HEADACHE

Definition: headache represents pain located at the level of brain and its coverings.

The brain does not present pain receptors, and, as such, it is not a pain sensitive organ. The pathological mechanisms that motivate the appearance of headache start from the pain sensitive intracranial and extra cranial structures.

The most well known mechanisms involved in the production of headache are:
- Traction on the cranial vascular structures
- Inflammation of the cranial vascular structures
- Increase in the intra-cranial pressure
- Direct pressure on the cranial nerves
- Movement of the cephalic content through tumors, abscesses, etc
- Sustained contraction of the cephalic muscles and of the cervical region
- Diseases of the sinuses
- Diseases of the eyes
- Diseases of the teeth
- Diseases of the face and of the cephalic bones

From a physiopathological perspective, headache can be:

a. primary headache (determined by certain neurochemical mechanisms): migraine, tension headache, vasomotor headache, rebound headache.

b. secondary headache of various diseases.

Headache can also be classified in:
- a) acute headache, recently installed
- b) chronic headache, which lasts for weeks, months, or years

a) Acute headache: the brutality of the appearance and the clinical context orient the diagnosis:
- acute headache associated with meningeal syndrome suggests meningitis or meningeal hemorrhage
- headache associated with motor deficits (hemiplegia - suggests a recent vascular accident: thrombosis or hemorrhagic accidents)
- headache associated with **paroxystic tension values** suggests pheochromocytoma or an eminence of hypertensive encephalitis
- headache associated with recently installed **ocular phenomena** suggests acute glaucoma
- headache associated with **signs of infection** will determine the suspicion of a frontal maxillary sinusitis.

**b) Chronic headache**

The etiological diagnosis is much more difficult: anamnesis, the clinical and paraclinical examinations must differentiate an “accompanying” symptom headache from a “prevailing” symptom headache.

The age when headache appears varies: some types of headache may appear at infant age, but are clinically discovered at adult age.

The etiological diagnosis will be made by performing:

1. **Anamnesis**
   a) **The location of pain:**
      - location can be inexact, diffuse
      - misleading location (there are tumors of the posterior matrix, manifested with frontal headache)
      - exact location corresponding to organic lesion (in tumors located, unilateral pain orients the diagnosis on the localization of tumor)
      - one-sided headache (evokes migraine)
   b) **Intensity**
      The appreciation of intensity is subject to a high degree of subjectivity, the perception of pain varying function of the personality of each individual. It is considered intense if it prevents sleep or daily activities.
   c) **Nature of headache:**
      - pulsatile
      - “in vice” – like a feeling of pressure on the head
      - superficial burn
   d) **Schedule of the headache**
      - It can present a certain punctuality
      - Morning headache, wakes up the patient “at dawn”, is indicative of arterial hypertension or intracranial hypertension syndrome
      - Headache that appears in the morning, after waking up, is indicative of migraine
- Daily crises (1-2 crises/day) at the same hours, usually in the evening, is indicative of vascular facial pain
- Headache that wakes the patient from his sleep is indicative of histaminic headache

e) **Headache duration and time evolution**
- Migraine evolves with short crises which occur at almost regular intervals for the same patient
- Vascular facial pain causes daily crises for a period of a couple of weeks, separated from total, lasting remissions
- Tumor headache is intermittent in the first period, and then becomes permanent and progressive in intensity and fixity of the location
- Psychogenic headache is continuous, its intensity varying function of environment factors

f) **Signs and symptoms associated with headache:**
- Digestive manifestations (nausea, vomiting) accompany headache from intracranial hypertension or vasomotor headache
- Ocular manifestations
- Neurological manifestations

g) **Conditions:**
- Ocular suffering may cause headache, if it appears in the evening, after a period of intense solicitation of the eye
- Premenstrual headache
- Influence of various factors: food related, digestive, climatic, conflictual states, overworking
- What are the conditions that soothe headache: darkness, silence, rest?

