STUDY GUIDE
for
Head, Neck, and Spinal Trauma

1. The brain and spinal cord make up the
   A. autonomic nervous system
   B. peripheral nervous system
   C. central nervous system
   D. none of the above

2. The three meningeal layers of the brain from the inside-out are the
   A. dura mater, pia mater, arachnoid membrane
   B. pia mater, dura mater, arachnoid membrane
   C. arachnoid membrane, pia mater, dura mater
   D. pia mater, arachnoid membrane, dura mater

3. The prominent bone of the cheek is known as the
   A. mandible
   B. maxilla
   C. sphenoid
   D. zygoma

4. The finger-like process of the second vertebra around which the first cervical vertebra rotates is the

   A. atlas
   B. axis
   C. odontoid
   D. mastoid

5. The opening on the vertebrae through which the spinal cord passes is the

   A. foramen magnum
   B. odontoid process
   C. spinal foramen
   D. dura mater

6. Cerebrospinal fluid circulates through which meningeal layer?
   A. Epidural space
   B. Subdural space
   C. Subarachnoid space
   D. Intracerebral space

7. Central nervous system neurons cannot regenerate after injury because they lack the protective protein sheath known as the

A. pia mater
B. neurilemma
C. falx cerebri
D. periosteum

8. The area of the brain that is the center of conscious thought is the

A. cerebrum
B. cerebellum
C. central sulcus
D. falx cerebri

9. The cerebrum is separated from the cerebellum by the

A. falx cerebri
B. central sulcus
C. cribriform plate
D. tentorium

10. The irregular bone at the base of the skull is the

A. falx cerebri
B. central sulcus
C. cribriform plate
D. tentorium

11. The pulse rate, respiration, and blood pressure are controlled in the

A. pons
B. falx cerebri
C. medulla oblongata
D. cerebellum

12. Topographical regions of the body innervated by specific nerve roots are

A. dermatomes
B. cauda equina
C. neurilemma
D. axons

13. Match the following parts of the eye with their respective definitions:

____	Vitreous humor	A.	Provides nourishment and lubrication
____	Pupil	B.	Gelatinous fluid found in eye globe
____	Iris	C.	Opening in the center of the iris
____	Lacrimal ducts	D.	Colored portion of the eye

14. Match the following parts of the eye with their respective definitions:

____	Conjunctiva	A.	Liquid found in anterior chamber of eye
____	Aqueous humor	B.	White, vascular area of the eye
____	Sclera	C.	Thin, clear layer covering iris and cornea

15. We hear because of the vibration of the

A. tympanic membrane
B. cochlea
C. semicircular canals
D. dens

16. Positional sense is regulated by our
A. tympanic membrane
B. cochlea
C. semicircular canals
D. dens

17. Which of the following statements is true regarding scalp lacerations?
A. They tend to bleed profusely.
B. Severe bleeding can lead to shock.
C. The blood vessels lack muscular control.
D. All of the above.

18. Battle's sign and periorbital ecchymosis are classic signs of a/an
A. intracerebral hemorrhage
B. basilar skull fracture
C. depressed skull fracture
D. subdural hematoma

19. A brain injury occurring on the opposite side of the impact is known as a

A. concussion
B. contusion
C. contrecoup
D. cochlea

20. A patient who has sustained a closed head injury with a brief loss of consciousness but no tissue damage and a complete recovery of function has suffered a

A. concussion
B. contusion
C. contrecoup
D. cochlea

21. A patient who has sustained a closed head injury with resulting tissue damage has suffered a

A. concussion
B. contusion
C. contrecoup
D. cochlea

22. A pool of blood in the anterior chamber of the eye is known as
A. conjunctival hemorrhage
B. retinal artery occlusion
C. hyphema
D. corneal abrasion

23. A patient who complains of sudden painless loss of vision in one eye has most likely suffered a

A. retinal detachment
B. retinal artery occlusion
C. hyphema
D. blowout fracture

24. Subcutaneous emphysema in the neck region is normally caused by
A. jugular vein laceration
B. carotid artery laceration
C. laryngo-tracheal laceration
D. cervical spine injury

25. Which of the following is a complication of jugular vein laceration?

A. Pulmonary embolism
B. Air embolism
C. Hemorrhagic shock
D. All of the above

26. Which of the following is **Not** part of "Cushing's Response?"

A. Hypertension
B. Bradycardia
C. Altered respirations
D. Hypothermia

27. A patient who responds only to deep pain by abnormally flexing the arms has a total Glasgow Coma Score of
A. 3
B. 5
C. 7
D. 9

Scenario

Your patient is a 75 year-old nursing home resident who presents with a decreased level of response. The staff claims he began acting strangely hours before calling you. He has no history of diabetes or CNS disease. His only history is that of a minor fall he took one week ago. He presents with a slow bounding pulse, systolic blood pressure of 170, which is high for him, an erratic breathing pattern and a slightly larger right pupil. His blood sugar is 120, and there is no history or evidence of substance abuse.

