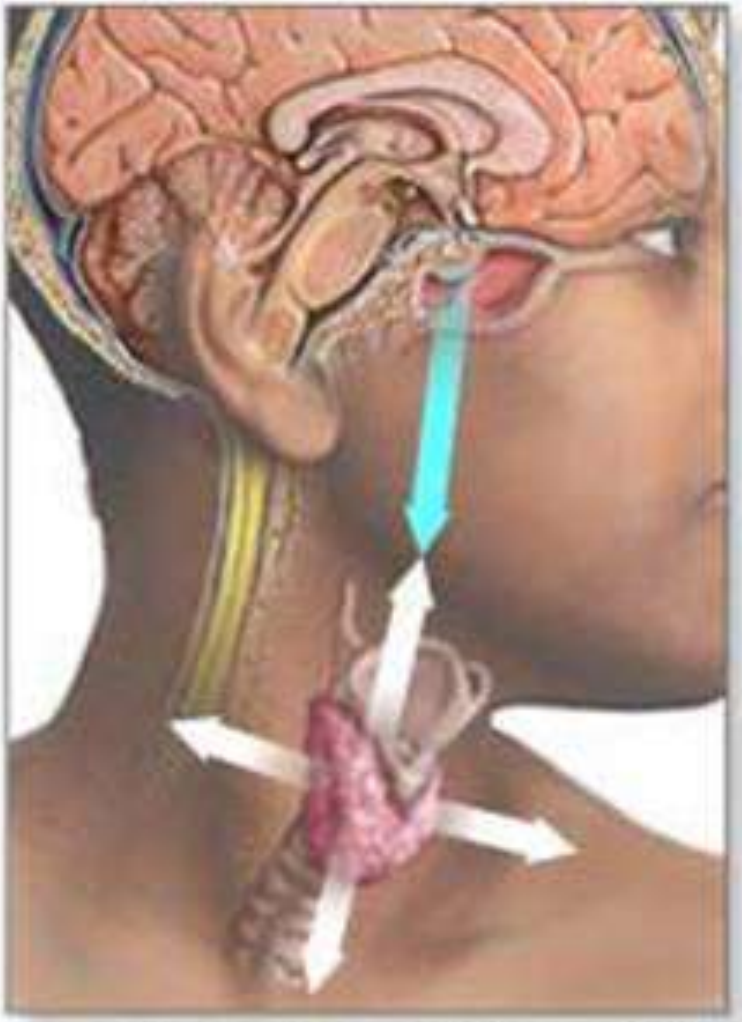
1) Hypothyroidism:
Causes

- **Hypothyroidism is caused** by inadequate function of the gland itself (primary hypothyroidism) or by not enough stimulation by thyroid-stimulating hormone (central hypothyroidism)
- Primary hypothyroidism is about a thousand fold more common than central hypothyroidism

en.wikipedia.org/wiki/Hyperthyroidism



Primary hypothyroidism: thyroid can't produce amount of hormones pituitary calls for



Secondary hypothyroidism: thyroid isn't being stimulated by pituitary to produce hormones

http://dommedika.com/endocrinologia/Pic/367.jpg

1) Hypothyroidism

What is primary hypothyroidism?

1) Hypothyroidism
Primary hypothyroidism

- Iodine deficiency (developing countries),
- autoimmune thyroiditis (Hashimoto's disease).
- previous thyroidectomy,
- previous radioiodine treatment,
- previous external beam radiotherapy to the neck
- a biosynthetic defect in iodine organification
- drugs such as lithium or interferon
- replacement of the thyroid gland by tumor (lymphoma)

en.wikipedia.org/wiki/Hyperthyroidism

1) Hypothyroidism

What is central hypothyroidism?

1) Central hypothyroidism
Definition

- Central hypothyroidism refers to thyroid hormone deficiency due to a disorder of the pituitary gland, hypothalamus, or hypothalamic-pituitary circulation
- Pituitary thyrotropin (TSH) production is regulated in part by thyrotropin-releasing hormone (TRH), which is secreted from the paraventricular nucleus in the hypothalamus
- TRH is released into blood vessels and transported to the anterior pituitary gland where it regulates the synthesis, glycosylation, and release of TSH

en.wikipedia.org/wiki/Hyperthyroidism

1) Hypothyroidism

What are causes of central hypothyroidism?

1) Hypothyroidism: Central hypothyroidism Causes

- Lesions compressing the pituitary gland (pituitary adenoma, craniopharyngioma, meningioma, glioma, Rathke's cleft cyst, metastasis, empty sella syndrome, aneurysm of the internal carotid artery)
- surgery or radiation to the pituitary, drugs, injury, vascular disorders (pituitary apoplexy, Sheehan syndrome, subarachnoid hemorrhage)
- autoimmune diseases (lymphocytic hypophysitis, polyglandular disorders)
- infiltrative diseases (iron overload due to hemochromatosis or thalassemia, sarcoidosis, Langerhans cell histiocytosis)
- particular inherited congenital disorders, and infections (tuberculosis, mycoses, syphilis)

