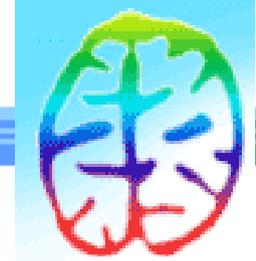


Consciousness disorders, convulsive states





Consciousness



- ▶ Active state of human psyche, expresses relationship between one's own personality and surrounding world.
- ▶ Alertness (vigilance), abstraction, verbalization, evaluation, self-consciousness (orientation in time, space, one's own personality).
- ▶ Most sensitive indicator of state of human brain (and its blood circulation).



Orientation examination of consciousness

- ▶ spontaneously conscious
- ▶ reaction to being addressed
- ▶ reaction to touch
- ▶ reaction to painful stimulus
- ▶ no reaction
- ▶ reaction = opening of eyes; speaking; movement - flexion, extension, shivering
- ▶ (reaction of pupils to light, position + movement of eyeballs)



Changes in **quality** of consciousness

- ▶ Changed conscious content
(confusedness, stupefied consciousness)
- ▶ **The affected is disoriented;**
restless | anxious | puzzled.
Speaks discontinuously, without succession
and meaning, asks repeatedly the same.

FA:

- ▶ **!! be calm, do not let the affected get hurt or
endanger the surroundings!!**



Changes in quantity of consciousness

- ▶ somnolence = as if sleeping, does not speak spontaneously, but is **able to wake up** by being addressed or touched, **fully oriented**, but without external stimuli falls asleep again
- ▶ sopor = does not react to common stimuli, able to be brought to partial consciousness by a short-term strong = painful stimulus (without verbal reaction, only hand movement or blinking)
- ▶ coma = deep unconsciousness = the affected cannot be woken up by either sound or a painful stimulus, passive position, slowed breathing, sunken tongue, body is lifeless, threat of inhaling content of stomach ... 0 reaction of pupils to light
- ▶ speed of change in consciousness – the faster the more serious



Glasgow coma scale

▶ 3

15 points

coma sopor somnolence consciousness

		Reaction	
		verbal:	motoric:
eyes opening:			

6			complies with an appeal
5		oriented	targeted reaction to pain
4	spontaneous	confused	non-targeted reaction to pain
3	to being addressed	inadequate	flexion
2	to pain	intelligible	extension
1	does not open eyes	no	no reaction



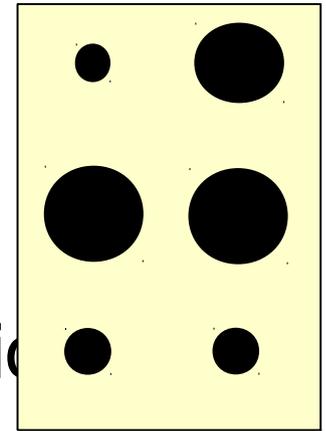
Focal neurological symptoms:

- ▶ locomotion disorder
- ▶ perception disorder
- ▶ eye symptoms

Focal neurological symptoms:

▶ eye symptoms

- anisocoria (different width of pupils)
- maximum widening = mydriasis = insufficient blood circulation in brain
- maximum narrowing of pupils = miosis = intoxication with opiates
- **Photoreaction**
= reaction of pupils to light
- **crossing of eyeballs**
(*squinting*),
spont. movements



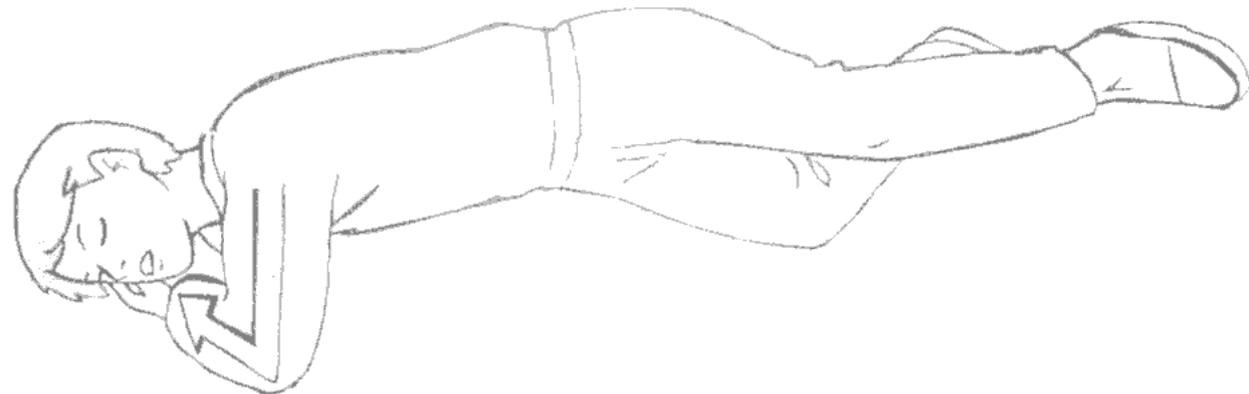


Causes of consciousness disorders:

