

Board Review Step I # 1

Neuroscience

The anterior border of the parietal cortex is the:

- A. parieto-occipital sulcus
- B. the parieto-frontal sulcus
- C. the central sulcus
- D. the lateral fissure
- E. none of the above

C. the central sulcus

Which of the following mark the border between the pons and midbrain on the dorsal surface of the brainstem?

- A. pontomedullary junction
- B. exit of the oculomotor nerve
- C. exit of the trochlear nerve
- D. superior colliculus caudal edge

C. exit of the trochlear nerve

The rostral end of the corpus callosum is called the:

- A. Genu
- B. Splenium
- C. Body
- D. Anterior Horn

A. Genu

What separates the parietal and occipital lobes on the medial surface of the brain?

- A. preoccipital notch
- B. nothing but an imaginary line
- C. the calcarine sulcus
- D. the parieto-occipital sulcus

D. the parieto-occipital sulcus

Which of the following neurotransmitters is the main inhibitory neurotransmitter of the CNS?

- A. Substance P
- B. Dopamine
- C. Acetylcholine
- D. Enkephalin
- E. Gamma Amino Butyric Acid (GABA)

E. Gamma Amino Butyric Acid (GABA)

Which of the following is NOT a catecholamine neurotransmitters?

A. tyrosine

B. dopamine

C. norepinephrine

D. epinephrine

E. all are catecholamines

A. tyrosine

The common enzyme in the synthesis of all of the catecholamine neurotransmitters is called:

- A. choline acetyl transferase
- B. catechol-O-methyl transferase
- C. dopamine -B- hydroxylase
- D. tyrosine hydroxylase

D. tyrosine hydroxylase

Alpha motor neurons contain which of the following enzymes?

- A. tyrosine hydroxylase
- B. choline acetyl transferase
- C. dopamine beta hydroxylase
- D. catechol -O- methyl transferase

B. choline acetyl transferase

Which of the following would be useful in reducing skeletal muscle tone?

- A. nicotine
- B. muscarine
- C. curare
- D. atropine

C. curare

The gaps in the myelin coating of axons are called:

- A. collaterals
- B. axon hillocks
- C. nodes of Ranvier
- D. axon boutons

C. nodes of Ranvier

The gap between neurons is called:

A. ephapse

B. synapse

C. Node of Ranvier

D. Nothing. There is no gap between neurons.

B. synapse

Dorsal root ganglion cells in the adult PNS are normally of what structural type:

- A. Purkinje cell type
- B. unipolar or pseudounipolar
- C. bipolar
- D. multipolar

B. unipolar or pseudounipolar

Spinal bifida results from:

- A. failure of closure of the anterior neuropore
- B. failure of closure of the posterior neuropore
- C. blockage of the ventricles
- D. b and c
- E. all of the above

B. failure of closure of the posterior neuropore

Which of the following areas is derived from the rhombencephalon?

- A. midbrain
- B. pons
- C. medulla
- D. b and c
- E. all of the above

D. b and c

The postnatal growth of the brain from about 350 to 1400 grams is primarily due to:

- A. increased numbers of neurons
- B. increased amount of cerebrospinal fluid
- C. myelination of axons and development of blood vessels
- D. increased numbers of axons and dendrites

C. mylenation of axons and development of blood vessels

The sinus that directly connects to the jugular vein is the:

- A. inferior sagittal sinus
- B. the cavernous sinus
- C. the transverse sinus
- D. the sigmoid sinus
- E. the superior sagittal sinus

D. the sigmoid sinus

Blockage of the subarachnoid granulations produces:

- A. non-communicating hydrocephalus
- B. communicating hydrocephalus
- C. spina bifida
- D. thrombosis

A. non-communicating hydrocephalus

The lumbar cistern is a region of:

- A. the dura mater
- B. the subarachnoid space
- C. the pia mater
- D. the sinuses

B. the subarachnoid space

Uncal herniation occurs when the uncus of the temporal lobe compresses the midbrain. This occurs when the uncus is pushed:

- A. into the foramen magnum
- B. under the tentorial notch
- C. under the falx cerebri
- D. rostrally

B. under the tentorial notch

If a patient showed non-communicating hydrocephalus with enlarged lateral ventricles, but normal third and fourth ventricles, then there is most likely blockage in:

- A. cerebral aqueduct
- B. medial aperture
- C. lateral apertures
- D. foramen of Monro

D. foramen of Monro

Damage to the level of the spinal cord that lies below the L1 vertebra should result in loss of sensory or motor function:

- A. on the anterior top of the thigh
- B. on the foot only
- C. the upper and lower limbs on the ipsilateral side
- D. on the foot and posterior aspect of the leg, thigh and buttocks

D. on the foot and posterior aspect of the leg, thigh and buttocks

The dorsolateral motor column of the ventral horn is most prominent at the:

- A. cervical level
- B. thoracic level
- C. coccygeal level
- D. sacral level

A. cervical level

A positive Romberg sign occurs when there is damage to:

- A. the superior cerebellar peduncles
- B. unconscious proprioceptive pathways
- C. the cerebellar hemispheres
- D. the vestibular nuclei

B. unconscious proprioceptive pathways

Atrophy and Fasciculations in the abdominal muscles just below the umbilicus indicate a lower motor neuron lesion at:

- A. Upper Cervical levels of the spinal cord
- B. L1, L2 or L3 levels of the spinal cord
- C. T6, T7, T8 levels of the spinal cord
- D. T11 or T12 levels of the spinal cord

D. T11 or T12 levels of the spinal cord

Which of the following arteries supply the lateral medulla with blood?

- A. anterior spinal
- B. basilar
- C. posterior inferior cerebellar artery
- D. anterior inferior cerebellar artery
- E. posterior cerebral

C. posterior inferior cerebellar artery

Unilateral blockage of the posterior cerebral artery, and the resulting brainstem damage, often produces a loss of fine touch and pain sensation on the which side?

- A. ipsilateral
- B. contralateral
- C. bilateral

B. contralateral, due to damage to the medial lemniscus and ALF in the midbrain.

Which of the following are NOT a branch of the internal carotid artery?

- A. anterior cerebral artery
- B. middle cerebral artery
- C. posterior cerebral artery
- D. ophthalmic artery

C. posterior cerebral artery

The anterior inferior cerebellar artery is a direct branch of:

- A. the vertebral artery
- B. the anterior cerebral artery
- C. the basilar artery
- D. the internal carotid

C. the basilar artery

Blockage of the paramedian branches of the basilar artery usually affects the abducens nerve. If the lesion grows laterally, what other cranial nerve is likely to be affected as well.

- A. facial
- B. hypoglossal
- C. vestibulocochlear
- D. glossopharyngeal

A. facial

The adult brain is about 2% or so of the adult body. What percent of the blood pumped by the heart flows to the brain?

- A. 1%
- B. 2%
- C. 15%
- D. 30%

C. 15%

Blockage of what artery is likely to produce damage to the visual cortex, oculomotor nerve and the corticospinal tract?

- A. superior cerebellar
- B. anterior cerebral
- C. middle cerebral
- D. posterior cerebral

D. posterior cerebral.

Superior alternating hemiplegia, a.k.a.
Weber's syndrome.



What vessel supplies this gyrus?

- A. Anterior cerebral artery.**
- B. Middle cerebral artery.**
- C. Posterior cerebral artery.**

The correct answer is A.

The cingulate gyrus is located on the medial surface of each hemisphere above the corpus callosum, and is vascularized by branches of the anterior cerebral artery.

Which of the following is incorrect in regard to cerebrospinal fluid?

- A. It is normally clear and colorless.
- B. Increased glucose concentration is usually meaningless.
- C. Normal concentration of lymphocytes is approximately 100/mm³.
- D. Normal specific gravity is approximately 1.007.
- E. Normal pressure is approximately 160 mm. H₂O cerebrospinal fluid.

C. Normal concentration of lymphocytes is approximately 100/mm³.

All of the following are true in regard to spinal cord development except.

A. The sulcus limitans delimits the alar from the basal plates.

B. Alar neuroblasts are always formed before basal neuroblasts.

C. The general visceral afferent and general visceral efferent cell columns lie closest to the sulcus limitans.

D. Spinal dysraphism is where there is duplication of the dorsal horns.

E. The gray matter of the adult represents the mantle layer of the embryo.

B. Alar neuroblasts are always formed before basal neuroblasts

All of the following would be found in the Kluver-Bucy syndrome except:

- A. Hyperorality.
- B. Hyposexuality.
- C. Psychic blindness.
- D. Obesity.
- E. Altered endocrine responses.

B. Hyposexuality.

A 70 year old male presents with a 2 day history of worsening generalized headache and increasing obtundation. He now complains of stiffness in his neck. Vital signs include T 38.7 C, pulse 85, respirations 23, and blood pressure 130/85 mm Hg. A CBC reveals a WBC count of 16,850/microliter. Serum electrolytes reveal a sodium of 145 mmol/L, potassium 4.3 mmol/L, chloride 103 mmol/L, CO2 26 mmol/L, urea nitrogen 18 mg/dL, and glucose 88 mg/dL. A lumbar puncture yields cloudy cerebrospinal fluid with a glucose of 32 mg/dL, protein 146 mg/dL, and cell count of 3800 WBCs (95% PMNs and 5 % mononuclears) and 122 RBCs. This condition has the potential to result (sooner or later) in all of the following complications EXCEPT:

- A Hydrocephalus
- B Thrombosis and infarction
- C Abscess
- D Subdural hematoma
- E Cerebellar tonsillar herniation

(D) CORRECT. A subdural hematoma is a typical complication of traumatic injury, not bacterial meningitis.

A 68 year old woman has been placed in a nursing home by her son because she can no longer be cared for at home. She is continually wandering away from the house and getting lost in the neighborhood. She has difficulty keeping her room in order. She misplaces articles of clothing and sometimes dresses herself in an odd fashion. These problems have gotten progressively worse over the past 6 years. She took early retirement as an accountant because she was having trouble keeping her clients accounts in order. There is no history of trauma. She has no history of seizures. Which set of histopathologic findings is most typical for her underlying disease process:

- A Atrophy of caudate nucleus and gliosis
- B Wallerian degeneration and gliosis
- C Substantia nigra depigmentation and loss of neurons
- D Grouped atrophy of muscle with anterior horn cell loss
- E Neurofibrillary tangles and senile neuritic plaques

(E) CORRECT. Plaques and tangles are typical for Alzheimer's disease, the most common form of senile dementia.

During radical prostatectomy, the anesthesiologist reports a drop in blood pressure in a 73-year-old male. The hypotension persists for 30 minutes despite intervention with pressor agents. The most likely consequence of this prolonged hypotensive episode is development of:

- A Hydranencephaly
- B Linear parasagittal infarction
- C Lacunar infarcts of basal ganglia
- D Parietal lobe hemorrhagic infarct
- E Anterior pituitary necrosis

(B) CORRECT. The most sensitive areas of the brain to ischemia will be the 'watershed' areas between anterior and middle cerebral arterial circulations.

A 28 year old male undergoes induction chemotherapy for acute myelogenous leukemia. He becomes severely pancytopenic, with a WBC count of 1320/microliter, Hgb 7.9 g/dL, and platelet count of 72,000/microliter. He becomes comatose. A CT scan of the head reveals a right parietal hemorrhage. He dies a day later. At autopsy, he is found to have a right middle cerebral arterial thrombosis with right parietal hemorrhagic infarction. Which of the following infectious agents is most likely to produce these findings:

- A Herpes simplex virus
- B Toxoplasma gondii
- C Human immunodeficiency virus
- D Cytomegalovirus
- E Aspergillus niger

(E) CORRECT. Aspergillus loves to invade blood vessels and produce thrombosis. Neutropenia is a risk for aspergillosis.

