1. Answer: B. Duret hemorrahes are linear midbrain or pontine hemorrhages that are seen in association with transtentorial herniations, as a result of stretching and tearing of the penetrating vessels of the posterior circulation. The reason for transtentorial herniation is a supratentorial increase in pressure, such as brain edema or mass lesion. Aqueductal stenosis is usually caused by perinatal periventricular bleeding, resulting in hydrocephalus. *(Robbins p. 1353)*

2. Answer: A. The lucid interval is typical of an epidural hematoma, developing after trauma to the left temporoparietal lesion, most likely associated with fracture of skull bones, damaging left middle meningeal artery. Cerebral artery ruptures will create subarachnoid and intraparenchymal bleeding. Rupture of a berry aneurysm is an acute event with excruciating headache, resulting in subarachnoid hemorrhage. It is highly unlikely for a bacterial meningitis to progress to this point without any previous signs and symptoms and no other findings on physical examination. Although there may be counter-coup lesions on the right side of the brain, rupture of meningeal artery would be related to the fracture at the trauma side. *(Robbins pp. 1357-1360)*

3. Answer: E. The scalp contusion and the brain contusion are on the same side, occipital region. This is a coup injury, suggesting that the head was still at the time of trauma, as opposed to fallin, when the head would be in motion to cause contrecoup injury. If he were strangled to death previously, contusions would not occur by subsequent trauma. The age and patterns of injury are not compatible with cancer or hypertensive hemorrhage. *(Robbins pp. 1357-1358)*

4. Answer: C. Hypertension is the most common cause of primary brain parenchymal hemorrhage, accounting for more than 50% of cases. In addition to hyalin change in the arteriole walls, which weaken the vessel wall, Charcot-Bouchard aneurysms are thought to be the site of hemorrhage in this setting. Hypertension causes intraparenchymal hemorrhage, mainly involving deep gray matter areas, such as basal ganglia and thalamus. Hypertension does not typically cause subdural hemorrhage. *(Robbins p. 1366)*

5. Answer: E. The picture shows a saccular (Berry) aneurysm, which is the most common type of intracranial aneurysm and is the most common cause of clinically significant subarachnoid hemorrhage. The most common location is the anterior circulation. It arises at the branching points of arteries. Bleeding is acute with excruciating pain. *(Robbins pp. 1366-1367)*

6. Answer: D. The picture shows pus in the subarachnoid space in a case of acute bacterial meningitis. E. coli and group B streptococci are common in the neonate, while S. pneumoniae and Listeria monocytogenes in the elderly and N. meningitidis in the adolescents and young adults. Bacterial meningitis causes increased pressure, increased neutrophils, high protein and low glucose levels in the cerebrospinal fluid. Fibrosis in the subarachnoid space during healing may interfere with the resorbtion of cerebrospinal fluid from the arachnoid granulations, resulting in hydrocephalus. The cloudy material in bacterial meningitis is yellow-green pus, as opposed to white plaque-like cancer in meningeal carcinomatosis. *(Robbins pp. 1369-1370)*

7. Answer: A. As many as 60% of patients with AIDS develop neurologic dysfunction in the course of their disease. The major central nervous system disorders in the setting of AIDS are HIV meningoencephalitis, vacuolar myelopathy of the spinal cord, various opportunistic infections and progressive multifocal encephalopathy (PML). The typical microscopic feature of HIV meningoencephalitis is, in addition to a chronic inflammatory infiltrate, widespread microglial nodules with multinucleated giant cells. Vacuolar myelopathy is degenration of posterior columns of the spinal cord and is not associated with Herpes virus infections. Opportunistic infections are seen more commonly in adults. One of them, PML, is caused by JC virus. CJD (Creudzfeltd-Jacob Disease) is a prion disease. *(Robbins pp. 1375-1377)*