- ▶ blood circulation disorder (shock)
- ▶ worsening of brain oxygenation (suffocation, CO intoxication)
- ▶ brain injury (head injury, cranial fractures)
- ▶ increase in intracranial pressure (tumour, cerebrovascular accident)
- ▶ intoxication
- ▶ disorder of internal environment (hypo-/hyperglycaemia)
- ▶ infection
- ▶ epilepsy
- ▶ injury by electricity

FA:

1. basic life functions (ABC = foreign bodies, tongue, ...)
2. if resuscitation is not needed – further examination – look for signs of head, neck, chest, abdomen or limb injuries
3. if spine is not injured – stabilised position and **breath and pulse monitoring.**
4. nothing per os, look for medicaments, ID for the diabetic, medical report, doctor's certificate
5. transport by EMS





Non-traumatic causes of unconsciousness:

- ▶ Cerebrovascular accidents (CVA)
- ▶ Brain inflammation = infection
- ▶ Diabetic coma
- ...
- ▶ Collapse, faintness





CVA

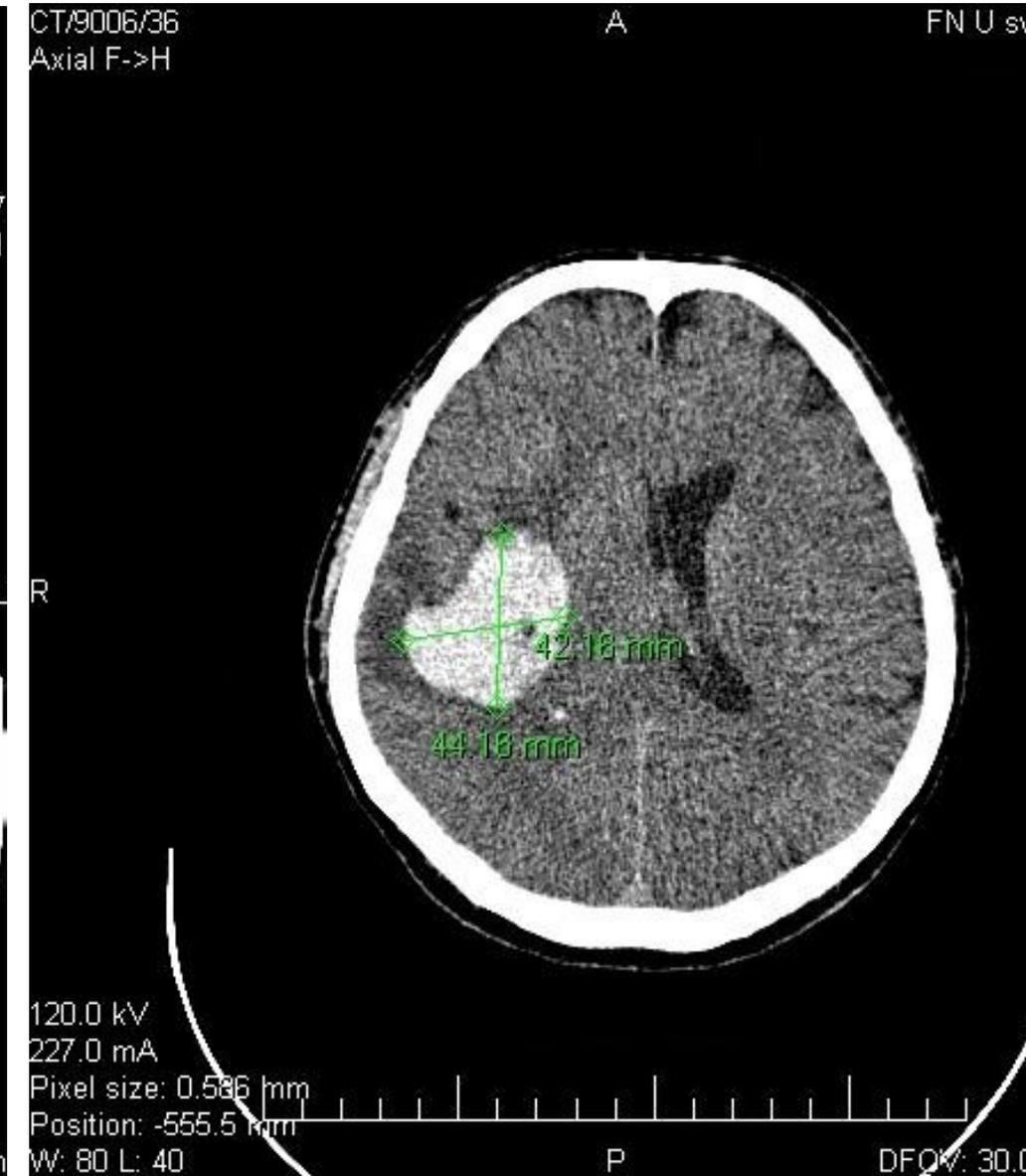
- ▶ **Bleeding** – from split blood vessel to cerebral tissue – in place of haematoma loss of function
sudden loss of function (from 50 years),
meningeal symptoms, often high blood pressure
- ▶ **Ischemic** – resulting from insufficient blood circulation (blood clots, decrease of blood pressure)
typical mild consciousness disorder – only dizziness, nausea
function: focal neurological symptoms
meningeal stimulation does not occur
- ▶ **Embolism** accidents
embolus to great blood circulation – head – partial obstruction of arteries
* for cardiac rhythm disorders