**Personal antecedents:**
- Recent cranial traumatisms
- Recent diseases of the cephalic segment (sinusitis, rhinopharyngitis, dento-maxillary, ocular, facial diseases)
- Surgical intervention for cancer (can lead to cerebral metastases)
- Hepato-biliary diseases
Family history:
- Other family members suffering from migraine
- Hypertensive familial antecedents

Physical examination:
- The physical examination of the cephalic extremity will comprise: inspection, palpation of the epicranium, examination of the sinuses, of the emergence points of the cranial nerves, maxillary examination, examination of muscular masses and of the temporal artery
- One will insist on the subjective and objective gastrointestinal and hepatobiliary manifestations
- One will recommend
  - Neurologic exam
  - Ophthalmologic exam (fundus of the eye, intraocular pressure, visual acuity)
  - ENT exam
  - Endocrinologic exam
  - Gynecologic exams exam for adolescents girls

Paraclinical exams:
- blood cell counting
- erythrocyte sedimentation rate
- urea, urinary acid, creatinine
- hepatic sample
- phosphocalcic balance
- radiological exams:
  - skull X-radiography
  - X-radiography of the sinuses
  - Pulmonary X-radiography
  - Cholecystography
- ENT exam
- Ophthalmological exam (visual acuity, exam of the fundus of the eye, refraction disorders, oculomotor paralyses, paresis of accommodation)
- CFS exam
- Electroencephalography (EEG)
- Cerebral arteriography, useful in cerebral tumors, will be performed when there exists the clinical suspicion of an angioma or aneurism of cerebral blood vessels (especially in the case of rebellious headache at young people)
- CT
- MRI

**Etiological classification of headache**

There are several etiological classifications of headache.

The Hegglin classification:

**I. Headache via intracranial processes:**

**A. Expansive intracranial processes:**
- tumors
- abscesses
- meningitis
- hemorrhages, vascular modifications

**B. Non-expansive intracranial processes:**
- migraine
- histaminic headache
- pressure modifications of the cerebro-spinal fluid

**II. Headache via extracranial processes:**
- with origins at the level of the braincase:
  - Paget’s disease
  - Internal frontal hyperostosis
- with vascular origins

**III. Headache in general diseases:**
- Cardiovascular diseases:
  - Arterial hypertension
  - Cardiac insufficiency
- Kidney diseases:
- acute diffuse glomerulonephritis
- acute and chronic renal failure
- blood diseases
  - polycythemia
- some metabolic disturbances:
  - hypoglycemia
- some intoxications
- fever
- some gastrointestinal and hepatobiliary diseases:
  - chronic constipation
  - biliary dyskinesia

IV. Post traumatic headache:
- Subdural and extradural hematoma
- Post concussion headache

V. Psychogenic headache

The most frequent forms of headache are:

A) Migraine

This is the main nosologic entity in the group of vascular headache. 50% of the migraines of adults start during their childhood, not before the age of 5; 4-7% of the children with ages between 7-15 suffer from migraine.

During childhood, boys usually have a predisposition for this disease (60%).

Another feature is the so-called “growing old” of the migraine, that is the crises become rarer and less severe with the passing of years.

The familial character of the disease is obvious in over 65% of the cases.

The patients suffering from migraine have a particular reactivity and instability of the nervous centers, are hyperemotional, anxious, stand-offish, scrupulous, thorough, ambitious, perseverant subjects.

Migraine is precipitated by stress, intense intellectual effort, emotions, fatigue, exaggerated attention.

From a pathogenic perspective, migraine is a phenomenon of vasomotor origin, a purely vascular pain.

During the initial or prodrome stage, there occurs an arterial or arteriolar spasm which
determines cerebral anoxia.

In the second, headache state, there occurs vasodilatation, hyper-pulsatility of dural arteries, especially of the branches of the external carotid.

Then there occurs a forced vasodilatation with an arterial wall edema and disturbances of capillary permeability (determined by the increase in the quantity of histamine, serotonin, etc.), which might explain some associated disturbances.

From a clinical perspective migraine evolves in crises whose frequency varies from one patient to another. Crises prevail especially in the case of young female patients.

The evolution of a migraine crisis has the following stages:
- the prodrome stage
- the condition stage (headache)

**The prodrome stage** or aura is comprised of:

a) – remote aura
b) – immediate aura

a) Remote aura precede the migraine crisis by 24-48 hours. They consist in: minor psychic disturbances (irritability, insomnia or drowsiness), appetite changes, modifications of the urinary debit (oliguria)

b) immediate aura consist in:

- visual disturbances, scintillating scotoma (a stain in the visual field, surrounded by a luminous area, which may be due to the ischemia in the occipital area), amputations of the visual field, transitory amourosis
- sensitive disturbances (parestesia, itching)
- speaking disturbances (sometimes even of aphasic nature)
- sensorial disturbances (auditory, olfactory, labyrinthic)
- psychic disturbances (depressions, anxiety)

**The condition stage** (headache)
- pain limited to half a head = hemicrania, most of the times on the same side at each crisis, one-sided headache

Hemicrania is suggestive for the diagnosis.

