Tuesday, November 22, 2016

Disorders

**Tumors 14.1**

Growth of non-function cells.  
**Benign**: Cells grow within their own membrane. Clear boundaries, can usually be removed surgically.  
**Malignant**: No ‘border’ between cell and tissue. Infiltrating tumor, cancerous.  
**Metastatic** tumors: Cells coming from malignant tumors in other organs (e.g. lungs), that reach the brain and develop.

Damage is caused by **compression** or **infiltration**.

Because neurons cannot divide they are **not** responsible for tumors.  
**Gliomas** (from glial cells): malignant. Can be removed surgically and with radiations.

**Meningioma’s** (from dura mater): benign.

Malignant & benign  
Compression  
Malignant  take up space, use up oxygen/glucose, destroy cells.

*Note: DO NOT USE table 14.1.*

Neurological Disorders

Seizure disorders

Uncontrollable spread of neural activity (excitatory), sometimes leading to convulsions.  
**Recurring seizures= epilepsy.**

**Partial** (focal + remain local) seizures vs. **Generalized** seizures.  
Partial seizures can be **simple** (no loss of consciousness) or **complex**.
**Grand Mal**: generalized seizure with convulsions.
Extending limbs in a rigid fashion, then leads to a phase of convulsions.

**PHASES:**
Aura (feels strange approx. secs) **Tonic Phase** (rigidity, loss of consciousness approx.

![](image)

- The phases of gran-mal seizure are as follows:

  - **Aura**
    - (flashing light, smells, spots before eyes, dizziness)
  - **Tonic – Clonic Phase**
    - Tonic phase: contraction
    - Clonic phase: jerking movements
    - Accompanied by dyspnea, drooling of saliva, urinary continence
  - **Post-ictal Phase**
    - Cessation of tonic-clonic movement
    - Characterized by exhaustion, headache, drowsiness, deep sleep of 1-2, disorientation

15 secs) **Clonic Phase** (convulsion (fast slow) Stop breathing, increase in inhibition approx. 30 secs) **Sleep** (mins/hours).

**Petit Mal**: Absence seizures (generalized, complex). Stop of activity (approx. secs), unconscious.

**Epilepsy** = repeated seizures
Primary damage in the temporal lobes (hippocampus, amygdala).
Status epilepticus = repeated complex seizures without regaining consciousness.
Temporal lobe: Hippocampus + Amygdala +… (memory and emotion systems)
  * an electrical storm in the temporal lobe
  * patients tend to have religious experiences… (possibly due to a bundle of many emotions at once??)

Neural substrate: Hippocampus, among others.
Excitotoxicity: neuron death because of too much excitation through NMDA channels.
Treatments:
Anticonvulsants (Benzodiazepines, Barbituates).
Surgery (side effects: remember HM? Problems with memory)
Vagus nerve stimulation (partial seizures)

Disorders: Cerebrovascular accidents

Stroke 14.5

½ million strokes per year. Age related.
Hemorrhagic: Bleeding in the brain.
Obstructive: Blood clot Ischemia (loss of blood flow).
   Hypoxia shortage of oxygen. Prevented with aspirin.
Thrombus and embolus  Loss of oxygen and glucose, osmolarity variations, bacterial infections.

Stroke produce permanent brain damage. Can be prevented:
Medications to reduce blood pressure.
Brain surgery (on vasculatures).
Antibiotics (embolus and bacterial infection)
Anticoagulant (prevent blood clot up to 9 hours after stroke)

Causes of Strokes

Plaques: Atherosclerosis: Buildup of material (cholesterol, calcium deposits) on walls of blood vessels.
Detected by angiography (X-ray of blood circulation)

Rehabilitation after stroke

Therapies depend on the type of brain damage (speech, motor impairment…)

Case of limb movement impairment. Constraint-Induced therapy: inducing brain plasticity by artificially ‘amputating’/restricting movement in good limb.
Brain-Machine Interface: Linking neural activity to an external artificial device.
Perception: artificial eye
Motor: artificial hand/arm

Development disorders

Generally induced by viruses or drugs.
Result in non-viability or retardation.

**Fetal-Alcohol Syndrome**: Affects axonal growth and synaptic plasticity (e.g. LTP/LTD).

Low doses of alcohol during pregnancy are sufficient.