ischemia

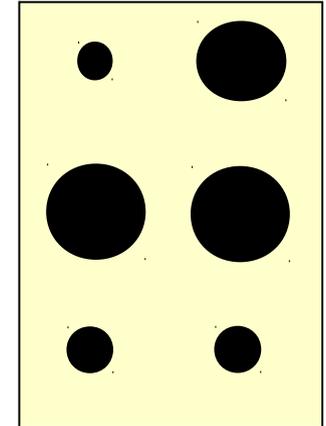


bleeding



CVA symptoms:

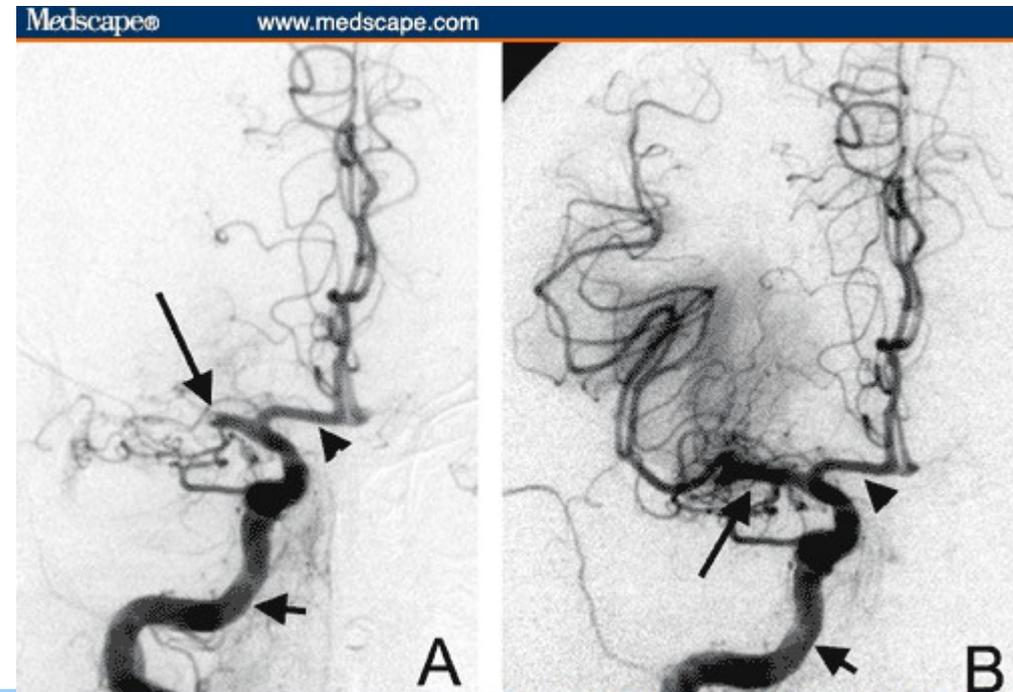
- ▶ Locomotion and perception disorder (*face asymmetry, droopy corner*)
- ▶ Eye symptoms
- ▶ Anisocoria (pupils differently wide) mydriasis, miosis
- ▶ Photoreaction disorder
- ▶ Eyeballs shift
- ▶ Loss of vision
- ▶ Nausea, vomiting, loss of balance
- ▶ Increase in blood pressure, slowed pulse



FA for CVA:

- ▶ vital functions
- ▶ transport – EMS – treating hospital
 - ▶ ABC
 - ▶ CT
 - ▶ thrombolytics up to 4,5 h from the beginning of symptoms