en.wikipedia.org/wiki/Hyperthyroidism

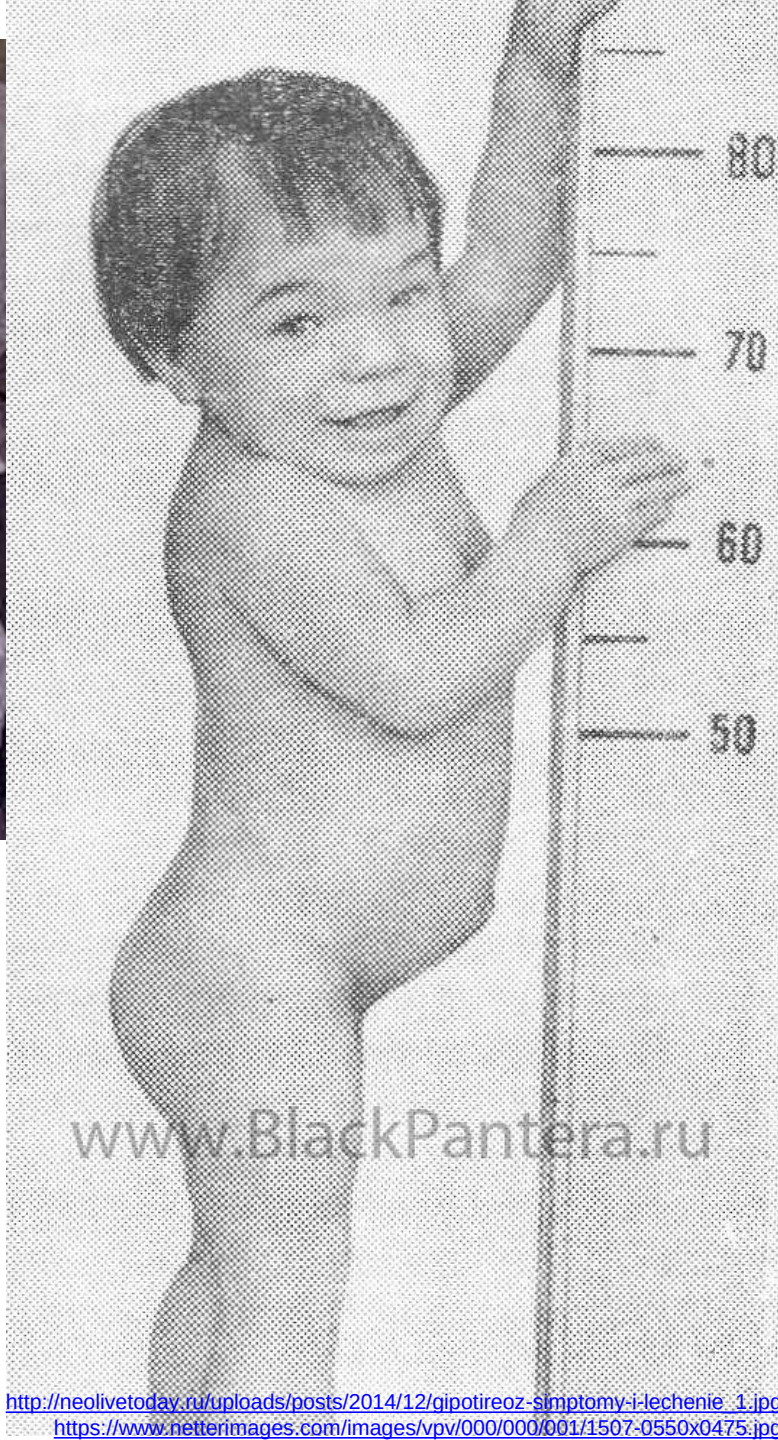
1) Hypothyroidism

What is congenital hypothyroidism?

1) Hypothyroidism:
Congenital hypothyroidism

- Thyroid dysgenesis (75%), thyroid dyshormonogenesis (20%), maternal antibodies or radioiodine transfer
- Syndromes: mutations (in *GNAS complex locus*, *PAX8*, *TTF-1/NKX2-1*, *TTF-2/FOXE1*), Pendred's syndrome (associated with sensorineural hearing loss)
- Transiently: due to maternal iodine deficiency or excess, anti-TSH receptor antibodies, certain congenital disorders, neonatal illness
- Central: pituitary dysfunction (idiopathic, septo-optic dysplasia, deficiency of *PIT1*, isolated TSH deficiency)

en.wikipedia.org/wiki/Hyperthyroidism



Congenital hypothyroidism

http://neolivetoday.ru/uploads/posts/2014/12/gipotireoz-simptomy-i-lechenie_1.jpg
https://www.netterimages.com/images/vpv/000/000/001/1507-0550x0475.jpg

1) Hypothyroidism

Can you list early symptoms of hypothyroidism?

1) Hypothyroidism:
Symptoms of hypothyroidism

Early symptoms:

- Hard stools or constipation
- Increased sensitivity to cold temperature
- Fatigue or feeling slowed down
- Heavier and irregular menstrual periods
- Joint or muscle pain
- Paleness or dry skin
- Sadness or depression
- Thin, brittle hair or fingernails
- Weakness
- Weight gain

en.wikipedia.org/wiki/Hyperthyroidism

HYPOTHYROIDISM

http://3.bp.blogspot.com/-wMOKpNr74TY/ULG6DgcxIpI/AAAAAAAAAjo/cZ5ITtdl_Z4/s1600/Hypothyroidism.jpg

1) Hypothyroidism: Clinical Features

- GENERAL: fatigue, cold intolerance, slowing of mental and physical performance, hoarseness, enlarged tongue
- CVS: slow pulse, generalized atherosclerosis (increased serum cholesterol and triglycerides), pericardial effusion
- GI: anorexia, weight gain, constipation, poor appetite
- NEUROLOGY: paresthesia, slow speech, muscle cramps, delay in relaxation phase of deep tendon reflexes ("hung reflexes")
- GU: menorrhagia, amenorrhea, anovulatory cycles (infertility)
- DERMATOLOGY: puffiness of face, periorbital edema, cool, dry and rough skin, hair dry and coarse, eyebrows thinned (lateral 1/3)
- HEMATOLOGY: anemia

1) Hypothyroidism

Can you list late symptoms of hypothyroidism?

1) Hypothyroidism:
Symptoms of hypothyroidism

Late symptoms, if untreated:

- Decreased taste and smell
- Hoarseness
- Puffy face, hands, and feet
- Slow speech
- Thickening of the skin
- Thinning of eyebrows
- Decreased concentration
- Memory and mental impairment
- Infertility

en.wikipedia.org/wiki/Hyperthyroidism

1) Hypothyroidism

What is subclinical hypothyroidism?

1) Hypothyroidism: Subclinical hypothyroidism

- Subclinical hypothyroidism is a milder form of hypothyroidism characterized by an elevated serum TSH level, but with a normal serum free thyroxine level
- This milder form of hypothyroidism is most commonly caused by Hashimoto's thyroiditis (2)
- In adults it is diagnosed when TSH levels are greater than 5 mIU/L and less than 10mIU/L

en.wikipedia.org/wiki/Hyperthyroidism

1) Hypothyroidism: Subclinical hypothyroidism

- Subclinical hypothyroidism is variability condition and classic signs and symptoms of hypothyroidism may not be observed
- Of people with subclinical hypothyroidism, a proportion will develop overt hypothyroidism each year:
  - in those with detectable antibodies against thyroid peroxidase (TPO), this occurs in 4.3%,
  - while in those with no detectable antibodies, this occurs in 2.6%
- Those with subclinical hypothyroidism and detectable anti-TPO antibodies who do not require treatment should have repeated thyroid function tests more frequently (e.g. yearly) compared with those who do not have antibodies

en.wikipedia.org/wiki/Hyperthyroidism

1) Hypothyroidism: during pregnancy

- During pregnancy, the thyroid gland must produce 50% more thyroid hormone to provide enough thyroid hormone for the developing fetus and the expectant mother
- In pregnancy, free thyroxine levels may be lower than anticipated due to increased binding to thyroid binding globulin and decreased binding to albumin
- They should either be corrected for the stage of pregnancy, or total thyroxine levels should be used instead for diagnosis
- TSH values may also be lower than normal (particularly in the first trimester and the normal range should be adjusted for the stage of pregnancy)