A baby is born prematurely at 29 weeks gestational age to a G2 P1 woman whose previous pregnancy resulted in a normal term birth. She reported no difficulties with the current pregnancy, though she continued to smoke 1 pack of cigarettes per day. Following the delivery, the baby receives surfactant therapy and does not develop respiratory distress from hyaline membrane disease. However, it is noted that the baby has a seizure during the next day of life. The most likely pathologic lesion to explain this complication is:

- A Intraventricular hemorrhage
- B Intracerebellar hemorrhage
- C Subdural hematoma
- D Subgaleal hemorrhage
- E Epidural hemorrhage

(A) CORRECT. A premature child, particularly in the gestational age range from 22 to 30 weeks, is at risk for germinal matrix hemorrhage, which often extends into the intraventricular region.

Following an episode of severe head trauma suffered in a motorcycle accident, an 18 year old female is noted to have decerebrate posturing. Funduscopy examination reveals marked bilateral papilledema. A CT scan reveals changes of marked diffuse cerebral edema. This increase in brain volume because of an increase in sodium and water content is most likely to be severest in which of the following components:

- A Neuronal cell bodies
- B Meninges
- C White matter
- D Dura
- E Ependyma

(C) CORRECT. The greatest amount of salt and water increase with cerebral edema occurs within white matter.

A 31 year old female has noted recent difficulty with writing. She has difficulty controlling her hand movements, and the writing is nearly illegible. A neurological examination reveals decreased strength in the right upper extremity and decreased sensation over the left lower extremity. She has no decrease in mentation, and there is no reported seizure activity. A lumbar puncture is performed, and the CSF contains elevated levels of IgG, some mononuclear cells, and oligoclonal bands on gel electrophoresis. Which of the following pathologic findings in the CNS best accounts for these findings:

- A Loss of pigmented neurons in the substantia nigra
- B Perivascular lymphocytes with demyelinated axons in white matter
- C Increased neurofibrillary tangles and neuritic plaques in the cortex
- D Periventricular lymphoid aggregates with cells marking with CD19
- E Foci of multinucleated cells and macrophages in grey and white matter

(B) CORRECT. The findings point to multiple sclerosis, which is marked by plaques of demyelination. The perivascular lymphocytes suggest an inflammatory etiology, but the cause of this disease is unknown. MS can present with a host of variable neurologic problems because the plaques of demyelination can occur almost anywhere in the brain.

A 23 year old primagravida has a fetal ultrasound performed at 17 weeks gestation. There is no family history of inherited diseases. The pregnancy has been uncomplicated. Which of the following congenital conditions is the most likely to be seen in this setting:

- A Anencephaly
- B Encephalocele
- C Arnold-Chiari malformation
- D Lissencephaly
- E Holoprosencephaly

(A) CORRECT. This occurs in about 1 birth per 1000. It is usually not associated with chromosomal abnormalities. It may be associated with maternal folate deficiency.

A 28 year old G3 P2 woman has had an uncomplicated pregnancy. An ultrasound is performed at 16 weeks gestation, and the findings prompt performance of an amniocentesis. The amniotic fluid is found to have an elevated alpha fetoprotein. Which of the following findings seen on ultrasound examination of the fetus is most likely to have been present:

- A Holoprosencephaly
- B Hydrocephalus
- C Encephalocele
- D Hydrops fetalis
- E Spina bifida

(C) CORRECT. This is a form of neural tube defect in which the occiput is not formed and herniation of brain occurs. Alpha fetoprotein is increased in amniotic fluid or maternal serum.

A 50-year-old African-American male had a blood pressure of 182/108 mm Hg at the last visit to his physician several months ago. He refuses to take any medications. He is admitted to the hospital after suddenly losing consciousness. When he is aroused, he cannot speak and he cannot move his right arm or his right leg. He probably has:

- A An embolus to the middle cerebral artery
- B A subfrontal meningioma
- C Cerebral venous thrombosis
- D Alzheimer's disease
- E Hemorrhage into the putamen

(E) CORRECT. The basal ganglia region is the typical location for hypertensive hemorrhages.

A 52 year old male has a history of chronic alcoholism. He is admitted after an episode of trauma in which he fell and hit the back of his head. A head CT scan shows no intracranial hemorrhage. He continues to exhibit decreased mentation and a brain MRI scan is performed that shows anterior vermian atrophy of the cerebellum. Of the following physical examination findings, which would he most likely have:

- A Choreiform movements
- B Nystagmus
- C Truncal and lower limb ataxia
- D Tremor at rest that diminishes or disappears with movement
- E Short-term memory loss

(C) CORRECT. Cerebellar disease often manifests with ataxia.

A previously healthy 31-year-old female suddenly loses consciousness and is taken to the hospital where an emergent head CT scan reveals extensive subarachnoid hemorrhage at the base of the brain. She is afebrile. A lumbar puncture yields cerebrospinal fluid with many red blood cells, but no white blood cells. The CSF protein is slightly increased, but the glucose is normal. Which of the following conditions do you most strongly suspect that she has:

- A Acute bacterial meningitis
- B Ruptured berry aneurysm
- C Progressive multifocal leukoencephalitis
- D Tay-Sachs disease
- E Parkinson's disease

(B) CORRECT. About 1% of the population have such an aneurysm. They can rupture suddenly.

Several members of a large family are affected by the onset of decreasing mental function and motor coordination when they reach middle age. Their movements are marked by choreoathetosis. Genetic testing reveals increased trinucleotide CAG repeats. Which of the following structures is most likely to appear grossly abnormal at autopsy of the affected persons::

- A Caudate nucleus
- B Midbrain
- C Temporal lobe
- D Locus ceruleus
- E Dorsal root ganglion

(A) CORRECT. Huntington disease (HD) is inherited in an autosomal dominant pattern. The gene is on chromosome 4, coding for a protein called huntingtin. Normally, there are 11 to 34 copies of the CAG repeat. There are more copies with HD; a greater number of copies correlates with earlier onset of the disease.

A 50 year old male has been imbibing martinis (shaken, not stirred) for several hours while at the blackjack table. He wanders off, and several minutes later is found down. Paramedics arrive, and discover a bruise on his posterior occiput, but no other signs of trauma. He is transported to the hospital in stable condition, with vital signs showing blood pressure 115/80 mm Hg, temperature 36.5 C., pulse 81, and respirations 20. On arrival, his blood ethanol is 330 mg/dL. He becomes progressively obtunded. His right pupil is 8 mm and the left 4 mm. A head CT scan reveals a collection of blood in the right subdural region. Damage to which of the following structures has resulted in these findings:

- A Middle meningeal artery
- B Cavernous sinus
- C Middle cerebral artery
- D Dural bridging vein
- E Great vein of Galen

(D) CORRECT. Falls in older persons, with some degree of cerebral atrophy can result in tearing of the bridging veins, which are more exposed, and lead to development of a subdural hematoma. Such hematomas can develop over a variable length of time.

Enlargement of the cerebral ventricles from obstruction to the flow of cerebrospinal fluid is LEAST likely to occur from which of the following conditions:

- A Previous meningitis from Pneumococcus
- B Forking of the aqueduct of Sylvius
- C Epidural hematoma
- D Ependymoma
- E Intraventricular hemorrhage

(A) CORRECT. Postmeningitic states more typically lead to communicating hydrocephalus from deficient reabsorption of CSF.

A 48 year old woman has developed chronic renal failure, and a renal scan shows bilaterally enlarged kidneys with multiple cysts. She has the sudden onset of a severe headache. A cerebral angiogram demonstrates marked narrowing of cerebral artery branches near the base of the brain, consistent with vasospasm, but no intraparenchymal hemorrhage is present. Which of the following conditions most likely produced these findings:

- A Bacterial meningitis
- B Severe atherosclerosis
- C Malignant hypertension
- D Cerebral edema
- E Subarachnoid hemorrhage

(E) CORRECT. The blood irritates the arteries. This effect is often delayed by several days following the initial hemorrhagic event. Berry aneurysms are located in the circle of Willis at the base of the brain, and rupture leads to extravasation of blood into the subarachnoid space. Her renal scan suggests a diagnosis of dominant polycystic kidney disease (DPKD). About 10% of persons with DPKD develop berry aneurysms.

A 41 year old woman had a worsening headache for the past week, along with a fever and increasing obtundation,. A head CT scan reveals a solitary 3 cm diameter lesion with ring enhancement located in the right parietal lobe. A stereotactic biopsy is performed and a frozen section shows granulation tissue with adjacent collagenization, gliosis, and edema. The probable cause for these findings is:

- A Chronic brain abscess
- B Aspergillosis
- C Progressive multifocal leukoencephalopathy
- D Toxoplasmosis
- E Rabies

(A) CORRECT. Granulation tissue with fibrosis is a typical reaction to a cerebral abscess. Collagen deposition around a ring enhancing lesion is typical for an abscess that organizes. A common source for such a brain abscess is a lung infection.

A 66-year-old male is finding that he has more difficulty moving about. He is annoyed by a tremor in his hands, but the tremor goes away when he performs routine tasks using his hands. His friends remark that he seems more sullen and doesn't smile at them, but only stares with a fixed expression on his face. He has not suffered any loss of mental ability. Which of the following diseases is he most likely to have:

- A Amyotrophic lateral sclerosis (ALS)
- B Alzheimer's disease
- C Parkinson's disease
- D Niemann-Pick disease
- E Tuberous sclerosis

(C) CORRECT. The tremor at rest is typical for Parkinson's disease. A 'mask-like' facies is another manifestation of this degenerative disease resulting from loss of pigmented neurons in the substantia nigra.

A 72 year old female has a five year history of worsening mental functioning with trouble remembering things. She has no problems with movement. She is noted on an MRI scan of the brain to have symmetrically increased size of the lateral ventricles along with cerebral cortical atrophy in a mainly frontal and parietal distribution. A lumbar puncture reveals a normal opening pressure, and analysis of the clear, colorless cerebrospinal fluid reveals a glucose and protein which are in normal ranges. Cell count on the CSF shows 3 WBCs (all lymphocytes) and 1 RBC. A funduscopic examination is normal. Which of the following findings is most likely associated with her underlying disease process:

- A Loss of gamma aminobutyric acid
- B Presence of the e4 allele of apolipoprotein E
- C Increased numbers of Lewy bodies
- D Perivascular mononuclear inflammation
- E Loss of Betz cells

(B) CORRECT. She has findings characteristic for Alzheimer's disease. The neuritic plaques have amyloid cores, and patients may also have a congophilic angiopathy.

A 26 year old previously healthy woman has the sudden onset of mental confusion. She has a seizure and is brought to the hospital. Her vital signs show blood pressure 100/60 mm Hg, temperature 37 C., pulse 89, and respirations 22. A lumbar puncture reveals a normal opening pressure, and clear, colorless cerebrospinal fluid is obtained with 1 RBC and 20 WBC's (all lymphocytes), with normal glucose and protein. An MRI scan reveals swelling of the right temporal lobe with hemorrhagic areas. Which of the following infectious agents is the most likely cause for these findings:

- A Herpes simplex virus
- B Influenza virus
- C Mycobacterium tuberculosis
- D Hemophilus influenzae
- E Neisseria meningitidis

(A) CORRECT. Hemorrhagic lesions of the temporal lobe are typical for Herpes simplex virus infection. Affected persons do not have to be immunocompromised. (Note: when this patient was brought to the ER, the examining physician initially passed the problem off as a 'drug overdose' which was his default diagnosis for any mental problem in a young person, but the family refused to accept that and pressed him for further workup).