28. This patient has probably suffered a/an
A. epidural hematoma
B. subdural hematoma
C. basilar skull fracture
D. concussion

29. The signs and symptoms of this type of injury often present themselves hours or days following the injury because
A. significant brain swelling takes that long to develop
B. the bleeding is from a small vein
C. the bleeding is from a large artery
D. there is no real tissue damage

30. High risk factors for this type of injury include

A. alcoholism
B. the elderly
C. recent head injuries
D. all of the above

SCENARIO

Your patient is a 25-year-old boxer who was knocked out with a left hook to the side of the head and now lies in the dressing room fully awake. His initial vital signs are: BP-130/80, pulse 80, respirations 18, pupils equal and reactive to light. En route to the hospital, he begins to lose consciousness and complains of being sleepy. This breathing becomes erratic, his pulse slows to 60, and his blood pressure rises to 180/90. His left pupil is larger than the right and is slow to react to light.

31. This patient is probably suffering from a/an

A. epidural hematoma
B. subdural hematoma
C. basilar skull fracture
D. concussion

32. The rapid onset of signs and symptoms is most likely due to the

A. fracture of the cribriform plate
B. rupture of the middle meningeal artery
C. leakage of CFS into soft tissues
D. jarring of the reticular activating system

33. This patient also shows the classic signs and symptoms of

A. increasing intracranial pressure
B. decreasing cerebral blood volume
C. basilar skull fracture
D. contrecoup injury

34. These signs and symptoms are caused by

A. brain shrinkage
B. cerebral blood flow interruption
C. brainstem herniation
D. abnormally low carbon dioxide levels

35. His abnormal breathing pattern is caused by

A. high levels of carbon dioxide
B. pressure on the medulla
C. the leakage of cerebrospinal fluid into the nasal cavity
D. foramen magnum collapse

36. This patient may hyperventilate in an attempt to

A. vasodilate the brain vasculature
B. vasoconstrict the brain vasculature
C. increase carbon dioxide levels
D. cause a metabolic alkalosis

37. The larger left pupil is caused by compression of the

A. third cranial nerve
B. reticular activating system
C. extraocular muscles
D. iris muscle

38. This patient may vomit without accompanying nausea due to

A. high levels of carbon dioxide
B. brain hypoxia
C. Cushing's reflex
D. pressure on the medulla

39. The collection of blood for this hematoma lies between the _____ and _____.

A. Dura mater and skull
B. Skull and arachnoid membrane
C. Arachnoid membrane and dura mater
D. Pia mater and brain

40. Pharmacological therapy for this patient may include

A. furosemide
B. methylprednisolone
C. Solu-Medrol
D. all of the above

Scenario

Your patient is a 45-year-old male who was ejected from a vehicle in a one-car rollover accident. He presents on the ground complaining of the inability to move his arms and legs. His airway is clear and his vital signs are: respirations 18 with no chest rise, BP-70/30, pulse 60, skin warm and dry. He also presents with priapism and the hands in the "hold-up" position.

41. Your field diagnosis of this patient should include

A. neurogenic shock
B. cervical spinal cord interruption
C. bilateral paralysis
D. all of the above

42. His unusual vital sign presentation is due to

A. peripheral nerve interruption
B. loss of sympathetic nervous system control
C. loss of parasympathetic nervous system control
D. blood loss below the injury

43. The priapism is caused by

A. parasympathetic stimulation
B. sympathetic stimulation
C. total autonomic nervous system dysfunction
D. none of the above

44. The absence of chest rise is due to

A. intercostal muscle paralysis
B. rupture of the diaphragm
C. damage to the third cranial nerve
D. Cushing's reflex

45. Prehospital management includes which of the following procedures?

A. IV fluid replacement
B. Pneumatic antishock garment
C. Spinal immobilization
D. All of the above

46. The cranium consists of the frontal, temporal,

A. occipital, maxillary, and nasal concha bones.
B. sphenoid, occipital, and parietal bones.
C. ethmoid, sphenoid, and zygomatic bones.
D. parietal, zygomatic and sphenoid bones.
E. occipital, parietal, and zygomatic bones.