1) Hypothyroidism: during pregnancy

- In pregnancy, subclinical hypothyroidism is defined as a TSH between 2.5 and 10 mIU/l with a normal thyroxine level, while those with TSH above 10 mIU/l are considered to be overtly hypothyroid even if the thyroxine level is normal
- Antibodies against TPO may be important in making decisions about treatment, and should therefore be determined in women with abnormal thyroid function tests
- Determination of TPO antibodies may be considered as part of the assessment of recurrent miscarriage, as subtle thyroid dysfunction can be associated with pregnancy loss, but this recommendation is not universal, and presence of thyroid antibodies may not predict future outcome

1) Hypothyroidism: Myxedema

- Myxedema or myxoedema is a term used synonymously with severe hypothyroidism
- It is also used to describe a dermatological change that can occur in hypothyroidism, and some forms of hyperthyroidism
- Myxedema refers to deposition of mucopolysaccharides in the dermis, which results in swelling of the affected area
- One manifestation of myxedema occurring in the lower limb is pretibial myxedema, a hallmark of Graves disease, an autoimmune form of hyperthyroidism
- Myxedema can occur in Hashimoto's thyroiditis and other long-standing forms of hypothyroidism, as well as Graves disease

https://en.wikipedia.org/wiki/Myxedem

1) Hypothyroidism: Myxedema

Here you can see how look like the face with late symptoms

http://www.studfiles.ru/html/2706/116/html_ahoLpZQhxP.c9U0/htmlconvd-BhLdtz_html_m3b5662ed.jpg
http://lumen.lumc.edu/lumen/MedEd/mech/cases/case15/scan20.jpg

1) Hypothyroidism

What is screening for hypothyroidism?

1) Hypothyroidism

- **Screening** for hypothyroidism is performed in the newborn period in many countries, generally using TSH
- This has led to the early identification of many cases and thus the prevention of developmental delay
- It is the most widely used newborn screening test worldwide
- The American Thyroid Association recommends screening at age 35 years and every 5 years thereafter, with closer attention to patients who are at high risk, such as the following
  - Pregnant women
  - Women older than 60 years
  - Patients with type 1 diabetes or other autoimmune disease
  - Patients with a history of neck irradiation

1) Hypothyroidism

How do you diagnose hypothyroidism?

1) Hypothyroidism

Diagnosis

Exams and Tests:

- The health care provider will do a physical exam and find that your thyroid gland is enlarged. Sometimes, the gland is normal size or smaller-than-normal
- The exam may also reveal:
  - Brittle nails
  - Coarse features of the face
  - Pale or dry skin, which may be cool to the touch
  - Reflexes that are abnormal
  - Swelling of the arms and legs
  - Thin and brittle hair
- Blood tests are also ordered to measure your thyroid hormones TSH and T4

1) Hypothyroidism
Diagnosis

Tests to check:

- Cholesterol levels
- Complete blood count (CBC)
- Liver enzymes
- Prolactin
- Serum sodium

1) Hypothyroidism

Please list Blood’ Thyroid Panel components

1) Hypothyroidism

Diagnosis

Blood' Thyroid Panel
Thyroid-Stimulating Hormone (TSH) evaluates overall thyroid function

- Total Thyroxine (T4) evaluates the total amount of T4 produced by the thyroid gland
- Free Thyroxine (T4) evaluates the amount of T4 available to the cells and tissues
- Free Tri-iodothyronine (T3)measures the amount of T3 (the active form of the hormone) available to the cells and tissues

https://www.youtube.com/watch?v=ua4uMumAOXI

1) Hypothyroidism : Diagnosis

TSH	FREE T4 (FT4)	FREE OR TOTAL T3	PROBABLE INTERPRETATION
High	Normal	Normal	Mild (subclinical) hypothyroidism
High	**Low**	**Low or normal**	**Hypothyroidism**
Low	Normal	Normal	Mild (subclinical) hyperthyroidism
Low	**High or normal**	**High or normal**	**Hyperthyroidism**
Low	Low or normal	Low or normal	Non-thyroidal illness; rare pituitary (secondary) hypothyroidism
Normal	High	High	Thyroid hormone resistance syndrome (a mutation in the thyroid hormone receptor decreases thyroid hormone function)

http://labtestsonline.org/understanding/analytes/t3/tab/test/

1) Hypothyroidism

How is hypothyroidism treated?

1) Hypothyroidism: Treatment

Hormone replacement

- Most people with hypothyroidism symptoms and confirmed thyroxine deficiency are treated with a synthetic long-acting form of thyroxine, known as levothyroxine (L-thyroxine)
- An initial dosage of levothyroxine of 25 to 50 µg/day can be used, the serum TSH level should be measured in 6 to 8 weeks, and the levothyroxine dose should be adjusted as necessary.
- The target TSH level should be between 0.3 and 3.0 µIU/mL. Once a stable TSH level is achieved, annual examination is appropriate.
- In young and otherwise healthy people with overt hypothyroidism, a full replacement dose (adjusted by weight) can be started immediately; in the elderly and people with heart disease a lower starting dose is recommended to prevent over supplementation and risk of complications
- Lower doses may be sufficient in those with subclinical hypothyroidism, while people with central hypothyroidism may require a higher than average dose

1) Hypothyroidism: Treatment

- Blood free thyroxine and TSH levels are monitored to help determine whether the dose is adequate
- This is done 4–8 weeks after the start of treatment or a change in levothyroxine dose
- Once the adequate replacement dose has been established, the tests can be repeated after 6 and then 12 months, unless there is a change in symptoms
- In people with central/secondary hypothyroidism, TSH is not a reliable marker of hormone replacement and decisions are based mainly on the free T_4 level
- Treatment of subclinical hypothyroidism remains controversial, Treatment is indicated in patients with TSH levels >10 µIU/mL or in patients with TSH levels between 5 and 10 µIU/mL in conjunction with goiter or positive anti-thyroid peroxidase antibodies (or both).

