

# Nursing

ABNN-CNRN  
Certified Neuroscience Registered Nurse

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## Question: 1

In the first 24 hours following carotid endarterectomy, the MOST important vital sign to monitor and stabilize is:

- A. temperature.
- B. heart rate and rhythm.
- C. blood pressure.
- D. respiratory rate and pulse oximetry.

**Answer: C**

Explanation:

Blood pressure monitoring and stabilization is critically important in the hours following carotid endarterectomy in order to avoid both hyperperfusion and hypoperfusion syndromes. Following carotid endarterectomy, abrupt restoration of arterial perfusion can lead to intracerebral hemorrhage. This is a particular risk until cerebral blood flow autoregulation normalizes. In addition to disrupted cerebral blood flow autoregulation there is also disruption of the normal systemic baroreceptor responses in patients immediately following surgical manipulation of the carotid artery, so systemic blood pressure may be difficult to regulate just when the brain is most vulnerable to alterations in flow. In this setting, hypertension poses a risk of hemorrhage, and hypotension poses a risk of cerebral ischemia. Blood pressure should be monitored continuously, and overcorrection is to be avoided. For most patients, a systolic pressure between 120 and 130 mmHg is optimal.

## Question: 2

In response to a patient's loss of self-control and social inhibitions following stroke, the MOST essential nursing intervention is to:

- A. discuss with the patient and family the likely need for psychiatric care, including pharmacotherapy.
- B. simply accept the new range of behavior and avoid judgment.
- C. explain to the patient and family that these behaviors are involuntary, resulting from brain injury.
- D. ignore the behavior.

**Answer: C**

Explanation:

Especially with injury to the frontal and temporal lobes, stroke patients may lack self-monitoring and display socially inappropriate behaviors such as disregarding personal hygiene or making socially unacceptable sexual advances. Although these behaviors are involuntary and

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should not be judged, neither should they be ignored. It is important to make the patient aware of unacceptable behavior and reassure the patient and family that this behavior is a result of organic brain injury, is not a reflection upon the patient's character, and can be brought under control in time. It is helpful to state and repeat expectations clearly and to maintain a predictable routine help to minimize unwanted behaviors. Psychiatric care, including psychoactive medications, may be needed, but with or without psychiatric input, the patient and family absolutely need both explanation and reassurance about the origin of distressing behaviors.

### Question: 3

What is the best nutritional advice to give a patient discharged on warfarin to prevent recurrence of embolic stroke?

- A. Take a vitamin K supplement, because warfarin inhibits vitamin K
- B. Eat leafy green vegetables regularly and in moderation
- C. Do not drink more than 2 glasses of wine or 1 mixed drink per week
- D. Take an iron supplement to counteract anemia associated with silent microscopic GI bleeding

**Answer: B**

Explanation:

Interference with vitamin K and the synthesis of clotting factors that depend upon vitamin K is the mechanism by which warfarin maintains anticoagulation. Taking vitamin K undermines anticoagulation with warfarin. Leafy green vegetables contain vitamin K. Patients should not avoid this class of foods, because they also provide fiber, folic acid, antioxidants, trace minerals, and other nutrients. While taking warfarin, however, they should keep their intake of leafy green vegetables as consistent as possible, avoiding unaccustomed excesses or unaccustomed abstinence from these foods. Plant-derived nutritional supplements should also be avoided. Patients should avoid cranberries and cranberry juice because they can augment the effects of warfarin as can ginseng, ginkgo, and certain botanicals such as St. John's wort. Alcohol is to be avoided altogether because of its inhibitory effect on the liver enzymes that break down warfarin. The therapeutic range for warfarin is narrow, and any factor that influences its actions or metabolism should be either strictly controlled or avoided altogether. The patient should not add or discontinue any prescription or over-the-counter medication while on warfarin without consulting the physician who is prescribing and monitoring the warfarin. With proper management of the medication, occult GI bleeding is not to be anticipated, and iron supplementation is not required.

### Question: 4

Early definitive laboratory diagnosis of herpes simplex encephalitis is possible with:

- A. CT scan of the brain.
- B. a 4-fold rise in serum antibody titer.
- C. viral DNA in the cerebrospinal fluid (CSF).
- D. characteristic temporal sharp waves on electroencephalogram (EEG).

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**Answer: C**

Explanation:

CT scan is often normal early in the course of herpes simplex encephalitis. MRI is more frequently abnormal, but the characteristic frontotemporal areas of hemorrhage are non-specific. A 4-fold rise in serum antibody titer is reliable but does not ensue until the convalescent stage - if the patient survives. The EEG changes are also non-specific. The only early laboratory indicator of herpes simplex encephalitis is the presence of viral DNA in the CSF. If this testing is not available, then the decision to treat must be made on clinical grounds supplemented by whatever imaging and laboratory data are available. Symptoms can be rapidly progressive, and if treatment is delayed until the onset of coma, mortality is over 30%.

