A 76-year-old man has a single episode of grand mal seizure. On physical examination, he is afebrile and normo- tensive. Motor strength is intact, and there is no loss of sen- sation. Cranial nerves are intact. His mental function is not diminished. There is a 1-cm, darkly pigmented skin lesion on the upper back. Brain MRI shows three solid, 1- to 3-cm mass lesions, without ring enhancement or surrounding edema, located at the gray-white junction in the right and left frontal lobes. The cerebral ventricles appear normal in size. What is the most likely diagnosis?
A Glioblastoma
B Hemangioblastoma
C Meningioma
D Metastatic carcinoma
E Non-Hodgkin lymphoma
F Oligodendroglioma

(D)

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A 45-year-old woman has had unilateral headaches on the right for the past 5 months. Physical examination yields no remarkable findings. The representative gross appearance of the lesion seen on CT scan of the head is shown in the figure. The mass is surgically removed and microscopic examination shows elongated cells with pale, oblong nuclei and pink cyto- plasm with occasional psammoma bodies. Cytogenetic analysis shows 22q-. What is the most likely diagnosis?
A Astrocytoma
B Ependymoma
C Meningioma
D Metastasis
E Tuberculoma

(C)

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An 11-year-old girl has had increasing headaches upon awakening for the past month. On examination, papilledema is present bilaterally. An MRI of her brain reveals a 3-cm solid circumscribed mass within the fourth ventricle. There is third and lateral cerebral ventricular dilation. The mass is excised and microscopically shows perivascular pseudorosettes with round, regular tumor cells arranged around vessels. Which of the following neoplasms is she most likely to have?
A Astrocytoma
B Ependymoma
C Glioblastoma
D Medulloblastoma
E Schwannoma

(B)

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46-year-old woman has had increasing weakness and loss of sensation in the lower extremities for the past 5 months. She has been unable to walk without assistance for the past week. On physical examination, there is 4/5 motor strength in the right lower extremity and 3/5 motor strength in the left lower extremity. There is bilateral loss of sensation to light touch from the lateral midthigh distally. MRI of the spine shows a 1 × 4 cm lesion in the filum terminale. The mass is removed. Microscopically, the mass is composed of cuboidal cells around papillary cores in a myxoid background. Which of the following lesions was most likely present in this patient?
A Choroid plexus papilloma
B Ependymoma
C Meningioma
D Neurofibroma
E Pilocytic astrocytoma
F Schwannoma

(B)

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10-year-old boy has had persistent headaches for the past 3 months. On physical examination, he is afebrile. He has an ataxic gait and dysdiadochokinesia. CT scan of the head shows a 4-cm cystic mass in the right cerebellar hemisphere. Cerebral lateral ventricles are enlarged. A lumbar puncture is done. The CSF protein concentration is elevated, but the glu- cose level is normal. Neurosurgery is performed, and the mass is removed and sectioned. On gross examination, the mass is a cyst filled with gelatinous material. The cyst has a thin wall and a 1-cm mural nodule. Microscopically, the mass is composed of cells that stain positive for glial fibrillary acidic protein (GFAP) and have long, hairlike processes. What is the most likely diagnosis?
A Astrocytoma
B Ependymoma
C Hemangioblastoma
D Medulloblastoma
E Meningioma
F Schwannoma

(A)

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A 55-year-old man has experienced headaches for the first time in his life beginning 2 months ago. He comes to the emergency department following a generalized tonic-clonic seizure. On physical examination, he has weakness on the left side. An MRI of his brain shows a large, irregular, 6-cm mass in the centrum semiovale of the right cerebral hemisphere that extends across the corpus callosum. A stereotaxic biopsy of the mass is done and microscopically shows pleomorphic cells positive for glial fibrillary acidic protein (GFAP). Molecular analysis shows abnormalities of TP53 and platelet-derived growth factor-alpha (PDGF-α). Which of the following neo- plasms is he most likely to have?
A Diffuse large B-cell lymphoma B Glioblastoma
C Hemangioblastoma
D Medulloblastoma
E Pilocytic astrocytoma
(e)

45-year-old, previously healthy man has developed headaches over the past month. There are no remarkable findings on physical examination. A cerebral MR angiogram shows a 7-mm saccular aneurysm at the trifurcation of the right middle cerebral artery. Which of the following is the most likely complication from this lesion?
A Cerebellar tonsillar herniation B Hydrocephalus
C Epidural hematoma
D Subarachnoid hemorrhage
E Subdural hematoma

(D)

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50-year-old woman develops a sudden, severe head- ache and is taken to the emergency department. On exami- nation, she has nuchal rigidity. Her blood pressure is 115/83 mm Hg. A lumbar puncture is done; the CSF shows numer- ous RBCs, no neutrophils, a few mononuclear cells, and a normal glucose level. The Gram stain result is negative. CT imaging shows subarachnoid hemorrhage at the base of the brain. Which of the following vascular events has most likely occurred in this woman?
A Bleeding from cerebral amyloid angiopathy
B Hematoma formation from arteriolosclerosis C Middle cerebral artery thromboembolism
D Rupture of an intracranial berry aneurysm
E Tear of subdural bridging veins