en.wikipedia.org/wiki/Hyperthyroidism

1) Hypothyroidism: Treatment

- Levothyroxine is best taken 30–60 minutes before breakfast, or four hours after food, as certain substances such as food and calcium can inhibit the absorption of levothyroxine
- There is no direct way of increasing thyroid hormone secretion by the thyroid gland

1) Hypothyroidism: Treatment

Levothyroxine

- A synthetic thyroid hormone that is chemically identical to thyroxine (T_4)
- Levothyroxine is used to treat hypothyroidism
- Levothyroxine for systemic administration is available as an oral tablet, an intramuscular injection, and as a solution for intravenous infusion
- Dosages vary according to the age groups and the individual condition of the patient, body weight and compliance to the medication and diet

en.wikipedia.org/wiki/Hyperthyroidism

1) Hypothyroidism: Clinical Case

Objective:

- We describe a 56-yr-old woman with profound central hypothyroidism and partial central hypoadrenalism, in the absence of other endocrine abnormalities
- In contrast to most cases of central hypothyroidism, serum TSH remained undetectable for 9 months before the initiation of thyroid hormone and hydrocortisone treatment
- A test for pituitary autoantibody was moderately positive
- Serum free T_4, serum T_3, and neck radioiodine uptake were low but detectable
- The thyroid and pituitary glands appeared morphologically normal on neck ultrasound and head magnetic resonance imaging, respectively

http://http://pmj.bmj.com/content/62/729/661.full.pdf/

1) Hypothyroidism:
Clinical Case

Settings:

- The study was conducted in a tertiary academic medical center

Conclusions:

- This case illustrates the variable clinical presentation of pituitary autoimmunity
- The persistence of low but detectable thyroid hormone levels and radioiodine neck uptake in the absence of TSH suggests that significant TSH-independent thyroid hormone synthesis may occur in the normal thyroid

http://http://pmj.bmj.com/content/62/729/661.full.pdf/

Thyroiditis (2): Definition

- Thyroiditis is the medical term for inflammation (swelling) of the thyroid gland, which can either cause abnormally high or low levels of thyroid hormones in the blood

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

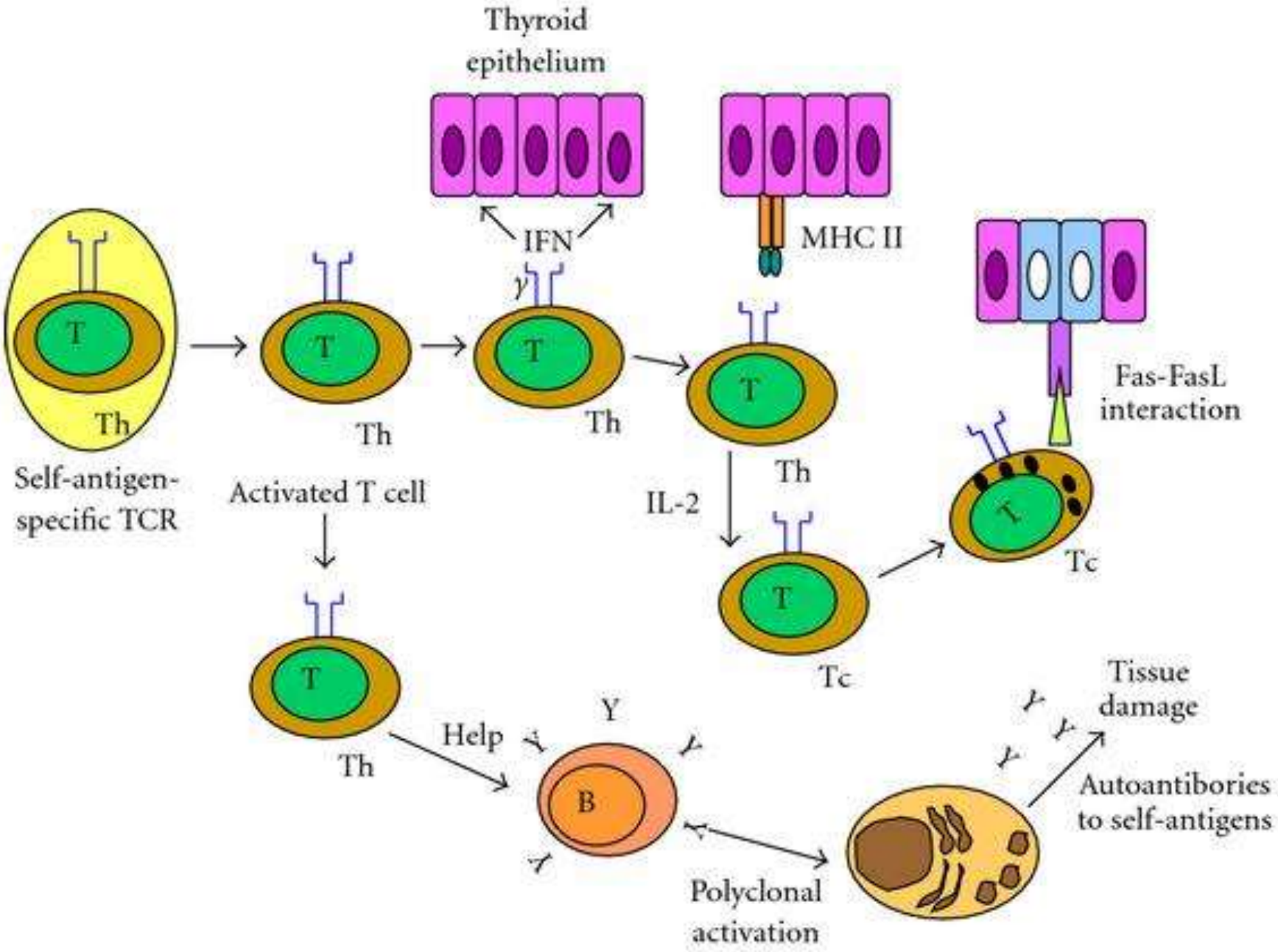
Thyroiditis (2): Causes

Which causes of thyroiditis do you know?

