

## Pathology Of The Nervous System

Important Facts About The CNS :

- \* 2% of body wt. **BUT** 20% body oxygen consumption. Therefore, in hypoxia it's first to be affected.
- \* It's very vascular & floating in CSF.
- \* It's very delicate, less supported, and lies in a limited space (hard, bony shell).
- \* No lymphatic drainage.
- \* No regeneration (permanent cells).

### Diseases Of Nervous System

Malformations :

- Anencephaly (no brain).
- Hydranencephaly (brain becomes a sac of fluid).
- Microcephaly (brain < 900 gm).
- Megalencephaly (brain > 1800 gm).
- Meningocele & meningocele (herniation of meninges or meninges with spinal cord through spina bifida; an unclosed bony spinal canal).

Degenerative :

\* Alzheimer's Disease :

- Progressive atrophy of the whole brain with severe dementia and death in 5-10 Y.
- Usually 50-65 Y , ? familial & sporadic.
- Gross : Cortical atrophy especially of frontal, parietal, and occipital regions with compensatory ventricular enlargement.
- Micro : 1) Neurofibrillary tangles (knots in neurons made of hyperphosphorylated Tau protein).  
2) Senile plaques (extracellular amyloid like material).  
3) Neuronal granulovacuolar degeneration.

\* Pick's disease :

- Females & ? familial.
- Gross : Cortical atrophy of frontal and temporal areas (sparing posterior zones).
- Micro : Eosinophilic cytoplasmic pick's inclusion bodies in neurons.

## Spongiform Encephalopathies .

\* **Cause** : Subvirus protein called Prion. A variant of normal protein found in mammalian nervous system, devoid of both RNA & DNA. Therefore, Prion is very resistant to sterilization and UV rays. Type of disease caused is determined by Prion conformation (changes by mutation).

\* **Diseases (Transmissible)** :

- 1) In Human : Creutzfeldt-Jacob disease, Kuru, fatal familial insomnia.
- 2) In Animal : Scrapie, mad cow disease.

\* **Pathology** :

- a) Slowly progressive degeneration of brain with neuronal loss.
- b) Demyelination
- c) Spongiform changes in white matter with no inflammation.
- d) Dementia, gait disturbances, and finally Death.

Brain Edema Brain has no lymphatics. Gross : Narrow sulci & wide gyri.

- 1) Vasogenic : occurs in white matter due to increased capillary permeability as in trauma, tumors, infections.
- 2) Cytotoxic : occurs in gray matter due to increased intracellular fluid as in toxemia, anoxia, ischemia.
- 3) Interstitial : Transudation from ventricles across ependymal lining as in increased ICT.

## Brain Herniation

\* **Definition** : Bulging of brain part through dural partition or cranial opening.

\* **Cause** : Increased ICT.

\* **Sites** :

- 1) Subfalcine (singulate gyrus).
- 2) Subtentorial (uncus) : vessel tear with fatal hemorrhage.
- 3) Tonsillar (cerebellar) : compressing medullary centers.
- 4) Skull fracture.