47. The cervical spine consists of

A. 3 to 5 vertebrae
B. 5 vertebrae
C. 7 vertebrae
D. 12 vertebrae
E. 14 vertebrae

48. The thoracic spine consists of
A. 3 to 5 vertebrae
B. 5 vertebrae
C. 7 vertebrae
D. 12 vertebrae
E. 14 vertebrae

49. The lumbar spine consists of
A. 3 to 5 vertebrae
B. 5 vertebrae
C. 7 vertebrae
D. 12 vertebrae
E. 14 vertebrae

50. The sacrum consists of ____ that are fused together.
A. 3 to 5 vertebrae
B. 5 vertebrae
C. 7 vertebrae
D. 12 vertebrae
E. 14 vertebrae

51. The coccyx consists of ____ that are fused together.
A. 3 to 5 vertebrae
B. 5 vertebrae
C. 7 vertebrae
D. 12 vertebrae
E. 14 vertebrae

52. Each vertebrae consists of vertebral body, a spinal foramen, and three processes:
    A. two transverse and one spinous.
    B. two spinous and one posterior.
    C. two spinal and one transverse.
    D. two peripheral and one anterior.
    E. two posterior and one spinous.

53. Deceleration forces may cause the brain to slide across the _____, which has sharp and irregular bony prominences that may produce abrasions, lacerations, or contusions of the brain tissue.

    A. zygomatic plate
    B. basilar plate
    C. tentorial plate
    D. cribriform plate
    E. sphenoidal plate

54. The body surface region of the clavicles is sensed by the

    A. first cranial nerve.
    B. third cervical nerve.
    C. fourth thoracic nerve.
    D. tenth cranial nerve.
    E. tenth thoracic nerve.

55. The nipple line body surface region is sensed by the

    A. first cranial nerve.
    B. third cervical nerve.
    C. fourth thoracic nerve.
    D. tenth cranial nerve.
    E. tenth thoracic nerve.

56. The umbilical body surface region is sensed by the

    A. first cranial nerve.
    B. third cervical nerve.
    C. fourth thoracic nerve.
    D. tenth cranial nerve.
    E. tenth thoracic nerve.

57. Blood is carried to the brain by the carotid artery system and vertebral artery system. These systems connect at the base of the brain in the _____, from which arteries supply blood to the brain itself.
    A. sinus of Wallace
    B. sinus of Willis
    C. circle of Wallace
    D. circle of Willis
    E. Haversian canals

58. The orbits of the eye (eye sockets) are formed by
    A. the frontal bones.
    B. the zygomatic bones.
    C. the maxillary and nasal bones.
    D. both answers a and b.
    E. answers a, b, and c.

59. The light-and color-sensing tissue of the eye is called the
    A. retina
    B. cornea
    C. lacrimal ducts
    D. pupil
    E. lens

60. The inner ear is susceptible to injuries from
    A. blast trauma
    B. diving trauma
    C. basilar skull fracture
    D. answers a and b only
    E. answers a, b, and c

61. The ____ the actual organ(s) of hearing; vibrations here stimulate the auditory nerve, which sends the sound signal to the brain.
    A. Tympanic membrane is
    B. cochlea is
    C. semicircular canals are
    D. ossicles are
    E. auditory nerve is

62. The _____ provide(s) the sense of motion, position, or balance.
    A. tympanic membrane
    B. cochlea
    C. semicircular canals
    D. ossicles
    E. auditory nerve

63. The first structure(s) to perceive sound wave vibrations is/are the _____
    A. tympanic membrane
    B. cochlea
    C. semicircular canals
    D. ossicles
    E. auditory nerve

64. Disturbances of the sense of balance can be caused by injury or illness and produce a variety of symptoms and complaints. The complaining, "The room is spinning!" would be referred to as

    A. vitiligo
    B. dizziness
    C. "the vapors"
    D. syncope
    E. vertigo

65. Open head injuries may involve the presence of

    A. linear skull fractures
    B. depressed skull fractures
    C. comminuted skull fractures
    D. answers b and c only
    E. answers a, b and c

66. Which of the following statements regarding basilar skull fractures is true?
    A. Bilateral periorbital ecchymosis (raccoon eyes) occurs within 10 minutes of a basilar skull fracture.
    B. Mastoid ecchymosis (battle's sign) indicates that basilar skull fracture has just occurred.
    C. Leakage of blood and/or cerebral spinal fluid (CSF) may assist in slowing a rise in intracranial pressure (ICP).
    D. All of the above are true.
    E. None of the above is true.