Thyroiditis (2): Causes

- Thyroiditis is generally caused by an attack on the thyroid, resulting in inflammation and damage to the thyroid cells
- This disease is often considered a malfunction of the immune system
- Antibodies that attack the thyroid are what causes most types of thyroiditis. It can also be caused by an infection, like a virus or bacteria, which works in the same way as antibodies to cause inflammation in the glands
- Certain people make thyroid antibodies, and thyroiditis can be considered an autoimmune disease, because the body acts as if the thyroid gland is foreign tissue
- Some drugs, such as interferon and amiodarone, can also cause thyroiditis because they have a tendency to damage thyroid cells

http://http://pcmj.abmj.com/content/62/729/661.full.pdf



http://dxline.info/img/new_ail/hashimoto-disease.gif

Thyroiditis (2)

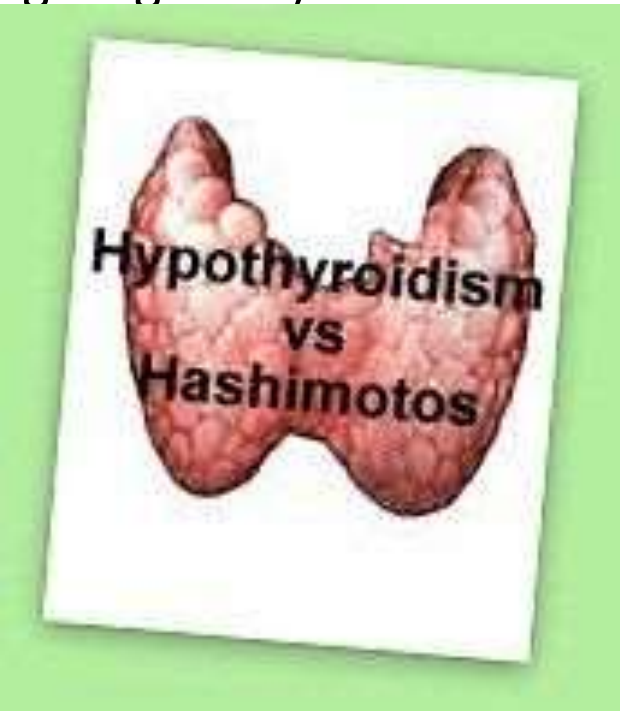
Classification

Which types of thyroiditis do you know?

Thyroiditis (2): Classification

The common types are:

- Hashimoto's thyroiditis (the most common)
- de Quervain's or subacute thyroiditis
- post-partum thyroiditis(triggered after giving birth)
- silent or painless thyroiditis
- drug-induced thyroiditis
- radiation-induced thyroiditis
- acute or infectious thyroiditis



http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2): Hashimoto's thyroiditis

The definition

- Hashimoto's thyroiditis or chronic lymphocytic thyroiditis is an autoimmune disease in which the thyroid gland is attacked by a variety of cell- and antibody-mediated immune processes, causing primary hypothyroidism
- It was the first disease to be recognized as an autoimmune disease
- It was first described by the Japanese specialist Hakaru Hashimoto in 1912
- This condition is the most common cause of hypothyroidism in the United States in individuals older than 6 years

https://en.wikipedia.org/wiki/Hashimoto%27s_thyroiditis

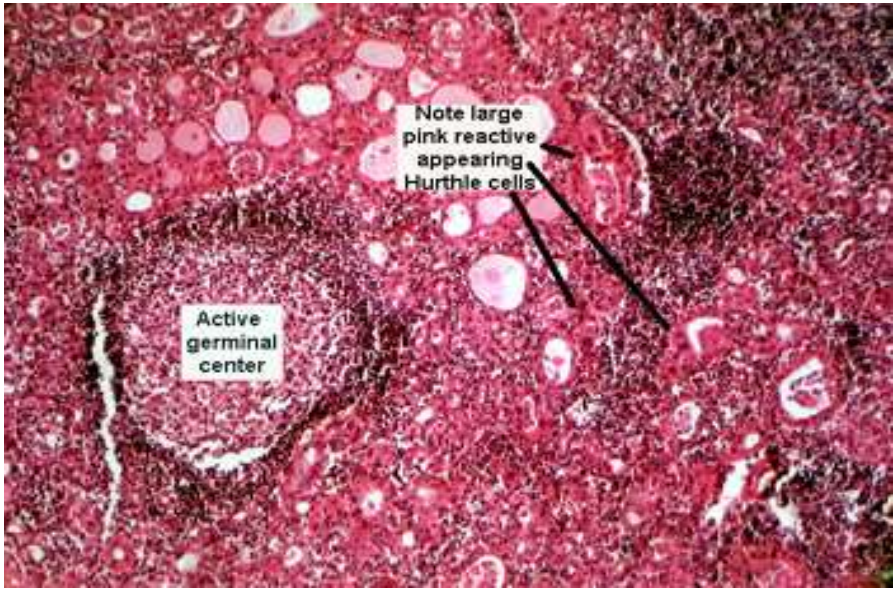
Thyroiditis (2):Hashimoto's thyroiditis

Describe the pathogenesis and pathomorphology of Hashimoto's thyroiditis

Thyroiditis (2):Hashimoto's thyroiditis

Pathogenesis

- The thyroid gland may become firm, large, and lobulated in Hashimoto's thyroiditis, but changes in the thyroid can also be nonpalpable
- Enlargement of the thyroid is due to lymphocytic infiltration and fibrosis rather than tissue hypertrophy
- Physiologically, antibodies against t hyroid peroxidase (TPO) (also called TPOAb) and/or thyroglobulin cause gradual destruction of follicles in the thyroid gland



http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2):Hashimoto's thyroiditis

Pathogenesis

- Accordingly, the disease can be detected clinically by looking for these antibodies in the blood
- Sometimes people may experience symptoms but their blood-work comes back normal, causing their thyroiditis to go undetected by the lab
- It is also characterized by invasion of the thyroid tissue by leukocytes, mainly T-lymphocytes
- A rare but serious complication is thyroid lymphoma, generally the B-cell type, non-Hodgkin lymphoma association with thyroid lymphoma
- associated with HLA B8 and DR3, and other autoimmune diseases (e.g. Sjögren's syndrome, SLE, RA, pernicious anemia, adrenal insufficiency)
- more common in females of middle age and is the most common cause of sporadic goiter in children

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2):Hashimoto's thyroiditis

Pathogenesis

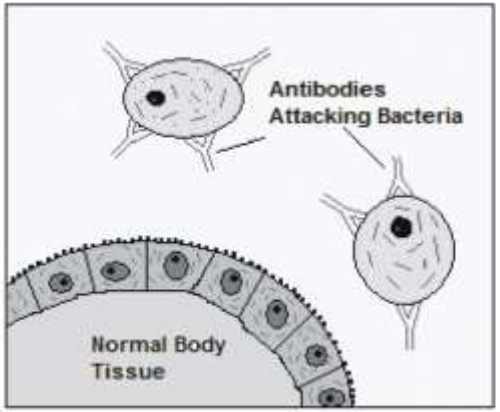
- There are multiple suggested mechanisms by which the pathology of Hashimoto's thyroiditis develops
- Various autoantibodies may be present against thyroid peroxidase, thyroglobulin and TSH receptors, although a small percentage of patients may have none of these antibodies present
- As indicated in various twin studies a percentage of the population may also have these antibodies without developing Hashimoto's thyroiditis. Nevertheless, antibody-dependent cell-mediated cytotoxicity is a substantial factor behind the apoptotic fall-out of Hashimoto's thyroiditis.