Which is NOT a pain sensitive structure:

- A. Scalp
- B. Brain parenchyma
- C. Trigeminal nerve
- D. Cranial sinuses
- E. 3rd cervical nerve

The correct answer is B.

The cranial structures that are insensitive to pain include: Parenchyma of the brain, Ependyma and choroid plexus, Pia mater, arachnoid membrane and parts of the dura mater, and the skull (periosteum slightly sensitive.)

A 45 year old man complains of nocturnal severe headaches which typically awaken him from sleep about two hours after going to bed. He states that the pain is intense and most frequently on the right side of the head. His wife has noted some flushing of that side of the face. The headaches are 20 minutes in duration and occur repeatedly for weeks at a time and then abate.

The most likely diagnosis is:

- A. Ophthalmoplegic migraine
- B. Brain Tumor
- C. Tension headache
- D. Cluster headache

The correct answer is D.

These are unilateral headaches almost always occurring the same side associated with flushing, sweating, rhinorrhea, lacrimation, ptosis, and occasionally Horner's syndrome. It occurs most frequently in men and lasts 10 minutes to 1 hour. It occurs in clusters (several headaches a week with long periods of time in between in which the patients are headache free).

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The workup and treatment should be:

- A. Intravenous compazine
- B. MRI scan as soon as possible
- C. A routine CT scan and treatment with amitriptyline
- D. Ergotamine and/or Oxygen

The correct answer is D.

Treat with sub-lingual, inhalational, or intramuscular Ergotamine, Oxygen, Lidocaine nose drops, and/or Sumatriptan.

Absence Seizures (Petit Mal) are characterized by which of the following:

- A. Post ictal confusion
- B. Loss of postural control
- C. Typical duration of 1 to 2 minutes
- D. All of the above
- E. None of the above

The correct answer is E.

Absence seizures involve a abrupt loss & return of consciousness (brief), often without major motor component (eg. eye blinking). It can occur hundreds per day without recognition. Onset usually in young children.

Match the epilepsy type with the treatment:

Idiopathic generalized tonic-clonic epilepsy

A. ACTH and/or vigabatrin

B. Valproic acid

C. Phenytoin or Tegretol or Valproic acid

D. Ethosuximide or Valproic acid

E. Felbamate or Clonazepam

The correct answer is C.
Carbamazepine will also work.

Match the epilepsy type with the treatment:

Juvenile myoclonic epilepsy

A. ACTH and/or vigabatrin

B. Valproic acid

C. Phenytoin or Tegretol or Valproic acid

D. Ethosuximide or Valproic acid

E. Felbamate or Clonazepam

The correct answer is B.

Match the epilepsy type with the treatment:

Childhood absence epilepsy

- A. ACTH and/or vigabatrin
- B. Valproic acid
- C. Phenytoin or Tegretol or Valproic acid
- D. Ethosuximide or Valproic acid
- E. Felbamate or Clonazepam

The correct answer is D.

A patient with Wernicke's Encephalopathy is likely to have which of the following clinical findings:

- A. Ataxia
- B. Nystagmus
- C. Bilateral 6th nerve palsies
- D. All of the above
- E. None of the above

The correct answer is D.

Clinical findings include Oculomotor signs (Nystagmus, Bilateral 6th nerve palsies - weakness/paralysis of abduction, horizontal diplopia, internal strabismus, & abnormal response to caloric stimulation), Global confusional-apathetic state, Memory disorder (Korsakoff's), & ETOH withdrawal.

In Alzheimer's Disease the amount of atrophy seen on CT or MRI scan strongly correlates with the degree of dementia.

A. True

B. False

B. The correct answer is False.

Degree of atrophy inconsistently related to degree of dementia.

Which are treatable causes of dementia

A. Hypothyroidism (myxedema)

B. Creutzfeldt-Jakob disease

C. B12 deficiency

D. All of the above

E. A & C only

The correct answer is E.

Hypothyroidism treatment consists of levothyroxine. B12 deficiency treatment calls for regular intramuscular B12.

In a patient with suspected multiple sclerosis which finding(s) in the spinal fluid would cause you to consider alternative diagnoses:

- A. Protein greater than 100 mg/dl
- B. Oligoclonal bands are present
- C. Cell count greater than 50 per cubic milliliter
- D. A and C
- E. None of the above

The correct answer is D.

In MS, serum electrophoresis is normal: Total CSF protein rarely exceeds 100 mg%, and while modest elevations of CSF WBC count are common, the number rarely exceeds 50/cu.mm.

A 21 year old woman is brought to the emergency room because of intense vertigo. She had been in good health until 2 days prior when she first experienced nausea and mild vertigo. The next day she noted diplopia. Past medical history is significant for a bout of optic neuritis on the right lasting 2 weeks when she was age 18. The optic neuritis completely resolved over 3 weeks. You are called to the emergency room to consult on the patients current condition. Your examination demonstrates paleness of the left optic nerve, bilateral internuclear ophthalmoplegia and severe vertigo precipitated immediately by small movements of the head. The patient has intention tremors in both upper extremities. Motor strength is normal in the upper extremities; however, she has mild weakness in both lower extremities. Reflexes are normal in the upper extremities and hyperactive in the lower extremities. Babinski signs are present bilaterally. Sensory examination reveals a level of numbness from the T12 dermatomes on down to the feet bilaterally.

The clinical examination demonstrates abnormalities in :

- A. Optic nerve
- B. Brainstem and Cerebellum
- C. Thoracic spinal cord
- D. All of the above
- E. A & C only

The correct answer is D.

This condition affects multiple areas of white matter within the central nervous system.

A 21 year old woman is brought to the emergency room because of intense vertigo. She had been in good health until 2 days prior when she first experienced nausea and mild vertigo. The next day she noted diplopia. Past medical history is significant for a bout of optic neuritis on the right lasting 2 weeks when she was age 18. The optic neuritis completely resolved over 3 weeks. You are called to the emergency room to consult on the patients current condition. Your examination demonstrates paleness of the left optic nerve, bilateral internuclear ophthalmoplegia and severe vertigo precipitated immediately by small movements of the head. The patient has intention tremors in both upper extremities. Motor strength is normal in the upper extremities; however, she has mild weakness in both lower extremities. Reflexes are normal in the upper extremities and hyperactive in the lower extremities. Babinski signs are present bilaterally. Sensory examination reveals a level of numbness from the T12 dermatomes on down to the feet bilaterally.

Which test(s) or evaluations would you proceed with?

- A. MRI scans of the brain and/or spinal cord
- B. Neurosurgical consultation
- C. Spinal tap to determine if oligoclonal bands are present
- D. All of the above
- E. A & C only

The correct answer is E.

Radiological studies are often useful to be certain that other causes of neurologic disease are not present as well as to confirm the presence of lesions in the white matter. MRI scans are more useful and may show characteristic white matter lesions in over 80% of patients. Spinal taps are helpful because CSF gammaglobulin is elevated in ~75% of patients at some time during the disease. In addition, when agarose gel, acrylamide electrophoresis or isoelectric focusing are used, it can be observed that gammaglobulin migrates in more than one band (oligoclonal pattern) in 80-95% of patients even if their gammaglobulin is normal.

A 21 year old woman is brought to the emergency room because of intense vertigo. She had been in good health until 2 days prior when she first experienced nausea and mild vertigo. The next day she noted diplopia. Past medical history is significant for a bout of optic neuritis on the right lasting 2 weeks when she was age 18. The optic neuritis completely resolved over 3 weeks. You are called to the emergency room to consult on the patients current condition. Your examination demonstrates paleness of the left optic nerve, bilateral internuclear ophthalmoplegia and severe vertigo precipitated immediately by small movements of the head. The patient has intention tremors in both upper extremities. Motor strength is normal in the upper extremities; however, she has mild weakness in both lower extremities. Reflexes are normal in the upper extremities and hyperactive in the lower extremities. Babinski signs are present bilaterally. Sensory examination reveals a level of numbness from the T12 dermatomes on down to the feet bilaterally.

The most likely diagnosis is:

- A. Herpes encephalitis
- B. Multiple sclerosis
- C. Brainstem stroke
- D. Cerebellar hemorrhage
- E. Ruptured basilar artery aneurysm

The correct answer is B.

MS is rare before puberty and ordinarily starts before age 50. Symptoms include motor weakness, paresthesia and other sensory disorders, optic neuritis, unsteady gait and other cerebellar signs. Symptoms may develop rapidly in the course of hours or days or less frequently may take weeks to reach their maximum. The Babinski response consists of dorsiflexion of the big toe and fanning of other toes in response to stroking the lateral border of the foot (S1 dermatome); flexion at the hip and knee may also occur. Such a response indicates an upper motor neuron lesion involving the contralateral motor cortex or the corticospinal tract.

In narcolepsy the following are usually found

- A. Polysomnography is abnormal and the multiple sleep latency test is normal
- B. HLA type DR2/DQW1
- C. The full tetrad of daytime sleepiness, sleep paralysis, hypnagogic hallucinations and cataplexy
- D. All of the above
- E. A&C only

The correct answer is B.

HLA markers DR2/DQW1 are found much more frequently in narcoleptics than in the general population.

Restless Legs Syndrome is associated with

- A. Uremia
- B. Iron deficiency
- C. Insomnia in the elderly
- D. All of the above
- E. A&C only

The correct answer is D.

This is a neurologic cause of insomnia or daytime sleepiness in the elderly, the uremic, and those with a positive family history. It is also associated with iron deficiency, peripheral neuropathy, and peripheral vascular disease.

The normal sleep architecture features slow wave sleep (stages 3&4) in the middle third of the night.

A. True

B. False

B. The correct answer is False.

SWS is concentrated during the first third of the night. (REM is concentrated during the last third of the night. About half of the night is spent in stage 2 sleep.)

In Locked In Syndrome the patient is unconscious.

A. True

B. False

B. The correct answer is False.

Locked in syndrome ("coma vigile") is not a form of coma-consciousness is preserved, but patient's motor function is sufficiently impaired to prevent outward expression of thought and behavior. (Due to extensive or transverse high brainstem lesions.)

Swelling of the hemispheres and basal ganglia bilaterally with compression of the diencephalon and adjoining midbrain is characteristic of:

- A. Central Herniation
- B. Uncal Herniation
- C. Cingulate Gyrus Herniation
- D. All of the above
- E. None of the above

The correct answer is A.

Central herniation: Involves swelling of hemispheres and basal ganglia bilaterally (usually), Compresses diencephalon and adjoining midbrain caudally through the tentorial notch, and Results in diencephalic and midbrain (upper brainstem) damage secondary to compression, ischemia and or hemorrhage (traction on penetrating vessels of midbrain and pons.)

Pinpoint pupils in the unconscious patient are consistent with which level of involvement:

- A. Diencephalon
- B. Tectum
- C. Midbrain
- D. Pons
- E. None of the above

The correct answer is D.

Note: In addition to this and the above, another level which can be identified by pupil involvement is compression of the third cranial nerve in uncal herniation.

This will cause a unilateral, fixed, dilated pupil ("blown pupil")

Decerebrate posturing is seen in unconscious patients with lesions or compression at which level.

A. Midbrain or Pons

B. Diencephalon

The correct answer is A.

Lower lesions (midbrain-pons) cause decerebrate posturing.

Initial evaluation of the spinal cord injured patient requires:

- A. Careful attention to the "ABCs" of resuscitation (airway, breathing and circulation)
- B. Emergency MRI scan
- C. EMG (electromyogram)
- D. Hyperventilation
- E. All of the above

The correct answer is A.