### Question: 5

While carefully monitoring the neurologic examination in a patient receiving a continuous intravenous heparin for cerebral venous thrombosis (CVT), the nurse notes an acute neurologic deficit. The immediate response should be:

- A. discontinue the heparin and notify the physician at once.
- B. elevate the head of the bed and make sure the head remains positioned at 30 degrees.
- C. assess the patient with PTT and CT scan of the brain.
- D. obtain PTT and empirically increase the heparin infusion slightly pending the result.

**Answer: A**

Explanation:

Although anticoagulation with heparin is standard treatment in the acute phase of management of the patient with cerebral venous thrombosis, the risk of converting an ischemic infarct to a hemorrhagic infarct is substantial; as many as 40% of CVT patients actually have hemorrhagic infarcts even before starting IV heparin. Acute changes in neurologic status of patients with CVT should be treated as if for intracerebral hemorrhage pending further evaluation.

### Question: 6

Admission to the intensive care unit is standard care for which diagnostic group, independent of neurologic status?

- A. Acute ischemic stroke
- B. Transient ischemic attacks
- C. Cerebral venous thrombosis
- D. Acute hemorrhagic cerebral infarction

**Answer: D**

Explanation:

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Patients with acute hemorrhagic cerebral infarction are at greatest risk for increased intracranial pressure and its attendant complications, including transtentorial herniation. Not only do these patients need extremely close monitoring, but if increased intracranial pressure is not responsive to simple measures such as positioning and mannitol, then more invasive measures may be needed rapidly. These measures may include ventriculostomy and hyperventilation. Patients with hemorrhagic cerebral infarction are also at greater risk than patients in the other three categories for accelerated systemic hypertension.

### Question: 7

Which of the following statements is correct concerning management of neurologic disease and pregnancy?

- A. Disease modifying therapy for multiple sclerosis should not be interrupted for pregnancy or lactation
- B. In a woman with a known cerebral arteriovenous malformation (AVM), pregnancy should be delayed until the lesion can be definitively treated
- C. A woman with a known cerebral arteriovenous malformation should not deliver her baby vaginally under any circumstances
- D. Women with myasthenia gravis should not take anticholinesterase medications during Pregnancy

**Answer: B**

Explanation:

The risk of bleeding from an arteriovenous malformation is probably slightly increased during pregnancy. Theoretically, the temporary increases in intracranial pressure associated with the transition stage of labor could contribute to bleeding from an AVM, but vaginal delivery is not absolutely contraindicated for a woman with an AVM.

None of the disease-modifying agents for MS is approved for use during pregnancy. When pregnancy can be planned, a patient should discontinue disease-modifying therapy several months before attempting to become pregnant. Pregnancy usually has a good effect on MS, and the incidence of exacerbations during pregnancy is lower than at any other time in the reproductive cycle. The post-partum period, however, is a time of increased incidence of exacerbations, and many neurologists advise patients to forgo breastfeeding in order to resume disease-modifying therapy immediately after delivery.

Pregnancy itself does not have a predictable effect on the course of myasthenia. About a third of women feel better symptomatically while pregnant while another third feel worse, and the remainder feel no different. Data concerning safety of anticholinergic medications during pregnancy are inconclusive regarding possible harm to the fetus. Most women who have been requiring anticholinergic medication prior to pregnancy will continue to need it while pregnant.

### Question: 8

What is the most accurate way to educate a patient contemplating surgery for an unruptured intracerebral arteriovenous malformation (AVM) about his risk of hemorrhage if the lesion is not treated?

- A. The patient should be reassured, because the risk of hemorrhage is only 2-4% per year
- B. Patients with particularly large AVMs should not be reassured, because they have a higher than average risk of bleeding
- C. The patient should understand that even though there is a substantial lifetime risk of hemorrhage, the risk of death with hemorrhage is low
- D. The patient should understand that although the risk of hemorrhage is low during any given year, the cumulative lifetime risk of hemorrhage is well over 50%

**Answer: D**

Explanation:

Although the annual risk of bleeding from an unruptured intracerebral AVM is low, the percentage cumulative lifetime risk can be estimated at 105 minus the patient's age in years at presentation. This risk is higher for aneurysms that have already bled once. Other factors also increase the risk of bleeding. Smaller AVMs have a higher risk, presumably because of higher pressures within the feeding artery. Hemorrhage risk is also greater for lesions that have only a single draining vein. Larger AVMs are less likely to bleed but are more likely to cause seizures, either because they are more likely to exert a mass effect on adjacent cerebral cortex or because of relative ischemia induced by shunting of larger volumes of blood away from parts of the cortex. Average mortality with the initial bleed from an AVM is between 6% and 30% and each hemorrhage increases the risk of subsequent hemorrhage.