67. Compression fractures of the spine and/or intervertebral disc ruptures generally result from

    A. axial loading forces
    B. hyperextension injuries
    C. hyperflexion injuries
    D. any of the above
    E. none of the above

68. Spinal fracture occurs most commonly in the
    A. cervical and thoracic and lumbar spine
    B. thoracic and sacral spine
    C. cervical and lumbar spine
    D. lumbar and sacral spine
    E. thoracic and lumbar spine

69. Rupture of the middle meningeal artery will result in

    A. an epidural hematoma
    B. a subdural hematoma
    C. intracerebral hemorrhage
    D. any of the above
    E. none of the above

70. Immediate onset of stroke-like signs and symptoms most frequently accompanies
    A. an epidural hematoma
    B. a subdural hematoma
    C. intracerebral hemorrhage
    D. any of the above
    E. none of the above

71. A transient loss of consciousness, followed by a lucid interval, and then a diminishing level of consciousness is the classical presentation of

    A. An epidural hematoma
    B. a subdural hematoma
    C. intracerebral hemorrhage
    D. any of the above
    E. none of the above

72. Bleeding within the meninges produces

    A. an epidural hematoma
    B. a subdural hematoma
    C. intracerebral hemorrhage
    D. any of the above
    E. none of the above

73. Several hours or days may pass before the manifestation of signs and symptoms when head trauma results in
    A. an epidural hematoma
    B. a subdural hematoma
    C. intracerebral hemorrhage
    D. any of the above
    E. none of the above

74. Which of the following statements regarding increased intracranial pressure (ICP) is false?
    A. ICP is increased by edema or hemorrhage within the cranium.
    B. Increased ICP compresses cerebral vasculature, resulting in diminished cerebral blood flow.
    C. Hypercarbia results from diminished cerebral blood flow and causes cerebral vascular constriction.
    D. Systolic blood pressure will rise in an attempt to improve cerebral circulation.
    E. Rising systolic blood pressure increases ICP.

75. Increasing ICP will displace the brain away from the site of insult, which will result in compression of
    A. the third cranial nerve, causing pupillary dilation of one or both pupils.
    B. the reticular activating system, producing diminishing level of consciousness.
    C. the medulla oblongata, producing nausea and/or projectile vomiting.
    D. answers a and b only
    E. answers a, b, and c

76. Compression of the medulla oblongata into the foramen magnum produces vital signs changes associated with increased ICP. These changes are called
    A. Cushing's reflex (or triad).
    B. Kussmaul's reflex (or triad).
    C. Biot's reflex (or triad).
    D. Beck's reflex (or triad).
    E. Stoke's reflex (or triad).

77. Which of the following best describes the vital signs produced by increased ICP?
    A. Increased systolic blood pressure, bradycardia, and apneustic respirations.
    B. Decreased systolic blood pressure, tachycardia, and hyperpnea.
    C. Decreased systolic blood pressure, bradycardia, and tachypnea.
    D. Increased systolic blood pressure, bradycardia, and deep erratic respirations.
    E. Decreased systolic blood pressure, bradycardia, and deep erratic respirations.

78. Which of the following statements regarding spinal cord injury is false?

A. Spinal cord injury may present with paresthesia, anesthesia, or paralysis of bilateral lower extremities only.
B. Spinal cord injury may present with paresthesia, anesthesia, or paralysis of all extremities.
C. Spinal cord injury may present with paresthesia, anesthesia, or localized pain at the site of insult.
D. Spinal cord injury may present with paresthesia, anesthesia, or paralysis of the arm and leg on one side of the body.
E. Spinal cord injury may present without any symptoms whatsoever.