Initial evaluation involves careful attention to “ABCs” of resuscitation and also careful attention to associated injuries. In addition, the spinal column needs to be immobilized.

Matching the reflex with its neurologic level:

Ankle jerk

A. C5-C6

B. L3-L4

C. S1-S2

D. C7-C8

The correct answer is C.
(Tibial nerve)

Matching the reflex with its neurologic level:

Knee jerk

A. C5-C6

B. L3-L4

C. S1-S2

D. C7-C8

The correct answer is B.
(Femoral nerve)

Matching the reflex with its neurologic level:

Biceps jerk

A. C5-C6

B. L3-L4

C. S1-S2

D. C7-C8

The correct answer is A.
(Musculocutaneous nerve)

Which is/are true of Parkinson Disease:

- A. The disease is characterized by bradykinesia, tremor and rigidity
- B. There is prominent loss of neurons in the substantia nigra
- C. Lack of facial expression (Masked facies) and diminished blink rate are common features
- D. All of the above
- E. A & C only

The correct answer is D.

Onset is with tremor. Patient simultaneously develops rigidity and brady kinesia which is manifested by a stooped, fixed posture, masked facies, diminished blink rate, difficulty initiating and maintaining movements, propulsion and retropulsion, and typical festinating gait.

Pathology consists of degeneration of pigmented neurons of the mesencephalon and brain stem. Most prominent is the loss of dopamine cell bodies in the substantia nigra.

Tourette's syndrome may be transmitted as an autosomal recessive trait with striking uniformity of phenotypic expression.

A. True

B. False

B. The correct answer is False.

Tourette's Syndrome may be transmitted as an autosomal dominant trait with a tremendous variability in phenotypic expression.

The genetics of Huntington's chorea is characterized by which of the following:

- A. Expansion of a trinucleotide repeat
- B. The gene is located on the short arm of chromosome 4
- C. Autosomal dominant inheritance
- D. All of the above
- E. A&C only

The correct answer is D.

It is characterized by the triad of autosomal dominant inheritance, movement disorder, & dementia. The gene is located on the terminal band of the short arm of chromosome 4. The mutation results from the expansion of a CAG repeat.

Clinical manifestations of Huntington's chorea include all with the exception of:

A. Emotional lability and depression

B. Dementia

C. Rigidity and spasticity in the later stages of the disease

D. Profound sensory loss

The correct answer is D.

Profound sensory loss is not a symptom of Huntington's

Management of elevated intracranial pressure includes:

- A. Modest hyperventilation to pCO₂ of 30 to 35
- B. Mannitol
- C. Elevation of the head 20 to 30 degrees avoiding neck vein compression
- D. Avoidance of antihypertensive medications
- E. All of the above

The correct answer is E.

Intubate with modest hyperventilation to pCO₂ of 30, IV Mannitol, IV Furosemide, Elevate head 20 - 30 degrees avoiding neck vein compression, sedate with IV morphine as needed to keep quiet or paralyze with pancuronium, avoid hypertensives.

Major complications of Subarchnoid Hemorrhage Include:

- A. Rebleed
- B. Hydrocephalus
- C. Vasospasm
- D. All of the above
- E. A & C only

The correct answer is D.

Major complications include: Rebleed, Vasospasm (symptomatic ischemia or infarct), Hydrocephalus, Cardiac (subendocardial infarction, arrhythmias), and Pulmonary (neurogenic edema)

Torn bridging veins and/or arterioles

A. Subarachnoid hemorrhage

B. Epidural hemorrhage

C. Acute subdural hemorrhage

D. Intracerebral hematoma

The correct answer is C.

Usually traumatic, from torn brain arterioles or bridging vein. Usually associated with severe brain injury, hemispheric contusions or diffuse shock injury.

Hemorrhage in the basal ganglia

A. Subarachnoid hemorrhage

B. Epidural hemorrhage

C. Acute subdural hemorrhage

D. Intracerebral hematoma

The correct answer is D.

Sites of hematomas include basal ganglia/internal capsule (causes hemiparesis and dysphasia), cerebellar (causes ataxia and dizziness) and pontine (causes coma and cranial nerve deficits.)

Torn middle meningeal artery

A. Subarachnoid hemorrhage

B. Epidural hemorrhage

C. Acute subdural hemorrhage

D. Intracerebral hematoma

The correct answer is B.

Traumatic, usually torn meningeal artery.
Commonly associated with skull fracture.
Brain is usually without significant injury.

Which is/are symptomatic of a transient ischemic attack (TIA).

- A. Syncope
- B. Transient monocular blindness
- C. Vertigo by itself
- D. All of the above
- E. A & C only

The correct answer is B.

Numbness of hand and cheek, weakness of hand or leg, transient monocular blindness, and less commonly language disturbance, are symptoms of TIA.

Cardiac sources of emboli include

- A. Prosthetic heart valves
- B. Mitral stenosis
- C. Atrial fibrillation
- D. Mural (heart wall) thrombus following anterior myocardial infarction
- E. All of the above

The correct answer is E.

Cardiac source for embolism includes:
Atrial fibrillation, Mitral stenosis, Aortic stenosis, Prosthetic heart valves, Ventricular aneurysm, Following anterior MI, Dilated cardiomyopathy, Paradoxical through atrial septal defect, congenital heart disease, Bacterial endocarditis, and Marantic endocarditis.

Matching Stroke Manifestations with Neuroanatomic localization

Pure motor stroke

A. Thalamus

B. Internal capsule

C. Dominant frontal lobe

The correct answer is B.

Pure motor stroke implicates an insult where corticospinal fibers are closely grouped, such as the internal capsule.

Matching Stroke Manifestations with
Neuroanatomic localization
Expressive aphasia with right arm and
facial weakness

A. Thalamus

B. Internal Capsule

C. Dominant Frontal Lobe

The correct answer is C.

The presence of aphasia and the difference in weakness between face/arm & leg localizes the injury to dominant frontal lobe cortex & white matter.

Matching Stroke Manifestations with Neuroanatomic localization

Pure sensory loss

A. Thalamus

B. Internal Capsule

C. Dominant Frontal Lobe

The correct answer is A.

This implicates the thalamus and is also usually lacunar.

The spinal fluid in viral meningitis is typically characterized by lymphocytes and normal glucose:

A. True

B. False

A. The correct answer is True.

Although there is a transient predominance of PMNs within the first few hours, the CSF formula quickly changes to a predominant lymphocytosis accompanied by a slight rise in protein. Glucose values are usually in the normal range.

Which is the most frequent non-epidemic necrotizing encephalitis in the United States?

- A. Western Equine
- B. California
- C. St. Louis
- D. Eastern Equine
- E. Herpes

The correct answer is E.
Herpes is non-epidemic.

Which are true for Herpes encephalitis:

A. If the illness is suspected then acyclovir should be started immediately and then an MRI and spinal fluid examination should be obtained.

B. The EEG is rarely abnormal

C. The PCR on spinal fluid is very infrequently positive for Herpes DNA

D. All of the above

E. A&C only

The correct answer is A.

Acyclovir reduces the mortality of Herpes encephalitis, but there is still a significant morbidity among survivors so it is imperative to establish the diagnosis of this condition at the earliest possible time.

Basilar meningitis may have severe consequences which include:

- A. Vasculitis
- B. Hydrocephalus
- C. Cranial nerve VII palsy
- D. All of the above
- E. A & C only

The correct answer is D.

Other severe consequences include cortical ischemia due to vasculitis w/ occlusion or loss of vascular auto regulation, and increased intracranial pressure.

The most frequent causes of bacterial meningitis in the adult are:

A. Pneumococcus and meningococcus

B. Hemophilus influenzae and meningococcus

C. Staph aureus and listeria monocytogenes

D. Staph aureus and E. coli

The correct answer is A.

The spinal fluid in bacterial meningitis is characterized by:

- A. Polymorphonuclear leukocytes and increased glucose
- B. Increased protein and increased glucose
- C. Polymorphonuclear leukocytes and decreased glucose
- D. Decreased protein and increased glucose

The correct answer is C.

In addition, protein is increased and gram stain detection of bacteria is often positive.

The spinal fluid in bacterial meningitis is characterized by:

- A. Polymorphonuclear leukocytes and increased glucose
- B. Increased protein and increased glucose
- C. Polymorphonuclear leukocytes and decreased glucose
- D. Decreased protein and increased glucose

The correct answer is C.

You are correct! In addition, protein is increased and gram stain detection of bacteria is often positive.

A 29 year old HIV positive man with previous and ongoing intravenous drug use is initially referred to you for evaluation of pain and numbness in the feet. Examination, at that time, revealed impaired sensation to pin, temperature and touch to the mid calf level symmetrically and absent ankle reflexes. The patient did not have Babinski signs and strength is normal in all extremities. Nerve conduction studies demonstrate mild decrease in nerve conduction velocities in the all four extremities.

Two months later you see the patient in the clinic because of a new complaint of increasing neck pain for the past three days. Pain is now radiating from the neck into the upper extremities and the patient is complaining of weakness in the legs. The patient has a fever of 101.5 degrees and pain on motion of the neck in all directions. Your neurologic examination shows depressed biceps and increased triceps reflexes. Knee jerks (patellar reflexes) are increased and the patient now has Babinski signs bilaterally. You also find mild weakness and spasticity in both legs.

The patients second problem (neck pain with radiation to the arms) will require evaluation

Which test should be obtained?

- A. MRI of the cervical spine
- B. Nerve biopsy
- C. Repeat nerve conduction studies
- D. Lumbar puncture (spinal tap) to determine CSF protein and cell counts

The correct answer is A.

MRI is the diagnostic procedure of choice for focal infections, followed by CT scan.

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The most likely diagnosis is:

- A. Chronic inflammatory demyelinating polyneuropathy
- B. HIV myelopathy
- C. Spinal epidural abscess
- D. Ruptured cervical disk
- E. Spinal meningioma

The correct answer is C.

Symptoms of spinal epidural abscess occur in 4 stages: Focal pain, Radicular pain, Long tract signs, and Signs of cord transection.

Match the feature(s) with the myopathy:

Cardiac Conduction Defect

A. Polymyositis

B. Myotonic Dystrophy

C. Duchenne's Dystrophy

D. All of the Above

The correct answer is B.

Other associated features include: Frontal balding, Cataracts, Intellectual dullness (esp. younger onset), Abdominal pain, Intestinal dysmotility, Testicular atrophy, Endocrine & bone abnormalities and Respiratory insufficiency.

Match the feature(s) with the myopathy:

Enlarged Trinucleotide Repeat

A. Polymyositis

B. Myotonic Dystrophy

C. Duchenne's Dystrophy

D. All of the Above

The correct answer is B.

Myotonic Dystrophy is due to a trinucleotide repeat in the myotonin protein kinase (MPK) gene on chromosome 19. The trinucleotide repeat increases in size in successive generation causing anticipation.

Match the feature(s) with the myopathy:
Autosomal dominant inheritance

- A. Polymyositis
- B. Myotonic Dystrophy
- C. Duchenne's Dystrophy
- D. All of the Above

The correct answer is B.

Match the feature(s) with the myopathy:
Gower's sign and X-linked Recessive
Inheritance

- A. Polymyositis
- B. Myotonic Dystrophy
- C. Duchenne's Dystrophy
- D. All of the Above

The correct answer is C.

Gower's sign: Patient places hand or hands on knees and effectively “crawls up the legs” to arise from the floor. Other findings include: Pelvic & shoulder girdle weakness, Calf hypertrophy, Waddling gait, Lordosis, Abnormal (or inability to) run, and Heel cord contractures.