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

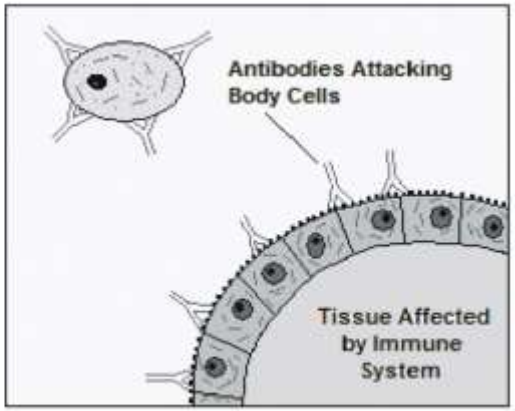
Thyroiditis (2):Hashimoto's thyroiditis

Pathogenesis

- Activation of cytotoxic T-lymphocytes (CD8+ T-cells) in response to cell-mediated immune response affected by helper T-lymphocytes (CD4+ T-cells) is central to thyrocyte destruction
- As is characteristic of type IV hypersensitivities, recruitment of macrophages is another effect of the helper T-lymphocyte activation, with Th1 axis lymphocytes producing inflammatory cytokines within thyroid tissue to further macrophage activation and migration into the thyroid gland for



Normal Tissue



Autoimmune Diseases like
Hashimoto's Thyroiditis

ttp://http://pcmj.abmj.com/content/62/729/661.full.pdf
ttp://www.balanceyourchemistry.com/picts/hasimotos_autoimmune.jp

Thyroiditis (2):Hashimoto's thyroiditis

Which symptoms of Hashimoto’s thyroiditis do you know?

Thyroiditis (2):Hashimoto's thyroiditis

Symptoms

Symptoms of Hashimoto's thyroiditis may include: symptoms/signs of hypothyroidism

- fatigue,depression,
- cold intolerance,
- weight gain,
- dry skin and hair,
- muscle cramps, constipation,
- decreased concentration and sleepiness,
- leg swelling, puffy eyes;
- severe symptoms include a slow heart rate,
- low body temperature, heart failure and coma – cause is suspected immune mediated reaction.

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2):Hashimoto's thyroiditis

What can you see in examination of the patient with Hashimoto’s thyroiditis?

Thyroiditis (2):Hashimoto's thyroiditis

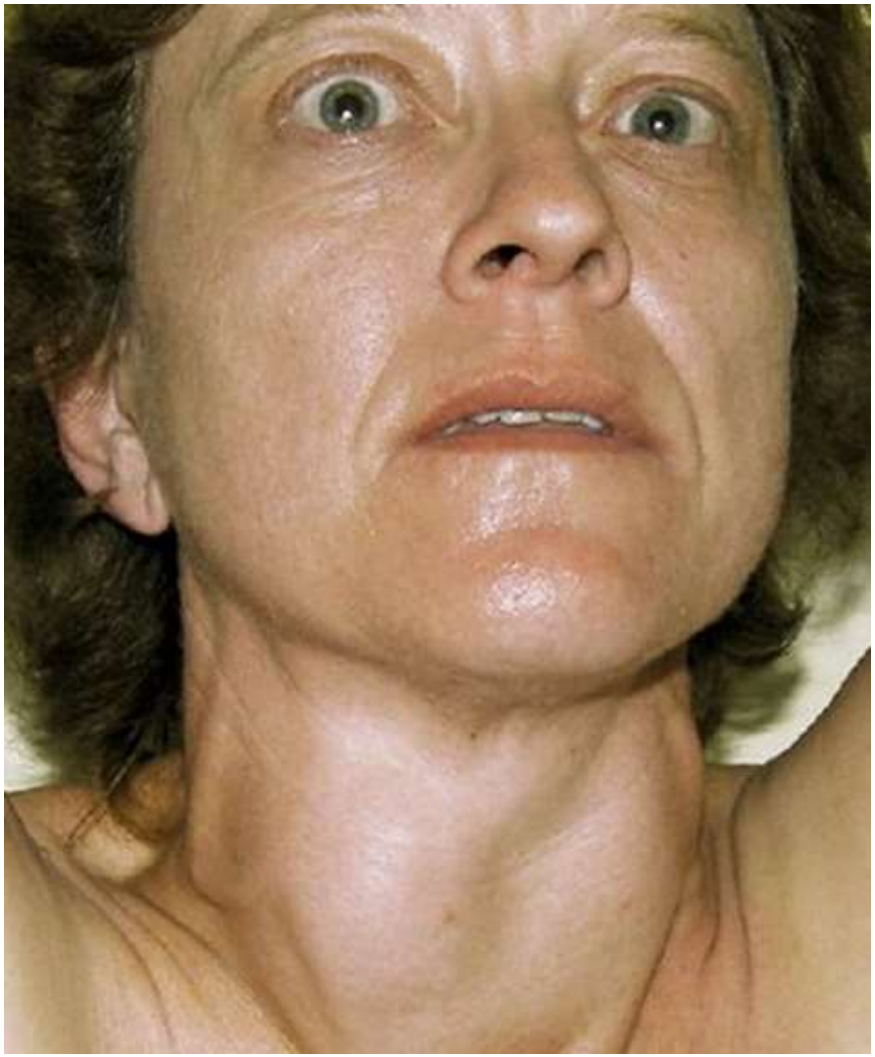
Examination

Physical findings are variable and depend on the extent of the hypothyroidism and other factors, such as age:

- Puffy face and periorbital edema typical of hypothyroid facies
- Cold, dry skin, which may be rough and scaly
- Peripheral edema of hands and feet, typically nonpitting
- Thickened and brittle nails (may appear ridged)
- Bradycardia
- Elevated blood pressure (typically diastolic hypertension)
- Diminished deep tendon reflexes and the classic prolonged relaxation phase
- Macroglossia
- Slow speech
- Ataxia