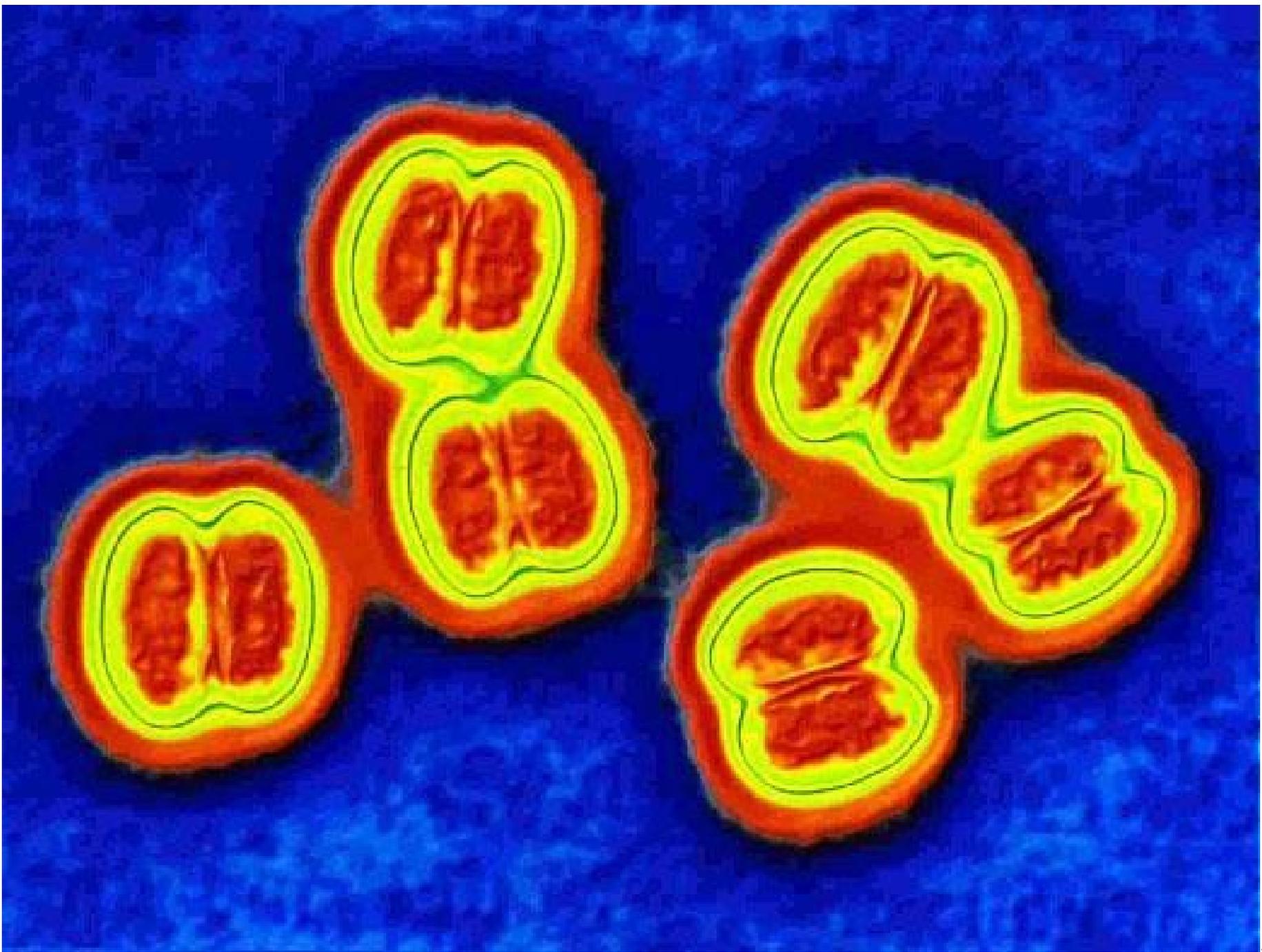
Face
Arms
Speech
Time







Meningococcus

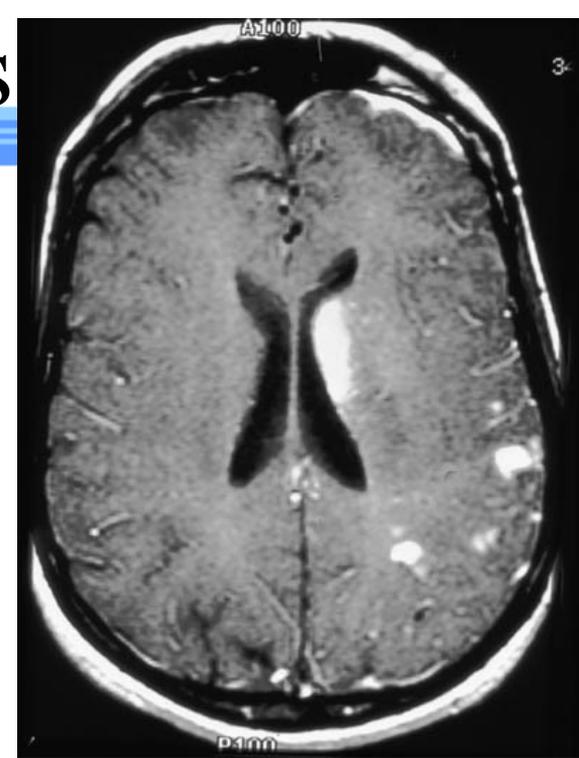


⚡ Inflammation of brain, meninges

Encephalitis, meningitis

▶ Causes:

- bacteria (*Neisseria meningitidis* = meningococcus)
- viruses (herpetic virus = herpes)
- parasites



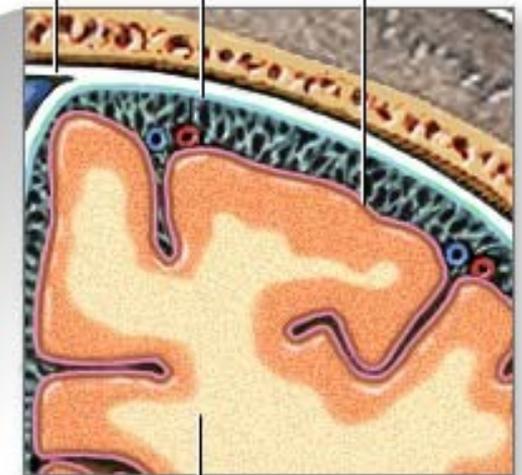
The meninges are the membranes covering the brain and spinal cord



Dura mater (2 layers)

Arachnoid

Pia mater

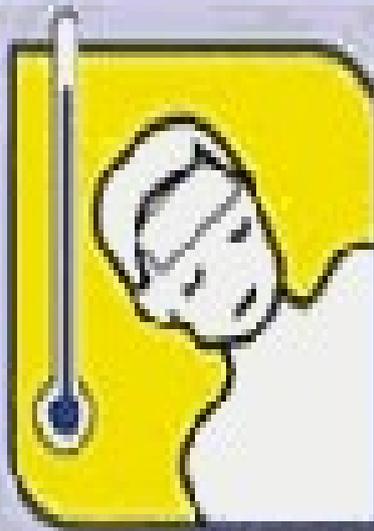


Brain

Symptoms of meningitis:



Vomiting



Fever



Headache



Stiff neck



Light aversion



Drowsiness



Joint pain



Fitting

Encephalitis, meningitis – symptoms:

- ▶ fever,
- ▶ breathlessness,
- ▶ meningeal symptoms
 - headache,
 - sickness, vomiting, dizziness
 - head bent backward, stiff neck muscles, flexion of limbs,
 - photophobia, hyperhearing



ADAM.



FA:

- ▶ ABC