Match the visual field with the location:
Bitemporal hemianopia

- A. Right Optic Nerve
- B. Right Parietal Lobe
- C. Right Temporal Lobe
- D. Left Occipital Lobe
- E. Optic Chiasm

The correct answer is E.

The major lesions that produce visual impairment at the level of the optic chiasm are tumors, especially of pituitary origin. The classic pattern of visual deficit is bitemporal hemianopia.

Match the visual field with the location:
Left superior quadrantanopia

- A. Right Optic Nerve
- B. Right Parietal Lobe
- C. Right Temporal Lobe
- D. Left Occipital Lobe
- E. Optic Chiasm

The correct answer is C.

With lesions in the temporal lobe, where tumors are the most common cause, the field deficit is denser superiorly than inferiorly, resulting in a superior quadrantanopia (pie in the sky deficit).

Match the visual field with the location:

Blind in Right eye

- A. Right Optic Nerve
- B. Right Parietal Lobe
- C. Right Temporal Lobe
- D. Left Occipital Lobe
- E. Optic Chiasm

The correct answer is A.

A complete lesion of the right optic nerve causes blindness in the right eye.

A stillbirth occurs at 28 weeks gestation to a 30 year old G2 P1 woman whose previous pregnancy resulted in a normal term birth. At autopsy, the cerebrum of the fetus demonstrates extensive diffuse periventricular areas of necrosis. Which of the following infections is most likely to have caused these findings:

- A Taenia solium
- B Cytomegalovirus
- C Poliovirus
- D Candida
- E Syphilis

(B) CORRECT. Remember TORCH for congenital infections. The 'T' for toxoplasmosis and the 'C' for cytomegalovirus are most likely to involve the CNS. The extent of necrosis and calcification with cytomegalovirus can be considerable.

A 73 year old male has exhibited problems remembering things for several months, and he is noted to confabulate. He dies as a consequence of a hepatocellular carcinoma. At autopsy, his brain demonstrates bilaterally small mammillary bodies that show brown discoloration. Microscopically, there is gliosis and vascular proliferation and hemosiderin deposition. These findings are most typical for:

- A Multiple sclerosis
- B Parkinson's disease
- C Amyotrophic lateral sclerosis
- D Wernicke-Korsakoff syndrome
- E Huntington's disease

(D) CORRECT. Wernicke's disease can also lead to hemorrhage and/or loss of periaqueductal grey matter. The Wernicke-Korsakoff syndrome is seen with chronic alcoholism. The mechanism may have to do with thiamine deficiency. (Micronodular cirrhosis with alcoholism is a risk for hepatocellular carcinoma.)

A 50-year-old male complained of headaches, becoming irritable and acting strangely about a month after being involved in a vehicular accident in which he was not wearing any restraint and struck his head against the windshield of his van. He did not lose consciousness at that time or at any point thereafter. He had a minor contusion to his forehead. This history is most consistent with the development of a (an):

- A Epidural hematoma
- B Chronic subdural hematoma
- C Cerebral contusions
- D Subarachnoid hemorrhage
- E Intracerebral hematoma

(B) CORRECT. The continued presence of a subdural hematoma leads to the problems described, even if it is relatively small.

A young healthy male, a major league baseball player, developed progressive, symmetric muscular weakness of his upper extremities over the course of several years. Then he developed difficulty speaking and swallowing. He did not have myalgias or arthralgias. He remained afebrile. His mental function never became diminished. He is most likely to have:

- A Amyotrophic lateral sclerosis
- B von Recklinghausen's disease
- C Multiple sclerosis
- D Werdnig-Hoffman disease
- E Guillain-Barre syndrome

(A) CORRECT. The course is progressive. Bulbar involvement can lead to problems speaking and eating, with risk for aspiration. This disease often goes by the eponym of another baseball player, Lou Gehrig, who could not play first base anymore.

A 20 year old previously healthy male has recently been inducted into the army. Several weeks into basic training, he experiences a severe headache for an entire day. He had been healthy prior to this, noting only a mild sore throat the prior day. He goes to the base physician, who records vital signs of T 39.2 C, P 90, R 22, and BP 110/70 mm Hg. A lumbar puncture is performed and examination of the cerebrospinal fluid shows 2 RBC's, 34,000 WBC's, glucose of 20 mg/dl (serum 75 mg/dL), and protein of 105 mg/dl. Which of the following additional laboratory tests would be the most helpful in reaching a diagnosis:

- A Cryptococcal antigen
- B Acid fast stain
- C India ink
- D Serology for Herpes simplex
- E Gram stain

(E) CORRECT. The findings point to a bacterial infection. The most likely organism at this age and under these circumstances is *Neisseria meningitidis*. The portal of infection may be a pharyngitis.

At autopsy, the brain of a 47 year old male is normal in size, with no cortical atrophy. The cerebral arteries show no atherosclerosis. Coronal sections reveal scattered periventricular plaques of demyelination from 0.3 to 1 cm in size. Microscopically, these plaques have loss of myelin as seen with the luxol fast blue (LFB) stain, but axonal preservation as seen with the Bodian silver stain. This disease process is characterized by all of the following findings EXCEPT:

- A Onset in early adulthood
- B Oligoclonal bands in the CSF
- C Association with influenza virus infection
- D Plaques of demyelination in white matter
- E A relapsing and remitting course

(C) CORRECT. This is the false statement. Multiple sclerosis (MS) is not associated with influenza virus.

A 45 year old man has had a severe headache for a week. Physical examination reveals papilledema on the right. A head CT scan reveals a marked right to left midline shift. An MRI scan demonstrates a 6 cm enhancing mass lesion in the right parietal region with marked surrounding edema. He develops a dilated pupil on the right and soon thereafter loses consciousness and dies. At autopsy, which of the following lesions is most likely to be found:

- A Superior sagittal sinus thrombosis
- B Right cerebellar hemispheric hemorrhage
- C Pontine hemorrhages
- D Thrombosis of the posterior cerebral artery
- E Diffuse subarachnoid hemorrhage

(C) CORRECT. The brain swelling leads to herniation, which damages small perforating vessels and results in Duret hemorrhages in the pons and midbrain.

A 43 year old woman develops a progressive, ascending motor weakness over several days. She is hospitalized and requires intubation with mechanical ventilation. She is afebrile. A lumbar puncture is performed with normal opening pressure and yields clear, colorless CSF with normal glucose, increased protein, and cell count of 5/microliter, all lymphocytes. She gradually recovers over the next month. Which of the following conditions most likely preceded the onset of her illness:

- A Ketoacidosis
- B Viral pneumonia
- C Staphylococcus aureus septicemia
- D Systemic lupus erythematosus
- E Vitamin B12 deficiency

(B) CORRECT. Guillain-Barré syndrome, an acute idiopathic polyneuritis, is felt to be immunologic. About 75% of cases have a history of a preceding infection, including viral (cytomegalovirus) and bacterial (*Campylobacter jejuni*) agents.

A 50 year old female has become comatose. She has papilledema on the right on funduscopic examination. Cerebellar tonsillar herniation is suspected. Which of the following conditions would be LEAST likely to explain these findings in this patient:

- A Wernicke's disease
- B Cerebral abscess
- C Glioblastoma multiforme
- D Chronic subdural hematoma
- E Hypertensive intraparenchymal hemorrhage

(A) CORRECT. The lesions of Wernicke's disease are unlikely to increase intracranial pressure.

The mother of a 5 year old girl realizes that her child has spent all of Saturday in bed. The girl is listless and not arousable, so her mother takes the child to the emergency room. The examining physician notes a temperature of 38.8 C and nuchal rigidity. A lumbar puncture yields slightly cloudy CSF with an elevated protein and decreased glucose. A culture of CSF is most likely to yield:

- A Hemophilus influenzae
- B Cryptococcus neoformans
- C Aspergillus fumigatus
- D Mycobacterium tuberculosis
- E Cytomegalovirus

(A) CORRECT. The findings point to a bacterial meningitis, and H. influenzae is the most likely organism to cause this finding in children.

A 45 year old female noticed tinnitus in her left ear which progressed over some weeks to hearing loss in that ear. On physical examination she is found to have a marked decrease in hearing on the left, with Rinne test indicating air conduction better than bone conduction. The other cranial nerves I - VII and IX - XII are intact. A brain MRI scan revealed a solitary, fairly discrete, 3 cm mass located in the region of the left cerebellopontine angle. Which of the following statements is most appropriate to tell the patient regarding these findings:

- A You are unlikely to survive for more than a year
- B Remissions and exacerbations are likely to occur in coming years
- C Other family members should undergo MR imaging of the brain
- D The lesion can be resected with a good prognosis
- E A test for HIV-1 is likely to be positive

(D) CORRECT. The findings are characteristic for schwannoma, called an acoustic neuroma when the 8th cranial nerve is involved. These are benign neoplasms. A solitary mass is unlikely to be part of neurofibromatosis.

A 65 year old male has general paresis with increasing loss of higher mental functions. A VDRL is positive on cerebrospinal fluid obtained by lumbar puncture. The CSF protein and glucose are normal, and there is 1 mononuclear cell present. Which of the following pathologic findings is UNLIKELY to be a feature of his disease:

- A Cortical neuronal loss with atrophy
- B Hemorrhagic encephalitis
- C Chronic meningitis
- D Endarteritis
- E Atrophy of spinal cord dorsal columns

(B) CORRECT. This is not a feature of neurosyphilis. Hemorrhagic encephalitis would be more typical of herpes simplex virus infection

A 53 year old woman has had transient ischemic attacks (TIAs) for several years. She then has the sudden onset of a left hemiparesis. Four months later, an MRI scan of the brain shows findings consistent with a cystic 4 cm area in the right frontal-parietal region. Which of the following underlying conditions is she most likely to have:

- A Occlusive coronary atherosclerosis
- B Chronic meningitis
- C Alzheimer disease
- D Glioblastoma multiforme
- E Cerebral arterial vasculitis

(A) CORRECT. These findings suggest a 'stroke' from cerebral infarction. Most brain infarcts result from thromboembolism. The most common source for emboli is the heart. Coronary atherosclerosis can result in myocardial infarction with overlying endocardial mural thrombosis. Such mural thrombi can embolize to the systemic circulation.

A 50-year-old male has a history of falling multiple times over the past few years. On his last hospital admission, he was noted to have a contusion on the scalp at his occiput. His blood ethanol was .29 gm% (290 mg/dL). Which of the following lesions is LEAST likely to be found in this patient:

- A Cerebral contusions
- B Basal ganglia hemorrhage
- C Wernicke's disease
- D Subdural hematoma
- E Central pontine myelinolysis

(B) CORRECT. Such hemorrhages are a feature of hypertension, not alcoholism.

A 54 year old female develops a a distal, symmetric, primarily sensory polyneuropathy over a period of several months. She also has a non-healing ulceration on the ball of her left foot. She had a myocardial infarction last year but recovered and is doing well following angioplasty. Which of the following laboratory test findings would you most likely expect to be present:

A Decreased (20 mg/dL) glucose in CSF

B Pap smear showing changes of herpes simplex virus infection

C Markedly increased blood lead of 50 micrograms/dL

D Chromosome analysis with a 47, XX, +21 karyotype

E Elevated serum glucose of 195 mg/dL

(E) CORRECT. Diabetic neuropathy is probably the most common form of peripheral neuropathy in the United States and Europe. She also has a 'diabetic foot' from severe peripheral vascular atherosclerosis, and the MI is consistent with severe occlusive coronary atherosclerosis.