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2):Hashimoto's thyroiditis



A lady with Hashimoto's thyroiditis

http://en.academic.ru/pictures/enwiki/83/Struma_001.jpg

Thyroiditis (2):Hashimoto's thyroiditis

Diagnosis

Diagnosis of Hashimoto’s thyroiditis

Thyroiditis (2):Hashimoto's thyroiditis

Diagnosis

- Diagnosis is usually made by detecting elevated levels of anti-thyroid peroxidase antibodies (TPOAb) in the serum, but seronegative (without circulating autoantibodies) thyroiditis is also possible
- Earlier assessment of the patient may present with elevated levels of thyroglobulin owing to transient thyrotoxicosis, as inflammation within the thyroid causes damage to the integrity of thyroid follicle storage of thyroglobulin; TSH is increased as the pituitary tries to compensate for decreased T4
- Thyroid function test reveals hypothyroidism, or a euthyroid state with a compensatory increase in TSH; followed by decreased free T4 and eventually decreased free T3
- Antimicrosomal and anti-thyroglobulin antibodies

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2): Hashimoto's thyroiditis

How you will treat it?

Thyroiditis (2): Hashimoto's thyroiditis Treatment

- The treatment of choice for Hashimoto's thyroiditis is typically synthetic T4 or thyroxine (levothyroxine - brand names include Synthroid,Levothroid and Levoxyl)
- The medication must be taken indefinitely, and successful treatment alleviates the symptoms and signs of hypothyroidism. Without medication, there is very little chance the thyroid would be able to maintain hormone levels within the normal range, and symptoms and signs of hypothyroidism would occur or worsen
- The dosage of levothyroxine may need to be modified after checking TSH levels once yearly
- Adjustment of the dose may also be required in pregnant women
- if hypothyroid, replace with L-thyroxine
- if euthyroid, also treat with L-thyroxine if significant anti-thyroid antibody present

en.wikipedia.org/wiki/Hyperthyroidism

Thyroiditis (2): Hashimoto's thyroiditis

Clinical Case

Objective:

- A 39-year-old woman presented with a large, painless swelling in her neck. The enlargement had been a gradual process over 2 years.
- She had no other symptoms and felt generally well. On examination, her thyroid was diffusively enlarged and had a rubbery consistency. There were no signs of thyrotoxicosis or of thyroid failure.
- Thyroid function tests showed that she was euthyroid; T3 was 1.2nmol/l (NR 0.8-2.4), T4 was 12nmol/l (NR 9-23) and TSH was 6.3mU/l (NR 0.4-5mU/l). However, her serum contained high titre antibodies to thyroid peroxidase (1/64000; 4000iu/ml).

  Conclusions:

  • This patient had *Hashimoto's thyroiditis*.

  • The goitre was huge, and she was treated by partial thyroidectomy; the goitre did not recur, and the patient has remained euthyroid for 12 years.

http://www.immunologyclinic.com/case.asp?chap=15&case=6

Thyroiditis (2): de Quervain's or subacute thyroiditis

Definition and classification

Thyroiditis (2): de Quervain's or subacute thyroiditis

Definition and classification

- It is sometimes called subacute thyroiditis, but there are other forms of subacute thyroiditis, subacute lymphocytic thyroiditis, post partum thyroiditis, and autoimmune thyroiditis all of which, in contrast to DeQuervain's, are typically painless or "silent"
- It is also sometimes called "painful subacute thyroiditis“
- This is in contrast to subacute lymphocytic thyroiditis, which is also sometimes called "painless thyroiditis"

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2): de Quervain's or subacute thyroiditis

Which causes of de Quervain's or subacute thyroiditis you know?

Thyroiditis (2): de Quervain's or subacute thyroiditis

Causes

- Some cases may be viral in origin, perhaps preceded by an upper respiratory tract infection
- Viral causes include Coxsackie virus, mumps and adenoviruses
- Some cases develop postpartum

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2): de Quervain's or subacute thyroiditis

Pathogenesis of subacute thyroiditis

Thyroiditis (2): de Quervain's or subacute thyroiditis

Pathogenesis

- Destruction of follicular epithelium and loss of follicular integrity are the primary events in the pathophysiology of subacute granulomatous thyroiditis
- Thyroglobulin (TG), thyroid hormones, and other iodinated compounds are released into the blood, often in quantities sufficient to elevate the serum thyroxine (T4) and triiodothyronine (T3) concentrations and suppress thyroid-stimulating hormone (TSH) secretion
- Disruption of thyroid follicles by inflammatory process results in the release of stored hormone *(Thyrotoxic Phase)*
- This state lasts until the stores of TG are exhausted or until healing occurs
- Thyroidal iodine uptake and new hormone synthesis temporarily ceases because of the low level of TSH *(Hypothyroidism Phase)*

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2): de Quervain's or subacute thyroiditis

Which clinical features do you know?

Thyroiditis (2): de Quervain's or subacute thyroiditis
Clinical Features

- Usually transient thyrotoxicosis with a subsequent hypothyroidism phase due to depletion of stored hormone, finally resolving in a euthyroid state over a period of months

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2): de Quervain's or subacute thyroiditis

How diagnose de Quervain's or subacute thyroiditis? Which laboratory tests will you do?

Thyroiditis (2): de Quervain's or subacute thyroiditis: Laboratory Tests

- elevated T4, T3
- radioactive iodine uptake (RAIU) markedly reduced
- marked elevation of ESR in painful variety only
- as disease progresses, values consistent with hypothyroidism may appear;

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Thyroiditis (2): de Quervain's or subacute thyroiditis

How will you treat it?