### Question: 9

Which of the following best characterizes postoperative nursing management of the patient who has just undergone surgical treatment for an intracerebral arteriovenous malformation (AVM) ?

- A. Mild systemic hypotension is permissible to avoid hemorrhage
- B. Mild systemic hypertension is permissible to avoid bleeding due to vasospasm
- C. Fluids should be relatively restricted to avoid cerebral venous hypertension and resulting increases in intracranial pressure
- D. Fluids should be relatively restricted because of the high likelihood of developing the syndrome of inappropriate ADH (SIADH)

**Answer: B**

Explanation:

Until autoregulation of cerebral blood flow is re-established, the risk of bleeding is significant, therefore mild systemic hypotension is permissible but must be closely monitored. The patients who are at risk of vasospasm are those who have had subarachnoid hemorrhage (SAH) due to a ruptured intracranial aneurysm, but vasospasm is not the main concern in the postoperative AVM patient. Cerebral venous hypertension is a concern preoperatively in patients who have high-flow AVMs, but it is not a major postoperative concern. SIADH is not a common complication in postsurgical AVM patients, and the patient should be kept well hydrated.

### Question: 10

The MOST important element of prevention of future strokes for the patient who has had lacunar infarcts is:

- A. careful glucose control with diet, supplemented by hypoglycemic agents if necessary.
- B. management of hypertension.
- C. anticoagulation.
- D. anti-platelet drugs.

**Answer: B**

Explanation:

The single greatest risk factor for lacunar strokes is hypertension. To the extent that thrombosis is part of the pathophysiology of lacunar infarcts, it is secondary to microatheroma of small penetrating arteries, a condition promoted by sustained systemic arterial hypertension. Cigarette smoking and diabetes mellitus are lesser risk factors for lacunar infarction. Anticoagulation may be considered only in the minority of cases in which a cardiac embolic source appears to be the cause of lacunar infarcts.

### Question: 11

A 25-year-old man is admitted to the hospital with severe throbbing right-sided headache and transient ipsilateral monocular blindness 3 days after an automobile accident in which he sustained no blunt trauma

- a. Imaging studies have been ordered and are pending. Periodic nursing assessments should be particularly alert for:
- A. swallowing problems and difficulty handling oral secretions.
  - B. aphasia.
  - C. partial Horner's syndrome.
  - D. spatial neglect.

**Answer: C**

Explanation:

Although this patient did not experience blunt trauma, he has likely had non-traumatic neck injury. His unilateral pain accompanied by ipsilateral monocular blindness suggests a right internal carotid arterial dissection with embolization to the right ophthalmic artery. A partial Horner's syndrome is a very common manifestation of carotid dissection because of the location of the sympathetic fibers to the face. The syndrome is partial - no anhidrosis - because the sympathetic fibers to the facial sweat glands are adjacent to the external carotid artery. Carotid dissection can be caused by surprisingly mild external force as well as by major blunt trauma. Mild injuries that can result in carotid dissection include whiplash, coughing, sneezing, and sexual activity. Some dissections occur spontaneously in the setting of fibromuscular Dysplasia or connective tissue disorders such as Ehlers-Danlos syndrome. Incidence is highest in young adults. Cerebral ischemia in the form of stroke or TIA occurs in at least 75% of patients with carotid dissection. A carotid bruit, if present, may aid in diagnosis, but in the majority of cases, there is no bruit.

## Question: 12

A 23-year-old woman with a diagnosis of hemifacial spasm has had no benefit from decompression surgery. In fact, at surgery, no aberrant blood vessel was found in the vicinity of cranial nerve VII. She refuses anticonvulsant medication because she would like to become pregnant. The next step in her management should be:

- A. a new MRI scan, with double gadolinium and FLAIR sequences.
- B. psychiatric consultation and behavior management, including relaxation techniques.
- C. botulinum toxin.
- D. dental consultation to look for intraoral pathology that could be stimulating the unwanted movements.