A 53-year-old male has a 6 month course of rapidly progressive dementia along with myoclonus. A cerebral electroencephalogram shows periodic biphasic synchronous sharp-wave complexes that are superimposed upon a slow background rhythm. He dies from bronchopneumonia. At autopsy, his brain appears grossly normal, but a spongiform encephalopathy is seen microscopically in a section of the cerebral cortex (which was put in concentrated formic acid for 1 hour prior to processing). He most likely has:

- A Alzheimer's disease
- B Creutzfeldt-Jakob disease
- C AIDS dementia
- D Rabies
- E Herpes viral encephalitis

(B) CORRECT. The incidence of this disease is about 1 per 1,000,000. It is caused by an abnormal prion protein. The formic acid pretreatment of the specimen will inactivate this protein.

An infant displays failure to reach developmental milestones. There is a prominent 2 cm lumbar meningocele. An MRI scan of the brain demonstrates downward extension of the cerebellar vermis and displacement of the medulla from a small posterior fossa into the foramen magnum. There is tenting of the tectum of the midbrain. The cerebral ventricles are enlarged. The spinal cord has findings of hydromyelia. Which of the following conditions is most likely to account for these findings:

- A Dandy-Walker malformation
- B Viral meningoencephalitis
- C Arnold-Chiari malformation
- D Maternal folate deficiency
- E Werdnig-Hoffman disease

(C) CORRECT. The findings are those of a Chiari type II malformation.

A 22 year old male has recently emigrated from Mexico City. He has the sudden onset of a seizure disorder while working as a chef in a restaurant. The MR scan of the brain reveals a 2 cm rounded cyst in the right temporal lobe cortex and another 1.5 cm cyst in the subarachnoid space over the left parietal lobe. Both lesions are non-enhancing. A lumbar puncture yields colorless CSF under normal pressure. The protein and glucose are normal. There are 5 WBCs (4 monos, 1 PMN). Which of the following conditions is most likely to be present:

- A Metastatic adenocarcinoma
- B HIV encephalopathy
- C Left atrial mural thrombosis
- D Cysticercosis
- E Hypertension

(D) CORRECT. This infection results when man becomes the accidental intermediate host for *Taenia solium* (pork tapeworm). The larvae may lodge in many organs but in the brain they are primarily found in the subarachnoid space and the cortex. They become encysted and the cysts within the subarachnoid space move around and can obstruct CSF flow leading to life threatening hydrocephalus.

Several weeks after the appearance of an expanding ring-like rash on her forearm, a 29-year-old female develops a stiff neck, left facial droop, and chest pain. These problems probably developed as a consequence of:

- A The bite of a deer tick
- B Mercury poisoning
- C Taking a cephalosporin
- D Sexual intercourse
- E Systemic lupus erythematosus

(A) CORRECT. The findings suggest erythema migrans along with neurologic sequelae and pericarditis that result from Lyme disease.

A 61 year old male has had a chronic cough for many years as a result of smoking 2 packs of cigarettes per day. Recently, he has noted headaches. His physician on neurologic exam can find no localizing signs. An MRI scan reveals a solitary 3.5 cm lesion that is located at the grey-white junction in the posterior left frontal lobe. There is no ring enhancement. A stereotactic biopsy of this lesion is most likely to show:

- A An organizing abscess
- B Viral inclusions
- C A plaque of demyelination
- D Neuronal loss with gliosis
- E Metastatic carcinoma

(E) CORRECT. The location of the mass at the grey-white junction is typical for a metastasis. Smoking increases the risk for development of lung and renal carcinomas that are the most common sources for metastases to brain in males.

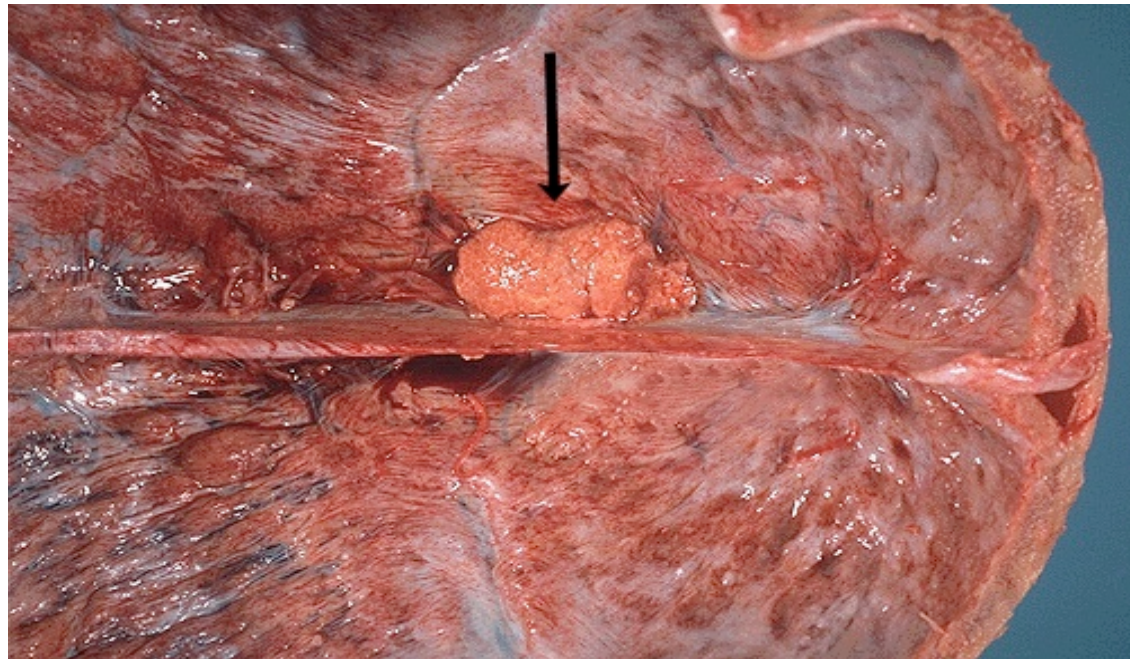
A 45 year old male complained of a severe headache. He was noted on physical examination to have papilledema on the right. He then became obtunded and died. The gross pathologic finding seen here is most likely to have been produced as a consequence of:

- A Ocular melanoma
- B Berry aneurysm rupture
- C Glioblastoma multiforme
- D Multiple sclerosis
- E Meningococccemia



C is CORRECT.

A glioblastoma multiforme is a large, fast-growing neoplasm that can produce unilateral brain swelling and papilledema.

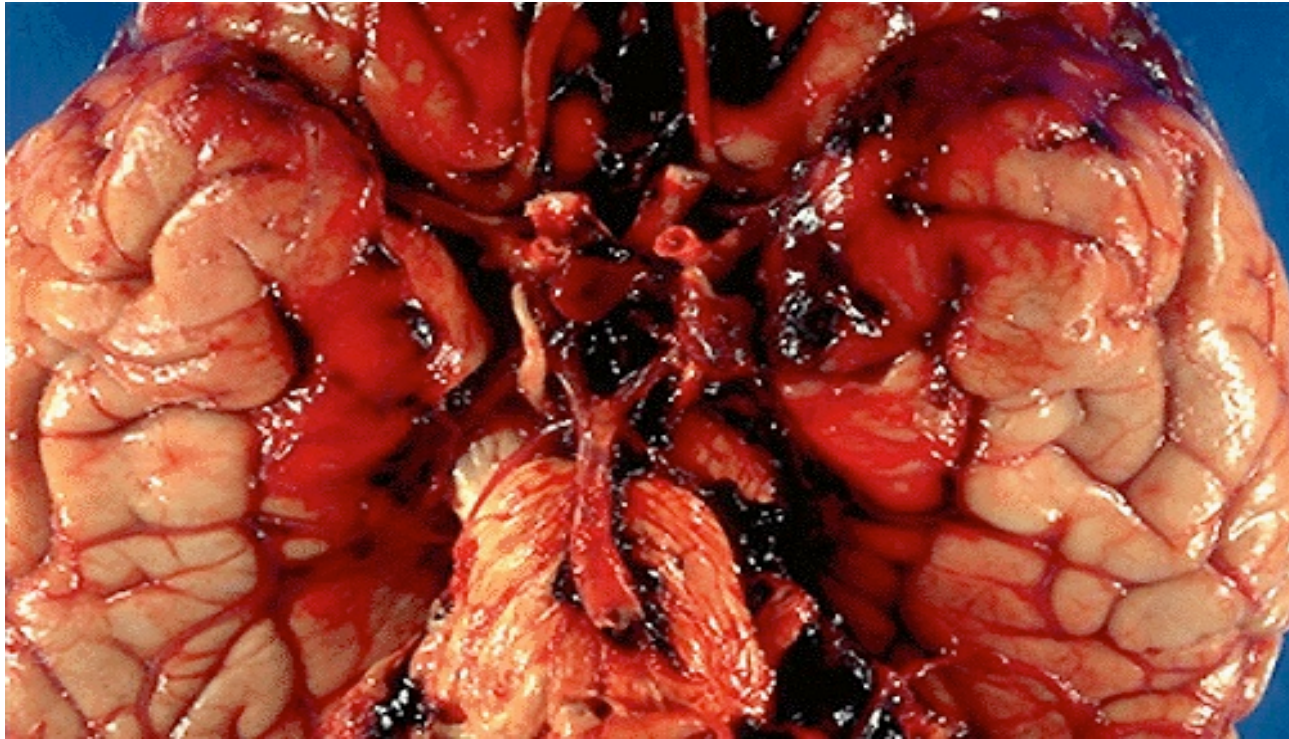


This lesion appeared on CT scan as a discrete mass beneath the dura and was seen to compress the underlying cerebral hemisphere. The patient is a 45 year old female who presented with headaches for the past month. The best diagnosis is:

- A Meningioma
- B Astrocytoma, low grade
- C Ependymoma
- D Metastasis
- E Tuberculoma

A is CORRECT.

A meningioma is a benign neoplasm that is slow-growing and can compress the underlying brain without invasion. The parasagittal region is a common location.

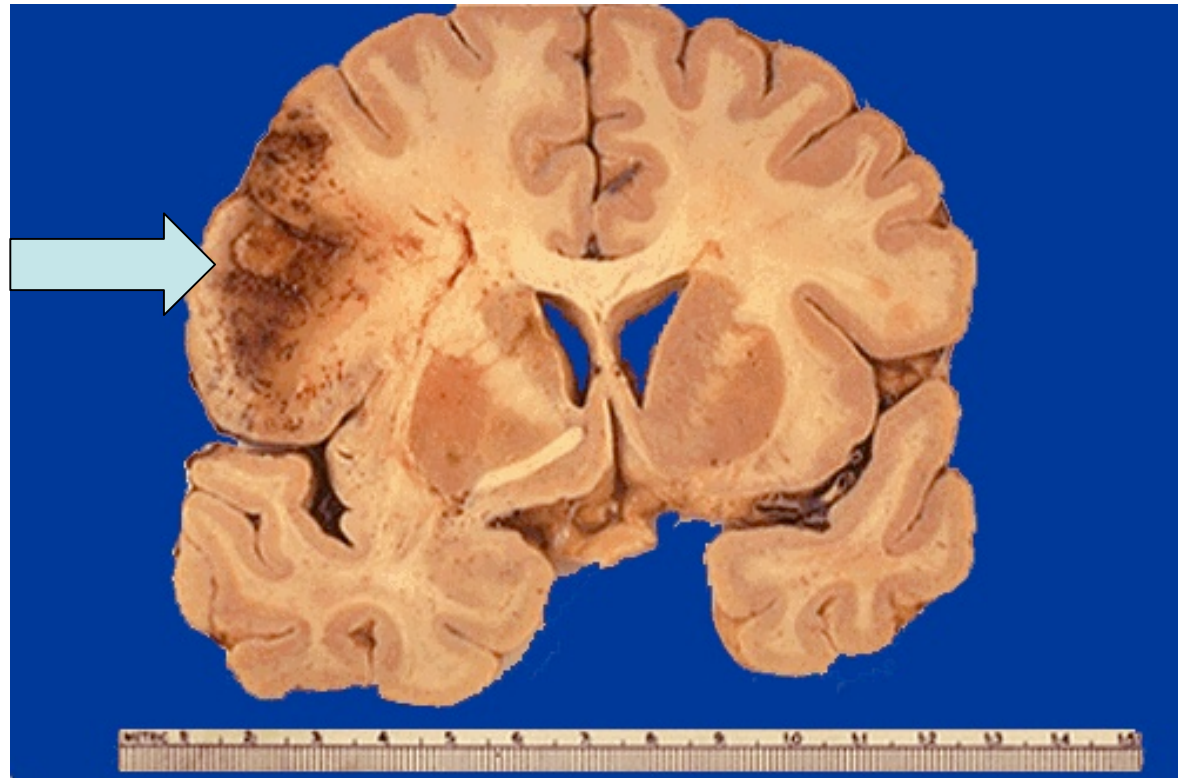


This 79 year old woman was driving her car when she had the sudden onset of a severe headache. She pulled in to a service station and stopped the car. Then she slumped over the wheel. She was taken to the emergency room, where she remained comatose and died hours later. The most likely explanation for the gross appearance seen here is:

- A Glioblastoma multiforme
- B Thromboembolization with cerebral infarction
- C Multiple sclerosis
- D Ruptured berry aneurysm
- E Huntington's disease

D is CORRECT.