(D)

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A study is conducted to identify causes of neuronal loss in patients 18 to 90 years old who died in the hospital from a natural manner of death and who had autopsies performed. Subsequent microscopic examination of sections revealed red, shrunken neurons, decreased numbers of neurons, or absent neurons. The hippocampal pyramidal cells, the cere- bellar Purkinje cells, and the superior parasagittal neocortical pyramidal cells are affected. What condition is most likely to be the major cause of neuronal loss in these patients?
A Autoimmunity
B Chemotherapy
C Diabetes mellitus
D Global hypoxia
E Lead ingestion
F Poor nutrition

(D))
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79-year-old man with metabolic syndrome has had 6 episodes of sudden dysarthria, a feeling of weakness in his hand, and dizziness in the past 3 months. These episodes usually last less than 1 hour, and then he feels fine. Today, he suddenly lost consciousness while walking to the bathroom in his house and fell to the floor. On regaining consciousness 4 minutes later, he was unable to move his right arm. Which of the following underlying lesions is most likely to be found in his brain?
A Arteriovenous malformation
B Cerebral atherosclerosis
C Frontal lobe astrocytoma
D Meningoencephalitis
E Subdural hematoma

(B)
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An 80-year-old resident of a nursing home is admitted to the hospital because of recent onset of fluctuating levels of con- sciousness with headache and confusion for the past 2 days. On physical examination, she is arousable, but disoriented and irritable. Vital signs include temperature of 36.9° C and blood pressure of 130/85 mm Hg. There is papilledema on the right. CT scan of the head shows a collection of blood in the subdu- ral space on the right. Which of the following vascular lesions most likely produced these findings?
A Bleeding from an arteriovenous malformation
B Laceration of the middle meningeal artery
C Rupture of a saccular aneurysm
D Tearing of the cerebral bridging veins
E Thrombosis of the middle cerebral artery

(D)

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A 72-year-old woman trips and falls down the stairs. She does not lose consciousness. She develops a headache and confusion 30 hours later and is taken to the emergency depart- ment. On physical examination, she is conscious and has a scalp contusion on the occiput. What is the most likely location of an intracranial hemorrhage in this patient?
A Basal ganglia
B Epidural
C Pontine
D Subarachnoid
E Subdural

(E)

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A 19-year-old snowboarder wearing protective equip- ment consisting of a baseball cap, baggy shorts, and a flak jacket flew off a jump and hit a tree. He was initially unconscious, and then “came to” and wanted to try another run, but his friends thought it best to call for help. On the way to the emergency department, he became comatose. Physical examination now shows left papilledema. Skull radiographs show a linear frac- ture of the left temporoparietal region. This clinical picture is most consistent with which of the following lesions?
A Acute leptomeningitis
B Contusion of frontal lobes
C Middle meningeal artery laceration
D Ruptured berry aneurysm
E Tearing of cerebral bridging veins

(c)

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16-year-old boy with no prior medical problems has complained of headaches for the past 9 months. There are no abnormal findings on physical examination. CT scan of the head shows enlargement of the lateral cerebral ventricles and third ventricle. A lumbar puncture is performed with normal opening pressure, and clear CSF is obtained, which has a slightly elevated protein, normal glucose, and no leukocytes. Which of the following intracranial lesions is most likely to cause these findings?
A Aqueductal stenosis
B Cerebral abscess
C Cryptococcal meningitis
D Ependymoma
E Multiple sclerosis
F Vascular malformation

(D)

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a study of hypoglycemic shock, cellular changes in the brain are analyzed. One cell type in the hippocampus is noted to exhibit intense cytoplasmic eosinophilia, central chro- matolysis, spheroidal swellings, and nuclear pyknosis. These changes appear 12 hours after blood glucose levels drop below 20 mg/dL. What is this cell type most likely to be?
A Astrocytes
B Endothelial cells
C Microglia
D Neurons
E Oligodendroglia

(D)

75-year-old man has a history of transient attacks of loss of vision. The only abnormalities on physical examina- tion are bruits over the carotids in the neck. Two days later he suddenly becomes hemiplegic and loses consciousness. He is rushed to the emergency room and a CT scan shows evidence of cerebral infarction. He is put on life support but dies 5 days later. At autopsy there is an area of necrosis and microscopi- cally these lesions are noted to have increased numbers of cells distributed around the central zone of necrosis. Which of the following cell types is most likely to have a phagocytic function in these lesions?

A Arachnoidal cells
B Astrocytes
C Ependymal cells
D Microglia
E Oligodendroglia

(D)