- ▶ temperature regulation, liquids (+paracetamol)– if conscious
- ▶ quiet
- ▶ medical examination (emergency)
- ▶ hospitalisation (blood, CerebralSpinalFluid)

Mening. irritation present = high probability of meningitis

Meningococcal sepsis:

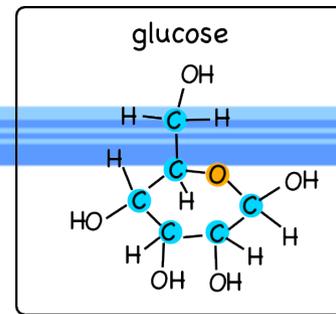
Petechia:



Do not waste time = call ambulance
(high mortality within 24 h in spite of treatment)

Penicillin administered in time can save the life.

Diabetic coma



Hypoglycemia

Excessive amount of insulin (drugs)

Low intake of glucose (vomiting)

Alcohol

Excessive physical activity

LO glucose

Diabetic hyperosmolar syndrome

(Relative) low dose of insulin

HI glucose

Diabetic ketoacidosis

No insulin = no medication

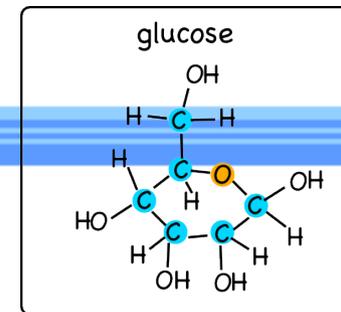
Without insulin: Glc can not enter cell

Glucose → urine - dehydration

cells break down fat – forms toxic acids (ketones).