- According to its location, headache can be:
  - Frontal
  - Supra-orbital (with the feeling that there is something pressing on the eye)
- Temporal
- At the level of the vertex
  - *The intensity* of headache is very high, almost unbearable, alternating with periods of pain diminution
  - *Pain has a pulsatile character:* it presents intensifications parallel with the pulse frequency (each beating intensifies pain)
  - *Pain exacerbation* is determined by: noise, light, the compression of the jugular arteries
  - *Pain diminution* occurs via carotid compression of the superficial temporal arteries, quiet, dark

The duration and evolution of a migraine crisis are characteristic: the crisis starts in the morning, a little while after waking up, intensifies during the day, diminishes at night, and can disappear during the night.

The duration of the crisis varies from patient to patient: from a couple of hours to 48 h.

The accompanying phenomena are: altered general health state, paleness, congested conjunctivitis, anorexia, nausea, vomiting, and balance disturbances.

Some children also have convulsions. Some authors consider that migraine is an equivalent of epilepsy (20% of the children with migraines have a paroxystic aspect on the electroencephalography).

Particular forms of migraine:
- Abdominal migraine (paleness, vomiting, abdominal pain)
- Migraine with transitory hemiplegia or ophtalmoplegic migraine.

**Treatment of migraine for children and teenagers**

1. **Hygiene-dietetic treatment**
- Respecting the sleep periods
- Correct nourishment
- Elimination of the precipitant factors
- Psychotherapy

2. **Treatment of the crisis**
- Analgesics: acetaminophen, non steroidal anti-inflammatories (ibuprofen, naproxen)
- Antagonists of 5-hydroxitiptamine (Sumatriptan, Almotriptan, Zolmitriptan, etc.)
- Antiemetics (metoclopramine, promethazine)
3. **Prophylactic treatment**
- tricyclic antidepressants (amitriptyline)
- cyproheptadine
- anticonvulsives (valproic acid, gabapentin)
- β-blockers (propranolol)
- serotonin inhibitors
- calcium channel blockers (verapamil)

B) **Post traumatic headache**

Headache is due to a general or focal cerebral *edema* or to a *bleeding*: the extradural hematoma and the subdural hematoma. Anamnesis is very important for being able to mention a traumatism in recent antecedents.

*Extradural hematoma*: it is precocious; it is determined by a rupture of the middle meningeal artery.

It is manifested by:
- acute syndrome of intracranial hypertension (headache, vomiting, bradycardia, neuropsychic disturbances)
- signs of contralateral location (hemiplegia) with evolution towards sleepiness, coma

Clinical signs may appear some time after the traumatism occurs.

*Chronic subdural hematoma*

It manifests late, 1-2 months after the traumatism, which can sometimes be minimal, via:
- profound, persistent, unilateral or general headache which can evolve slowly and progressively, sometimes realizing the intracranial hypertension syndrome

For the diagnosis we resort to: skull X-radiography, arteriography, CT.

C) **Post concussion headache**

This is a vascular disturbance.

It manifests with:
- headache in the cervico-occipital area or at the level of the vertex
- asthenia
- irritability
- lack of power to focus
- noise and whistling in the ears
visual disturbance (fast fatigue when reading)
These disturbances are amplified by emotions, physical or intellectual fatigue, and can be soothed by getting rest.
Electroencephalography: presents minor modifications.

T**reatment:**
- psychotherapy (this explains the benign character of the pain)
- anxiolytics
- analgesics

**D) Headache in cerebral tumors**
Clinical diagnosis is based on the association of: a) *an intracranial hypertension syndrome* (ICH) with a b) *focal neurological syndrome*.

a) The intracranial hypertension syndrome is characterized by the tetrad: *headache, vegetative disturbances, neuropsychic disturbances, ocular disturbances.*

- **Headache**

At the beginning headache can be discrete and transitory, becoming more intense and more frequent with the evolution of the disease. Violent headache makes the patient scream, prevents him from sleeping, wakes him from his sleep and does not surrender when taking the usual analgesics. It is more severe in the morning, when the venous congestion is higher. It becomes even more intense after physical efforts or movements of the head, coughing, sneezing, motion, noise, light. At first the pain is located unilaterally, on the side of the tumor. Although there is no perfect concordance between the main area of the headache and the location of the tumor, we can nevertheless state that *occipital headache* is met more frequently in the *tumors of the posterior fossa* for example.