Thyroiditis (2): de Quervain's or subacute thyroiditis

Treatment

- The palpitations and shakes associated with thyrotoxicosis can be treated with a beta-blocker
- The pain caused by de Quervain’s thyroiditis can often be relieved with painkillers such as aspirin, or non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen
- In the cases where these medications are ineffective, corticosteroid medication may be prescribed
- De Quervain’s thyroiditis settles down after a few days and is often followed by a spell of hypothyroidism lasting a few weeks or months, before the thyroid gland recovers completely. If symptomatically hypothyroid may treat short-term with thyroxine

http://http://pcmj.abmj.com/content/62/729/661.full.pdf

Clinical case

A Case of Painful Hashimoto's Thyroiditis that Mimicked Subacute Thyroiditis
http://synapse.koreamed.org/Synapse/Data/PDFData/1057CMJ/cmj-48-69.pdf

Clinical Endocrinology' Tests

http://http://pmj.bmj.com/content/62/729/661.full.pdf/

Test 1

A 35-year-old female patient has gained 20 kg weight within a year with the normal diet. She complains of chill, sleepiness, shortness of breath. The patient's mother and sister are corpulent. Objectively: height - 160 cm, weight - 92 kg, BMI - 35,9. Obesity is uniform, there are no striae. The face is amimic. The skin is dry. The tongue is thickened. Heart sounds are muffled. HR- 56/min, AP- 140/100 mm Hg. The patient has constipations, amenorrhea for 5 months. TSH-28 mkME/l (normal rate - 0,32-5). Craniogram shows no pathology. What is the etiology of obesity?

A. Hypo-ovarian

B. Hypothalamic-pituitary

C. Alimentary and constitutive

D. Hypothyroid

Test 2

A 19-year-old patient complains of fever up to 37,4oC during the last 2 months after recovering from ARVI. Objectively: malnutrition, diffuse gradeII enlargement of the thyroid gland feeling dense on palpation, exophthalmos, tachycardia. What kind of pathological syndrome is it?

A. Thyrotoxicosis

B. Hypothyroidism

C. Hypoparathyroidism

D. Hyperparathyroidism

Test 3

A 47-year-old woman underwent a thyroid gland resection on ccount of nodular euthyroid goiter. What preparations are most likely to prevent the disease recurrence?

A. Thyroid hormones

B. Mercazolil

C. Thyrotropin

D. Antistruminum (potassium iodide)

E. Radioactive iodine

Test 4

A 39-year-old patient complains of a tumour on the anterior surface of her neck. The tumour has been observed for 2 years. It is nonmobile and has enlarged recently. The patient has a changed tone of voice, a sense of pressure. Objectively: in the left lobe of the thyroid gland a 3 cm node is palpable; it is very dense, tuberous, painless. Cervical lymph nodes are enlarged. Functional status of the thyroid gland is unchanged. What is the most likely diagnosis?

A. Thyroid gland cancer

B. Nodular euthyroid goiter

C. Nodular hyperthyroid goiter

D. Chronic lymphomatous Hashimoto's thyroiditis

E. Chronic fibrous Riedel's thyroiditis

Test 5

A female patient consulted a doctor about gain in weight, chill, edemata, dry skin, sleepiness, problems with concentration. Objectively: the patient's height is 165 cm, weight is 90 kg, gynoid body proportions, to- 35,8oC, ESR- 58/min, AP- 105/60mm Hg. Heart sounds are weakened, bradycardia is present. Other internal organs have no changes. Thyroid gland is not palpable. Mammary glands ooze milk droplets. Hormonal study revealed rise of TSH and prolactin concentration, reduction of T4. What factor caused obesity?

A. Primary hypothyroidism

B. Secondary hypothyroidism

C. Prolactinoma

D. Hypopituitarism

E. Adiposogenital dystrophy

Test 6

A 26 y.o. Male patient with postoperative hypothyroidism take thyroxine 100 mg 2 times a day. He has developed tachycardia, sweating, irritability, sleep disorder. Determine further treatment tactics.

A. To decrease thyroxine dosage

B. To increase thyroxine dosage

C. To administer betablockers

D. To add mercasolil to the treatment

E. To administer sedatives

Test 6

A 26 y.o. Male patient with postoperative hypothyroidism take thyroxine 100 mg 2 times a day. He has developed tachycardia, sweating, irritability, sleep disorder. Determine further treatment tactics.

A. To increase thyroxine dosage

B. To decrease thyroxine dosage

C. To add mercasolil to the treatment

D. To administer sedatives

Test 8

A 39-year-old patient complains of a tumour on the anterior surface of her neck. The tumour has been observed for 2 years. It is nonmobile and has enlarged recently. The patient has a changed tone of voice, a sense of pressure. Objectively: in the left lobe of the thyroid gland a 3 cm node is palpable; it is very dense, tuberous, painless. Cervical lymph nodes are enlarged. Functional status of the thyroid gland is unchanged. What is the most likely diagnosis?

A. Thyroid gland cancer

B. Nodular euthyroid goiter

C. Nodular hyperthyroid goiter

D. Chronic lymphomatous Hashimoto's thyroiditis

E. Chronic fibrous Riedel's thyroiditis

Test 9

A 40-year-old female patient complains of having a bulge on the anterior surface of neck for 5 years. Objectively: Ps- 72 bpm, arterial pressure - 110/70 mm Hg, in the right lobe of thyroid gland palpation reveals a mobile 4x2 cm node, the left lobe is not palpable, the basal metabolic rate is 6%. What is the most likely diagnosis?

A. Nodular euthyroid goiter

B. Nodular hyperthyroid goiter

C. Riedel's thyroiditis

D. Mixed euthyroid goiter

E. The median cervical cyst

Test 10

On the first day after a surgery for diffuse toxic goiter a patient developed difficulty breathing, cold sweats, weakness. Objectively: pale skin, body temperature - 38,5oC, RR - 25/min, Ps- 110/min, AP-90/60 mm Hg. What early postoperative complication occurred in the patient?

A. Hypothyroid crisis

B. Thyrotoxic crisis

C. Postoperative tetany

D. Acute thyroiditis

E. Compression of the trachea by the hematoma

Test 11

A 39-year-old female patient complains of rapid fatigability, drowsiness, dry skin, hair loss, swelling of the face. A month ago, she underwent a surgery for thyrotoxicosis. The patient has the following gland dysfunction:

A. Pituitary, due to a tumor

B. Adrenal

C. Thyroid (hypothyroidism), due to inadequate operative technique

D. Parathyroid, due to the gland removal during surgery

E. Ovarian, due to a tumor

Recommended literature

- Brent GA, Davies TF. Hypothyroidism and thyroiditis. In: Melmed S, Polonsky KS, Larsen PR, Kronenberg HM, et al.Williams Textbook of Endocrinology
- Longo, DL; Fauci, AS; Kasper, DL; Hauser, SL; Jameson, JL; Loscalzo, J (2011). "341: disorders of the thyroid gland". Harrison's principles of internal medicine. (18th ed.). New York: McGraw-HillDayan CM, Daniels GH (1996).
- "Chronic autoimmune thyroiditis“ .N Engl J Med. pp. 335:99–107. Retrieved 11 April 2014.