Sings before onset



Hypoglycemia

Hunger

Shakiness
or nervousness

Anxiety

Fatigue

Weakness

Sweating

Nausea

Dizziness or light-
headedness

Difficulty speaking

Confusion, seizures, coma

Diabetic hyperosmolar syndrome

Diabetic ketoacidosis

Increased thirst

Frequent urination

Fatigue

Nausea and vomiting

Shortness of breath

Stomach pain

Fruity breath odor (aceton)

A very dry mouth

A rapid heartbeat



Diabetes Mellitus

DM type 1:

Hypoglycemia

Diabetic ketoacidosis

DM type 2:

Diabetic hyperosmolar syndrome (middle-aged or older)

If you have either type 1 or type 2 diabetes, the following factors can increase the risk of a diabetic coma:

Insulin delivery problems. If you're on an insulin pump, you have to check your blood sugar frequently. One of the reasons for this is that a **kink** in the insulin pump tubing may stop all insulin delivery without you being aware of it. Even tubeless pumps can sometimes have problems that cause insulin delivery to stop. A lack of insulin can quickly lead to diabetic ketoacidosis if you have type 1 diabetes.

An illness, trauma or surgery. When you're sick or injured, blood sugar levels tend to rise, sometimes dramatically. This may cause diabetic ketoacidosis if you have type 1 diabetes and don't increase your insulin dosage to compensate. Other medical conditions, such as congestive heart failure or kidney disease, may increase your risk of diabetic hyperosmolar syndrome.

Poorly managed diabetes. If you don't monitor your blood sugar properly or take your medications as directed, you'll have a higher risk of developing long-term complications and a diabetic coma.

Skipping insulin. Sometimes, people with diabetes who also have an eating disorder choose not to use their insulin as directed with the hope of losing weight. This is a dangerous, life-threatening practice that increases the risk of a diabetic coma.

Drinking alcohol. Alcohol can have unpredictable effects on your blood sugar, sometimes dropping blood sugar levels as late as a day or two after the alcohol was consumed. This can increase your risk of a diabetic coma caused by hypoglycemia.

Illegal drug use. Illegal drugs, such as cocaine and Ecstasy, can increase your risk of severe high blood sugar levels, as well as your risk of a diabetic coma.

Diabetic coma

First Aid Diabetic COMA:

If you have no training in diabetes care, care for comatous (= nothink to eat, nothink to drink, DRSABC) and wait for the emergency care team to arrive.

If you are familiar with diabetes care, follow these steps:

- Test the unconscious person's blood sugar.
 - If the blood sugar level is lower than 70 mg/dL (4 mmol/L), administer an injection of glucagon.
If glucagon isn't available, rub glucose gel, honey or non-sugar-free syrup on the inside of the unconscious person's cheek.
Do not try to give fluids to drink and do not give insulin to someone with low blood sugar.
 - If the blood sugar level is above 4 mmol/l, wait for medical help to arrive.
Don't give sugar to someone whose blood sugar isn't low.

Let the emergency care team know about the diabetes and what steps you've taken, if any.



<https://youtu.be/ybEZmHu7Gds>





Alert victim:

- Help to sit or lie down
- Give sugar drink (or glucose gel, help to use it)
- If victim responds quickly
= give more food or sugar drink.
Advice to see the doctor even if victim feels fully recovered.
- If condition does not improve
= monitor response and activate EMS.



line up



WWW.FTIPKY.CZ



Faintness, collapse

- ▶ Short-term unconsciousness caused by short-term insufficient blood circulation in brain.
- ▶ Caused by (failure of circulation regulation = hypo-tension) :
 - exhaustion, heat, long standing, hot space
 - pain, psyche
 - sudden change of position – quick standing up

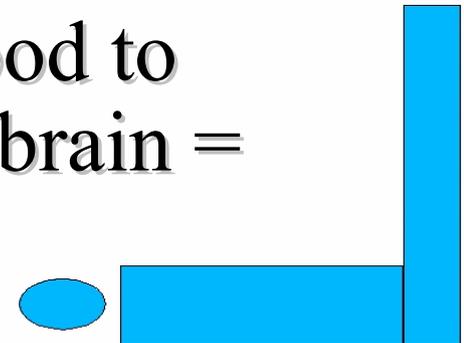


Symptoms of faintness:

- ▶ being pale, sickness, sweating, low blood pressure
- ▶ loss of hearing, vision, loss of consciousness, fall
- ▶ **Short-term unconsciousness**
- ▶ normal breath,
- ▶ bradycardia, **palpable pulse**