**Answer: A**

Explanation:

Hemifacial spasm is a syndrome, not a diagnosis. Hemifacial spasm is often caused by an aberrant blood vessel irritating the facial nerve at the cerebellopontine angle. Other compressive lesions may also produce hemifacial spasm. In this case, there was no aberrant vessel and presumably no other compressive lesion. The patient is atypical because of her age as hemifacial spasm presents most often in the 5th or 6th decade of life. Although hemifacial spasm can occur on an idiopathic basis, underlying neurologic disease has to be considered, especially given the patient's age. She should be re-evaluated for multiple sclerosis, especially since this diagnosis could impact her decisions concerning if, when, and how to have children. This is most effectively done via MRI with double gadolinium and FLAIR sequences. Botulinum toxin may relieve her symptoms regardless of the cause, but further investigation at this point is essential. Some patients with orofacial dyskinesia have underlying dental abnormalities (often edentulousness) but the condition should be clinically distinguishable from hemifacial spasm and rarely affects young people, so dental consultation is not likely to produce useful information in this case. Psychiatric consultation may help the patient to cope with cosmetically distressing problem, but it will not yield diagnostic information or alleviate her symptoms.

## Question: 13

A patient with acute intracerebral hemorrhage has remained hypertensive, developed papillary edema, and now is becoming unresponsive. She has no respiratory problems, and her family is questioning preparations for endotracheal intubation. What is the most appropriate way to counsel the family?

- A. Tell the family that continued increased intracranial pressure puts her at risk for compression of her medullary respiratory center, and it is better to do a controlled elective intubation now than to intubate her on an emergency basis after respirations are compromised
- B. Initiate a medical ethics consultation
- C. Explain that the patient's increased intracranial pressure has reached a crisis level, putting the patient at risk for fatal pressure on her brainstem, and artificially inducing her to



breathe rapidly can reduce the pressure inside her head by reducing the carbon dioxide concentration in her blood

D. Prepare the family for the fact that the patient will remain intubated for at least several days, and ask for a speech therapy consultation to help the patient and family find a way to communicate during the period of intubation

**Answer: C**

Explanation:

Hyperventilation is a strategy for short-term management of increased intracranial pressure (ICP.) The resulting hypocapnia causes vasoconstriction. This is intended to reduce both cerebral blood flow and ICP, but sometimes only cerebral blood flow is actually decreased, and the effect may be inconsistent in different areas of the brain. Even when successful, the benefit is only temporary. For these reasons, hyperventilation is a less than ideal approach and should only be used as a temporizing measure until a more definitive approach such as ventriculostomy can be instituted. Furthermore, rebound ICP often ensues if hyperventilation is discontinued abruptly.

### Question: 14

A patient has hemineglect syndrome following a nondominant parietal lobe stroke. The MOST effective strategy is to:

- A. approach the patient on the unaffected side of the body. If you must approach on the affected side, help the patient to turn his head toward you.
- B. approach the patient on the affected side of the body as frequently as possible to help him to begin to pay attention to it again.
- C. stimulate the affected side of the body frequently to flood the dysfunctional cerebral hemisphere with neural input.
- D. request magnetic stimulation of the normal hemisphere to dampen its disproportionate activity so that the output from the damaged hemisphere is not overwhelmed.

**Answer: A**

Explanation:

Hemineglect syndrome is usually refractory to treatment. The patient may never fully recognize the affected side of his body as truly belonging to him. He, his family, the hospital staff, and ultimately his associates outside the hospital will need to make accommodations to cope with this deficit, such as approaching the patient on the unaffected side of the body. It will be important to assist the patient with bathing and grooming of the unrecognized body parts and to help him avoid injury. Emotionally, the deficit may be more distressing to family members than to the patient, and they will need support in finding coping strategies. Techniques of behavioral modification, electrical or magnetic stimulation of the body parts or cerebral hemisphere are generally not successful.

### Question: 15

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Which of the following is the MOST appropriate nutritional supplement for a patient with multiple sclerosis and for his children?

- A. Vitamin C
- B. Vitamin B12
- C. Vitamin D
- D. Vitamin E

<b>Answer: C</b>
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Explanation:

In laboratory models, it is more difficult to induce experimental autoimmune encephalitis (EAE) in animals that have been pre-treated with Vitamin D. In animals with established EAE, those treated with Vitamin D have a milder course. In a 20-year epidemiologic study of 187,563 nurses, a negative correlation was demonstrated between Vitamin D intake and incidence of MS. Offspring of a parent with MS have a risk of developing MS between 1 in 100 and 1 in 40, compared with the average risk of 1 in 750 for the general population. MS is thought to develop through interaction of a variety of environmental factors on a polygenic hereditary substrate. Clinical trials of Vitamin D in humans with MS are now in progress. Vitamin D deficiency has been implicated as a causative factor in numerous autoimmune diseases and malignancies, including multiple sclerosis, rheumatoid arthritis, diabetes, and cancers of the prostate, colon, ovary, and breast. Daily vitamin D requirement and normal serum Vitamin D levels have been underestimated, and these parameters are being revised upward.

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