Rupture of a berry aneurysm involving the circle of Willis and its branches is a sudden event that produces hemorrhage into the subarachnoid space at the base of the brain.



A 60 year old male has the lesion shown here at autopsy. He had suddenly lost consciousness, and when he again became alert, he was unable to move his left arm or speak. Which of the following underlying disease processes is he most likely to have to explain these findings:

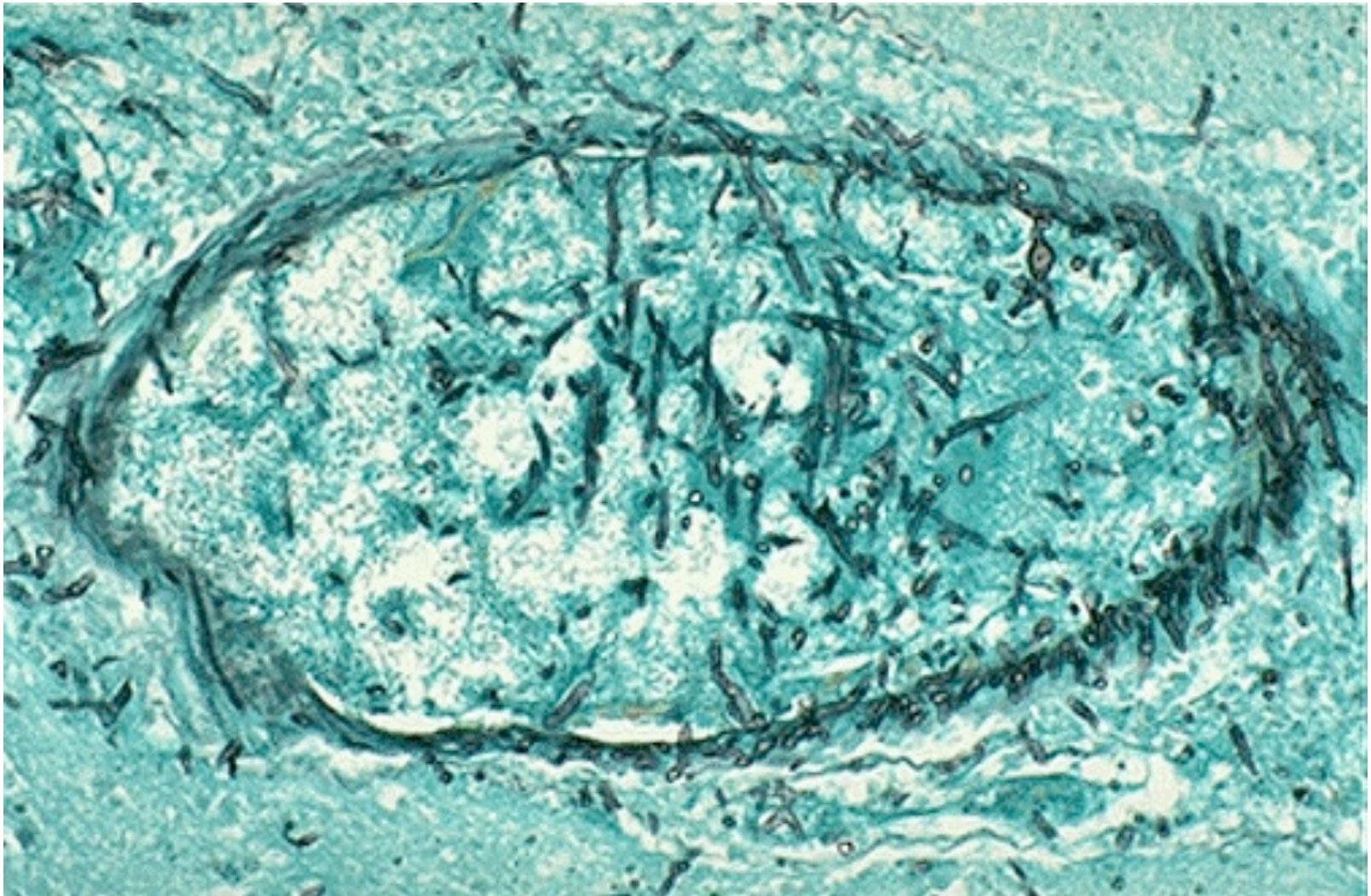
- A Hypertension with chronic renal failure
- B Rheumatic heart disease with left atrial mural thrombosis
- C Chronic alcoholism with micronodular cirrhosis
- D Acquired immunodeficiency syndrome with low CD4 count
- E Papillary thyroid carcinoma with metastases to bone

B is CORRECT.

Cerebral infarction can be the result of thromboembolic disease. Many thromboemboli originate in the left side of the heart. Thromboembolic cerebral infarctions can have hemorrhage, since the embolus may not completely occlude the artery.

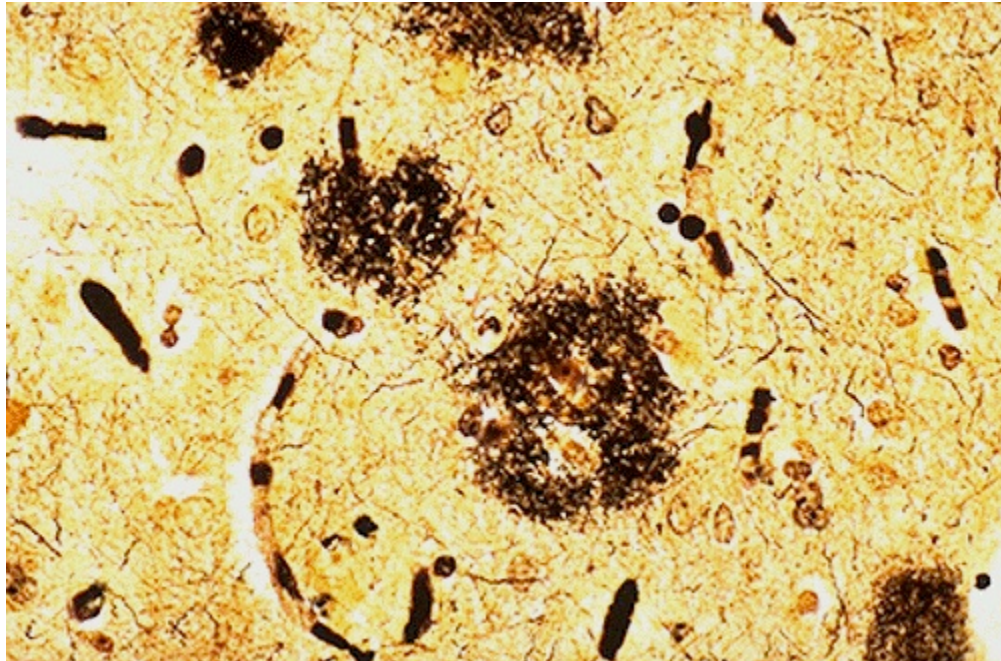
For the past year, a 34 year old woman has been treated with high dose immunosuppressive therapy, including prednisone and cytoxan, for high grade lupus nephritis. She now presents with increasing headache and decreased mentation for about a week. A complete blood count reveals that her WBC count is markedly decreased. Based upon the microscopic appearance of the lesion seen here with Gomori methenamine silver stain (next slide), the most likely explanation for these findings is:

- A Progressive multifocal leukoencephalopathy
- B Multiple sclerosis
- C Aspergillosis
- D Herpes simplex encephalitis
- E Cryptococcosis



C is CORRECT.

The branching septate hyphae invading the vascular wall are typical for infection with *Aspergillus*.



A 75 year old female has had progressively worsening mental function, as indicated by her son when he brings his mother to see you. The son states that his mother is now frequently getting lost in the neighborhood. He relates that she cannot easily feed or dress herself. She often does not seem to know who he is. After a year-long course in a nursing home, she dies from a respiratory infection. The brain at autopsy weighs 1025 gm and demonstrates frontal and parietal atrophy, with ex vacuo ventricular dilation. The light microscopic appearance of the frontal cortex is seen here with Bielschowsky silver stain. Which of the following statements best characterizes this process:

- A A bloodborne pathogen led to this illness
- B An amyloid angiopathy can be present
- C Inheritance of this disease occurs in an autosomal dominant fashion
- D A response to dopaminergic pharmacologic agents is often observed
- E Aluminum toxicity can explain these findings

B is CORRECT.

Amyloid can be present within the senile plaques of Alzheimer's disease as well as in peripheral cerebral arteries. Sometimes the amyloid angiopathy leads to intraparenchymal or subarachnoid hemorrhage.

Cerebral cortex that histologically shows numerous senile plaques is most consistent with which of the following histories:

A A 48-year-old male with choreiform movements

B A 30-year-old female with sudden loss of consciousness

C A 44-year-old male with progressive muscular weakness

D A 40-year-old female with Down's syndrome

E A 2-year-old boy with blindness and decreased neurologic function

(D) CORRECT.

The histologic finding is typical of Alzheimer's disease. Persons with Down's syndrome who live to middle age often develop Alzheimer's disease.

A 69-year-old male with a history of a remote myocardial infarction is found at autopsy to have a 4-cm diameter area of softening in the region of the left middle cerebral artery distribution. This is most consistent with:

- A Vasculitis
- B Arterial embolization
- C Venous thrombosis
- D Hypertension
- E Mycotic aneurysm

(B) CORRECT. The appearance of the infarction in the major blood flow distribution and the previous history of heart disease suggests embolic disease.

A 50-year-old female has had right-sided headaches for 5 years, but recently noted mild weakness in her right hand. A CT scan shows a well circumscribed lateral mass compressing the right hemisphere at the frontal-parietal junction. This is probably a:

- A Medulloblastoma
- B Metastatic carcinoma
- C Schwannoma
- D Glioblastoma multiforme
- E Meningioma

(E) CORRECT. This is a slow-growing dural mass compressing the brain.