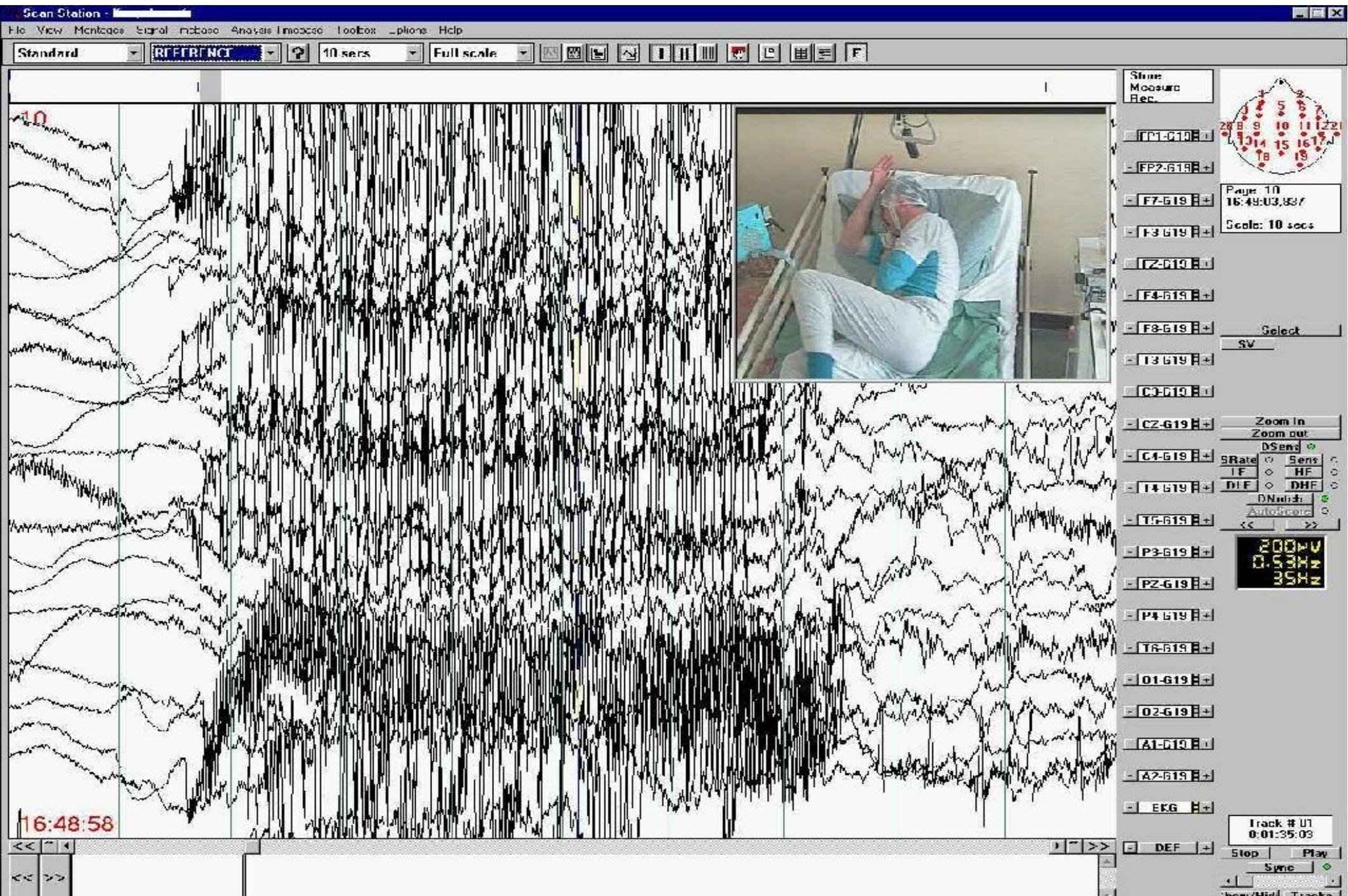
FA for faintness:

- ▶ leave lying on the floor, raise legs = auto-transfusion position (better return of blood to heart – recovery of blood circulation in brain = recovery of consciousness)
- ▶ if recovery of consciousness is fast, colour returns, cause of faintness is known – doctor is not necessary
- ▶ while unconscious, ABC
- ▶ if longer than 1 min – EMS (not a case of faintness)
 - epileptic fit, arrhythmia – doctor





Convulsive states





Convulsive states

▶ convulsion = involuntary contraction of striated muscles

▶ occurrence:

- at least 1x in lifetime in as much as 10% of population

maximum:

- children 1/2 year to 3-4 years
- ... puberty... +



Convulsions – classification:

- ▶ with consciousness disorder:
 - febrile convulsions in children, epilepsy, eclampsia
- ▶ without consciousness disorder:
 - tetanus, tetany
- ▶ Types of convulsion:
 - **Tonic** – overall body stiffness, arched bent of torso, patient stops breathing (cyanosis) = muscle flexes and keeps tense
 - **Clonic** – repeated muscle twitches = alternating tension and relaxation