- **Vegetative disturbances :**

  a) *Vomiting* is easy, without effort, it appears when the disease is evolved, in the case of intracranial hypertension

  b) *Bradycardia*: it represents a classical but inconstant sign of intracranial hypertension; it is maximum during painful crises or vomiting

  c) *Other vegetative disturbances:*

- Facial vasodilatation
- Abundant sweat
- Temperature disorder
- Digestive disturbances (hiccup, regurgitation)
• Neuropsychic disturbances:
  - psychic retardation
  - slowness of intellectual activity and ideas
  - fatigue at the work place
  - memory diminution
  - apathy
  - clouding of consciousness
  - drowsiness

• Ocular disturbances:
  - diplopia (via the paresis of the 6th pair of cranial nerves)
  - sight clouding, with vision becoming foggy during paroxystic crises
  - permanent decrease in visual acuity
    Ophthalmological exam:
    - modifications of the visual field
    - ocular paresis
    - modifications of the fundus of the eye (edema and papillary stasis)

Paraclinical exams:
  - Exam of the fundus of the eye:
    - Papillary stasis (counter indicates lumbar puncture)
    - Papillary edema

  The lack of modifications of the fundus of the eye does not allow the elimination of the cerebral tumor diagnosis.
  - The skull X-radiography outlines:
    - Consequences of intracranial hypertension: disjunction of sutures, digital prints, thinning of the bones of the skull, leveling of the base
    - Deformation of the Turkish saddle
    - Calcifications
    - Localized bone modifications (erasure, bone crypts)
  - Electroencephalogram:
    - It can outline a localized area of cerebral suffering
• In evolved tumors, the electroencephalogram can indicate signs of diffuse suffering, determined by intracranial hypertension
  - Cerebral arteriography shows: vascular voids, movements, abnormal basal vascularization
  - Computerized tomography
  - Nuclear magnetic resonance

E) Headache in meningitis and encephalitis
It is caused by the inflammatory processes of the intracranial structures and by the contraction of the muscles of the back-head via the irritation of the motor fibers in their subarachnoid trajectory.
  Clinical:
  - Fever
  - Vomiting
  - Altered health conditions
  - Meningeal symptoms

F) Post-puncture headache
It appears in 20-30% of the cases after back puncture. It occurs due to CSF hypotension and traction that is exercised on the cerebral formation via the decrease in the CSF volume.

G) Headache in vascular cerebral malformations (angioma, aneurism)
Headache in cerebral ruptures is the most intense known headache. It is associated with loss of consciousness, convulsions.

H) Non-migraine headache associated with convulsive states
It appears:
  - as an aura in epileptic crises
  - post-convulsive
Sometimes headache is the unique manifestation of convulsive disturbances.
I) **Headache in psychic disturbances**
- it is moderate, prolonged, more frequent in the morning
- occurs via the contraction of the facial muscles and the constriction of the vessels that irrigate it
- in case of depression, headache is associated with the loss of appetite, sleep disorders, decrease in the focus power, lack of involvement in current activities
- headache can be the common expression of stress and family frustration

J) **Headache in general diseases**
- fever = the most frequent cause of headache (vasodilatation occurs)
- intoxication with substances that produce cerebral vasodilatations that accompany headache (nitrites, CO, reserpine)
- intoxications with vitamin A, Negram, Tetracycline

K) **Headache in ENT diseases**
The mucous membrane of the para-nasal sinuses is the most sensitive structure in this zone.

**Causes:**
- sinusitis
- otitis
- traumatisms
- tumors
- allergies

L) **Headache with ophthalmologic causes**
It is caused by the contraction of the intraocular muscles, associated with a sustained effort of accommodation and by the contraction of the extraocular muscles.

The most frequent ocular causes are: refraction disturbances and it appears more frequently in the evening.

The appearance circumstances most frequently incriminated are: • prolonged period of watching TV; • prolonged lecture; • inappropriate light; • too much computer use, etc.
M) Pressure type headache

The characteristics of this type of headache are essential for the diagnosis: • it is not associated with nausea, vomiting, photophobia; headache duration: 30 min – 7 days; • bilateral localization, tension of the back neck muscles and of the scalp muscles; • physical activity does not make headache worse; • frequency and intensity are connected to psychological factors; • headache appears at the end of the day; • it can be associated with: ocular effort, stress, daily discontent.

N) Headache caused by neuralgia

It is caused by inflammation, traumas, tumors. Sometimes in pediatrics there also appears primitive neuralgia, which interests some sensitive cranial nerves (trigemen, glossopharyngeal and the Arnold occipital nerve).