8. Answer: C. A Lewy body in a pigmented neuron of substantia nigra, a midbrain structure, is shown in this picture. The pigment is neuromelanin, a metabolic byproduct that accumulates in time in these neurons. When these nerons die in Parkinson's Disease, substantia nigra grossly appears pale; however, it is normally nonpigmented in neonates as there is not enough pigment accumulation. Cortical Lewy bodies are seen in the cortical neurons. Due to their subtle and not so characteristic appearance, they are difficult to identify, but can easily be highlighted by synuclein immunohistochemistry. Dopamine levels are decreased in Parkinson's disease. *(Robbbins 1391-1393)*

9. Answer: B. Adrenoleukodystrophy is characterized by the inability to catabolize very long chain fatty acids due to peroxisomal problems. Lysosomal enzyme arylsulfatase A is deficient in metachromatic leukodystrophy. Kerns-Sayre syndrome is associated with mtDNA deletion/rearrangement. Vitamin B1 deficiency causes beriberi, Wernicke encephalopathy and Korsakoff syndrome. B12 deficiency is associated with subacute combined degeneration of the spinal cord. Etiology and pathogenesis of amyotrophic lateral sclerosis is unknown and a variety of sporadic genetic alterations have been identified; however, the prototype of trinucleotide repeat disorders is Huntington disease. *(Robbins pp. 1393- 1399)*

10. Answer: D. this picture shows a plexiform neuofibroma, which is considered an index lesion for neurofibromatosis type 1, and has a higher rate of progression to malignancy than the general population. NF1 is one of the more common genetic disorders, with a frequency of 1 in 3,000. It is due to a mutation in the tumor supressor NF1 gene, located on 17q and is autosomal-dominant. Bilateral schwannomas of the 8th. cranial nerves are seen in the central neurofibromatosis, NF2. *(Robbins p. 1413)*

11. Answer: B. This is the subependymal giant cell astrocytoma of tuberous sclerosis. It is typically subependymal and is composed of large, tapering pleomorphic cells in clusters in a glial background. The neoplastic cells have both neuronal and astrocytic features. In spite of its appearance, it is a low grade tumor with no necrosis or mitotic activity. Other central nervous system features of tuberous sclerosis are cortical tubers, glial hamartomas, and microdysgenesis. Elsewhere in the body, renal angiomyolipomas, retinal glial hamartomas, pulmonary lymphangioleiomyomatosis, cardiac rhabdomyomas, cysts of liver, kidney and pancreas, and characteristic skin lesions are seen. *(Robbins p. 1413)*

12. Answer: C. This is a hemangioblastoma. Although it has a superficial resemblance to clear cell renal cell carcinoma histologically, it is typically positive only for vimentin immunohistochemically. It can coexist with renal cell carcinoma in von Hippel-Lindau syndrome. It is a well-circumscribed, cystic tumor with a good prognosis. The most common location is cerebellar hemisphere, followed by brainstem and spinal cord. *(Robbins p. 1414)*

13. Answer: A. Reticulin network is expanded in hyperplasias and lost in adenomas. Most common type of pituitary adenoma is prolactinoma. Nelson sndrome is the development of a large ptuitary adenoma after removal of the adrenal glands for treatment of Cushing syndrome. Pituitary apoplexy is a sudden hemorrhage into the pituitary gland, often into an adenoma. The postpartum ischemic necrosis of the pituitary gland is Sheehan syndrome. Invasive adenoma indicates that the adenoma invades through the capsule into the surrounding structures and is not an indication of malignancy. *(Robbins pp. 1158-1163)*

14. Answer: E. This is an ependymoma. It is more common in the 4th. ventricle in children and in spinal cord in adults. due to its proximity to ventricular surface, cerebrospinal fluid dissemination is common and negatively affects the prognosis. GFAP positivity is most prominent in the anuclear perivascular zone, i.e.m pseudorosettes. 1p/19q losses are associated with oligodendrogliomas and indicate a better response to treatment in those tumors. *(Robbins pp. 1404-1405)*

15. Answer: A. Meningovascular neurosyphilis can have obliterating endarteritis accompanied by a distinctive lyphoplasmacytic infiltrate. Involvement of central nervous sytem occurs in the tertiary stage of the disease and is seen in approximately 10% of untreated patients. Paretic neurosyphilis is caused by the invasion of the brain by Treponema pallidum and leads to dementia. *(Robbins p. 1372)*

References:

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