Causes of convulsions:

- ▶ high temperature – febrile convulsions
- ▶ meningoccephalitis, brain inflammation
- ▶ epilepsy
- ▶ metabolic changes (Ca^{++} , hypoglycaemia)
- ▶ cerebrovascular accidents, intracranial bleeding
- ▶ tumorous illnesses
- ▶ poisonings
- ▶ eclampsia – (formerly EPH gestosis)



FA for convulsions:

- ▶ Prevent secondary injury – fall, injury with surrounding objects
- ▶ Monitor duration of convulsions, unconsciousness
- ▶ During and after fit – ABC, stabilised position, limit commotion around = limit stimuli that could cause other convulsions
- EMS: breathing disorders, consciousness disorders, high fever, diabetes, little children, pregnant, **first** (unknown) occurrence





Epilepsy

- ▶ E. stimulus (rhythmical sound, colours, cinema, television)
- ▶ Brain reaction:
 - sensory symptoms (visual, auditory, olfactory perception)
 - fit of convulsions,
 - consciousness disorder
- ▶ Typical GrandMall: Aura, Cry, Fall, Fit
Tonic, Clonic, Urine, Sh-- (sleep)
- ▶ Other manifestations:
 - Absence = eyes fixed, eyes turned up
 - Convulsions localised at 1 limb, muscle group



Emergence of convulsions in Epilepsy

- ▶ epileptic impulse = photostimulation (cinema, fire), hyperventilation, rhythmical sounds (on a train, music – drums)
- ▶ epileptic focus = cells with pathological electrical activity
- ▶ low spread threshold through the brain



Epilepsy FA

Call EMS:

- first time in life
- diabetes
- child
- disorder of breathing
- **Status Epilepticus** = A prolonged seizure (usually defined as lasting longer than 30 minutes) or a series of repeated seizures; a continuous state of seizure activity.

See the neurologist

- epi. patient with treatment, increased frequency of fits
- During fit - care about ABC, ...

Febrile convulsions



- ▶ Convulsions + consciousness disorder, children (6M .. 6Y) with rapid onset of fever (over 39°C), tachycardia, sweating.
- ▶ FA: cooling: remove blanket, wrap; air the room
if conscious – enough liquids, Paracetamol (painkiller).
During a fit of convulsions, unconsciousness (10 min) –
 - Ensure clear airways.
 - Do not prevent child from movements during convulsions.
 - Do not put anything into mouth during convulsions (inhaling).
 - Medical examination // EMS



Eclampsia

- = advanced stadium of “EPH gestosis” (oedemas, proteinuria, hypertension), illness is related to pregnancy (placenta),
- ▶ oedema of brain, lungs – disorder of consciousness, convulsions, insufficient breathing, low blood pressure, shock
- ▶ FA: EMS, hospitalisation, termination of pregnancy



Tetany

= increased readiness for convulsions (tonic).

▶ occurs during lower concentration of Ca^{++} in blood:

changes of internal environment = alkalosis

- hyperventilation after psychical stress;
(hysteria)

- after repeated vomiting

▶ FA: calm patient down, sit in half-upright position

▶ hyperventilation tetany – plastic/paper bag, reinhalation of CO_2

▶ Doctor – Calcium i.v.

Tetanus



- ▶ infection with *Clostridium tetani* = spores in soil --> wound --> toxin production (days) – block of neuromuscular transfer:
 - difficulties chewing,
 - trismus = flexed chewing muscles,
 - generalisation of convulsions
 - generalized muscle spasms—> suffocating while fully conscious
- ▶ Prevention: vaccination (re-vaccination á 10y)
- ▶ Prevention: treatment of wound with H₂O₂
- ▶ FA&Th: EMS - artificial respiration

Tetanus—United States, 1947-2005*



Botulism



- ▶ Foodborne botulism - ingestion of contaminated food – *Clostridium botulinum* (home made canned food) – botulotoxin
- ▶ (Wound b., infant b., inhaled)
- ▶ double vision, unclear speaking, difficulties chewing, swallowing
- ▶ muscular weakness, considerable muscular weakness, palsy without convulsions and while fully conscious
- ▶ FA: EMS – UPV, [administration of antitoxin]
- ▶ US: 724 cases of food-borne botulism in 25 y,



Summary of Neurol. exam:

- ▶ DR ABC (shake, shout)
- ▶ what's your name
- ▶ where are you
- ▶ what's the day today
- ▶ Do you have some pain?
- ▶ Can you move?
 - open, close eyes
 - whistle
 - extremities
- ▶ Convulsions ?
- ▶ Time when the person had been without deficit.