A 65-year-old male has been healthy all his life until a sudden seizure. Neurologic exam reveals no focal abnormalities. A CT scan reveals a poorly demarcated large mass with central necrosis in the right frontal lobe. The most likely diagnosis is:

- A Glioblastoma multiforme
- B Medulloblastoma
- C Low grade astrocytoma
- D Meningioma
- E Choroid plexus tumor

(A) CORRECT. High grade gliomas are most likely to occur in adults and in the cerebral hemispheres. They are often large and infiltrative.

True statements regarding intracranial berry aneurysms include all of the following EXCEPT:

A They are present at birth.

B Subarachnoid hemorrhage could result from rupture.

C They can be associated with dominant polycystic kidney disease.

D Rupture is probably not associated with systemic hypertension.

E Intraparenchymal hemorrhage could result from rupture.

(A) CORRECT. Although the arterial medial weakness was present, the aneurysm itself developed over time.

A 52-year-old male with chronic respiratory difficulty dies from bronchopneumonia. At autopsy, the anterior spinal nerve roots are atrophic, and spinal cord anterior horns show neuronal loss with gliosis. These findings are most consistent with:

- A Guillain-Barre syndrome
- B Poliomyelitis
- C Rabies infection
- D Botulism
- E Amyotrophic lateral sclerosis

(B) CORRECT. Poliovirus infection leads to destruction of anterior horn cells. The anterior (motor) spinal nerve roots then atrophy.

A 78-year-old male who suffers ischemic injury with cerebral infarction most likely has which of the following histopathologic findings:

- A Gangrenous necrosis
- B Liquefactive necrosis
- C Coagulative necrosis
- D Caseous necrosis
- E Fat necrosis

(B) CORRECT. The brain has a high lipid content and typically undergoes liquefaction with ischemic injury.

During a fight at the Beacon Club in Casper, Wyoming, a patron is knocked backwards off a barstool and lands on the back of his head. Which of the following pathologic findings is most likely to be present as a consequence of this injury:

- A Occipital lobe contusions
- B Subarachnoid hemorrhage
- C Inferior frontal lobe contusions
- D Anterior pituitary necrosis
- E Skull fracture with epidural hematoma

(C) CORRECT. This is the location for a contracoup injury following a fall backwards.

The presence of a neural tube defect is suggested most strongly by which of the following findings:

A Decreased maternal serum alpha-fetoprotein

B Microcephaly

C Hydranencephaly

D Spina bifida

E Polyhydramnios

(D) CORRECT. This suggests a possible neural tube defect.

Progressive spastic paraparesis, optic nerve atrophy, sensory ataxia, and marked paresthesias of the legs are most characteristic of a 44-year-old male with:

- A Chronic alcoholism
- B Down's syndrome
- C Pernicious anemia
- D Lead poisoning
- E Diabetes mellitus, type I

(C) CORRECT. The subacute combined degeneration of the spinal cord (posterior and lateral white columns) from B12 deficiency leads to these findings.

A 54-year-old female has a lumbar puncture performed. The cerebrospinal fluid (CSF) opening pressure is 220 mm H₂O, the CSF protein 60 mg/dl, and the CSF glucose 75 mg/dl (serum glucose 105 mg/dl). Biopsy of a 3-cm right parietal mass reveals gliosis and fibrosis with necrosis, neutrophils, and lymphocytes. These findings suggest:

- A Glioblastoma multiforme
- B Herpes simplex type II encephalitis
- C Vascular malformation
- D Subacute infarction
- E Cerebral abscess

(E) CORRECT. The necrosis with fibrosis is typical for an abscess with an organizing wall. Neovascularization around the organization leads to edema.

A 50-year-old Vietnam veteran had a history of paresthesias, difficulty moving one or more extremities, loss of sensation, and ataxia over 22 years. These problems would come and go, but he eventually developed paraplegia and incontinence. Which of the following findings best explains his history:

- A Parasagittal meningioma
- B Scattered plaques of demyelination
- C Shrapnel in spinal cord
- D Wernicke's disease
- E Progressive multifocal leuko-encephalopathy

(B) CORRECT. The history is most consistent with multiple sclerosis.

Which of the following statements concerning an epidural hematoma is most appropriate:

A It is accompanied by a skull fracture.

B The bleeding is of venous origin.

C Onset of symptoms is delayed following vascular rupture.

D A fluctuating level of consciousness is evidenced by the patient.

E It can occur as a result of rupture of a mycotic aneuysm.

(A) CORRECT. An epidural hematoma is almost always preceded by a skull fracture that results in a tear of the middle meningeal artery.

Following a mild upper respiratory flu-like illness, a 47 year old male develops a rapidly ascending paralysis. A week later he is hospitalized and requires intubation with mechanical ventilation. Lumbar puncture yields clear CSF under normal pressure with a slightly elevated protein, but no red blood cells and only 3 mononuclear cells. He gradually improves over the next couple of weeks. He most likely has:

- A Multiple sclerosis
- B Amyotrophic lateral sclerosis
- C Huntington's disease
- D Guillain-Barré syndrome
- E Werdnig-Hoffman disease

(D) CORRECT. About 3/4 of patients have an antecedent viral infection. This disease is thought to be the result of an immunologic response..

Loss of all somatic sensation on the right side of the tongue is likely with damage to:

- A. the right hypoglossal nerve
- B. the left hypoglossal nerve
- C. the right facial nerve
- D. the right trigeminal nerve

D. the right trigeminal nerve

Loss of sensation on the little finger (your pinkie) is likely to result from damage to primary afferent fibers that enter the spinal cord at:

- A. L1
- B. C8
- C. C1
- D. T2

B. C8

Axons in the medial lemniscus cross the midline in:

- A. the ventral white commissure
- B. the pyramidal decussation
- C. the decussation of the dorsal columns
- D. the internal arcuate fibers

D. the internal arcuate fibers

Fine touch and proprioception information travels through the _____ of the spinal cord.

- A. anterior funiculus
- B. lateral funiculus
- C. posterior funiculus

C. posterior funiculus

Fasciculus Gracilis contains axons that mainly synapse in:

- A. the ipsilateral nucleus gracilis
- B. the contralateral ventral posterior lateral nucleus of the thalamus
- C. the contralateral nucleus gracilis
- D. the contralateral dorsal horn

A. the ipsilateral nucleus gracilis

Axons which synapse in nucleus cuneatis have their cell bodies in:

- A. cervical or thoracic dorsal horn
- B. lumbar or sacral dorsal horn
- C. cervical or thoracic dorsal root ganglia
- D. lumbar or sacral dorsal root ganglia

C. cervical or thoracic dorsal root ganglia

Damage to the posterior funiculus at T10 on the left side is likely to produce

A. inability to detect a vibrating stimulus when it is placed on the right knee

B. loss of pain and temperature below the lesion on the contralateral side

C. inability to detect the stroke of an artist's brush on the bottom of the left foot

D. loss of the Babinski reflex below the lesion on the ipsilateral side

C. inability to detect the stroke of an artist's brush on the bottom of the left foot

The medial lemniscus carries fine touch and proprioception information as far as

A. the medulla

B. the pons

C. the thalamus

D. the somatosensory cortex

C. the thalamus

Damage to the most ventral region of the medial lemniscus in the middle medulla should result in:

- A. loss of conscious proprioception in the contralateral ankle joint
- B. loss of fine touch in the ipsilateral foot
- C. loss of fine touch in the contralateral hand
- D. loss of proprioception in the ipsilateral hip joint

A. loss of conscious proprioception in the contralateral ankle joint

In the sensory homunculus of the postcentral gyrus, which area of the body is represented most laterally?

- A. the feet
- B. the nose
- C. the tongue
- D. the forehead

C. the tongue

When there is damage to the spinal cord there is often an ipsilateral loss of pain and temperature:

- A. at and below the level of the lesion
- B. below the level of the lesion
- C. above the level of the lesion
- D. at the level of the lesion

D. at the level of the lesion

The main neurotransmitter that is released both peripherally and centrally by primary pain afferent fibers is:

- A. gamma amino butyric acid
- B. glutamate
- C. acetylcholine
- D. Substance P

D. Substance P

The reason the ALF is not the same as the spinothalamic tract is:

- A. it starts in the spinal cord, but doesn't terminate in the thalamus
- B. it is a fasciculus not a tract
- C. it is an Alien not a tract
- D. it contains the spinothalamic tract but also several other tracts

D. it contains the spinothalamic tract but also several other tracts

What type of fibers travel in the dorsolateral fasciculus (Lissauer's Tract)?

- A. primary pain afferents
- B. primary touch afferents
- C. secondary pain afferents
- D. primary pain and touch afferents

A. primary pain afferents

The cell bodies of the axons in Lissauer's Tract (the dorsolateral fasciculus) are located in:

- A. the dorsal root ganglia
- B. the dorsal horn
- C. the ventral horn
- D. the Gasserian ganglia

A. the dorsal root ganglia

Pain information that reaches the postcentral gyrus is carried by axons that originate in neurons located in:

- A. nucleus gracilis or cuneatis
- B. ventral posterior lateral nucleus of the thalamus
- C. dorsal horn of the spinal cord
- D. medial and intralaminar nuclei of the thalamus

B. ventral posterior lateral nucleus of the thalamus

In syringomyelia, the central canal of the spinal cord enlarges dramatically, especially at cervical levels. A likely outcome is:

A. difficulty distinguishing coins in the patient's pocket

B. ignoring a cut or burn of the hand, leading to infection

C. loss of pain perception bilaterally at all levels of the spinal cord

D. paralysis of the upper and lower limbs with a decrease in tone.

B. ignoring a cut or burn of the hand,
leading to infection

Patients with blockage of the middle cerebral artery often retain pain sensation because:

A. the somatosensory cortex receives it's blood supply from the anterior cerebral artery

B. blockage of the MCA may not damage the thalamus

C. the somatosensory cortex does not process pain information

D. blockage of the MCA does not damage the cingulate cortex

D. blockage of the MCA does not damage the cingulate cortex

What muscle is most responsible for abducting the eye?

- A. superior rectus
- B. superior oblique
- C. inferior oblique
- D. lateral rectus

D. lateral rectus

The spinal accessory nerve exits the skull through:

- A. the foramen magnum
- B. the internal auditory meatus
- C. foramen spinosum
- D. the jugular foramen

D. the jugular foramen

If a patient cannot look to the left with his left eye, then there may well be damage to:

- A. the abducens nerve
- B. the trochlear nerve
- C. the oculomotor nerve

A. the abducens nerve

The facial nerve closes the eye lid while the ____ nerve opens it.

- A. 5th
- B. 7th
- C. 4th
- D. 3rd

D. 3rd

The hypoglossal nerve exits the brainstem at:

- A. the preolivary sulcus
- B. the postolivary sulcus
- C. the pontomedullary junction
- D. the obex

A. the preolivary sulcus

When the eye is adducted, which muscle elevates the eye?

- A. superior rectus
- B. superior oblique
- C. inferior oblique
- D. inferior rectus

C. inferior oblique

Damage to the ventral midbrain is likely to produce all of the following symptoms EXCEPT:

A. difficulty in depressing the ipsilateral eye when it is adducted

B. a drooping eyelid

C. a dilated pupil

D. difficulty in depressing the ipsilateral eye when it is abducted

A. difficulty in depressing the ipsilateral eye when it is adducted

Visceral sensory fibers in the vagus nerve terminate mainly in:

- A. nucleus cuneatis
- B. nucleus ambiguous
- C. the nodose ganglia
- D. the solitary nucleus

D. the solitary nucleus

If your gag reflex was absent AND when your uvula was stimulated you had no conscious sensation of gagging, then it is likely that there is damage to at least:

- A. the vagus nerve
- B. the glossopharyngeal nerve
- C. the facial nerve
- D. the hypoglossal nerve

B. the glossopharyngeal nerve

Good Luck!