79. Weakness or partial paralysis is referred to as

A. paraplegia
B. quadriplegia
C. hemiplegia
D. paresis
E. paresthesia

80. The sensation of numbness, prickling, and/or tingling is called

A. paraplegia
B. quadriplegia
C. hemiplegia
D. paresis
E. paresthesia

81. Neurogenic shock is caused by

A. systemic vasodilation
B. systemic vasoconstriction
C. autonomic nervous system interruption
D. both answers a and c
E. both answers b and c

82. Cervical spine injury may result in

A. apnea or diaphragmatic breathing
B. priapism
C. “hold-up” positioning of the arms above the head
D. answers a and b only
E. answers a, b, and c

83. The patient's complaint of a "dark curtain" suddenly obstructing a portion of her/his field of vision accompanies an ocular emergency called

A. hyphema
B. acute retinal artery occlusion
C. retinal detachment
D. conjunctival hemorrhage
E. corneal abrasions

84. Extreme pain involving the anterior eye (often with the sensation that "Something is in my eye!") accompanies

A. hyphema
B. acute retinal artery occlusion
C. retinal detachment
D. conjunctival hemorrhage
E. corneal abrasion

85. Sudden, painless vision loss involving one eye is caused by

A. hyphema
B. acute retinal artery occlusion
C. retinal detachment
D. conjunctival hemorrhage
E. corneal abrasions

86. Which of the following statements regarding cervical spine immobilization is true?
A. A rigid cervical collar alone will not maintain immobilization of the C-spine.
B. In-line traction of the cervical spine is contraindicated in trauma patients.
C. Even when oral intubation is required, cervical spinal immobilization is not discontinued.
D. All of the above are true
E. None of the above is true

87. Endotracheal intubation may stimulate a parasympathetic response, which could result in

A. increased ICP
B. bradycardias and/or dysrhythmias
C. tachycardias and/or dysrhythmias
D. both answers a and b
E. both answers a and c

88. The first priority in care for the spinally immobilized, head injured patient with increasing ICP is

A. establishment of IV access with 5% dextrose in water to facilitate administration of ICP-reducing medications without overhydration
B. establishment of IV access with NS or LR to facilitate administration of ICP-reducing medications
C. hyperventilation with high flow oxygen and intubation
D. both answers a and c
E. none of the above

89. All of the following medications may be indicated for administration in the setting of increasing ICP and/or spinal trauma, except

A. morphine sulfate
B. oxygen
C. diazepam
D. furosemide
E. methylprednisolone

90. Which of the following statements regarding hyperventilation of a head injured patient is false?

A. Hyperventilation of the non-intubated patient frequently produces gastric distention, increasing the risk of emesis and subsequent aspiration.
B. Hyperventilation with high flow oxygen increases cerebral hypercarbia, providing a decrease in ICP via cerebral vascular dilation.
C. Hyperventilation with high flow oxygen decreases cerebral carbon dioxide levels thereby reducing development of cerebral edema and increased ICP.
D. All of the above are false.
E. None of the above is false.

91. When provided with a pain stimulus, your patient attempts to interfere with the stimulus application by grabbing at the source or pushing the source away. This response characterizes

A. a withdrawal response to pain
B. decerebrate posturing
C. the ability to localize pain and coordinate a response
D. decorticate posturing
E. either answer b or d

92. When provided with a pain stimulus, your patient flexes and/or retracts the stimulated area to avoid or escape the stimulus. This response characterizes

A. a withdrawal response to pain
B. decerebrate posturing
C. the ability to localize pain and coordinate a response
D. decorticate posturing
E. either answer b or d

93. Decorticate or decerebrate posturing indicates the presence of
A. coordinate and localizing responses to stimulation
B. irreversible brain damage
C. a high (C-1 to C-3) spinal cord lesion, resulting in reflexive muscle movement of the extremities.
D. a significant brain injury that is life-threatening
E. either answers c or d

94. Open wounds to the neck should
A. increase suspicion of spinal injury.
B. increase anticipation of airway compromise.
C. be sealed with an occlusive dressing and the patient placed in a slightly Trendelenburg position to reduce the potential for an air embolus.
D. answers a and b only
E. answers a, b, and c

95. Failure of the pupils to move together (looking in different directions simultaneously) is called
A. dysconjugate gaze
B. doll's eye response
C. sympathetic ophthalmia
D. nystagmus
E. anisocoria

96. Which of the following statements regarding unequal pupils is false?
A. A lesion on, or increase ICP on, the third cranial nerve will produce pupillary size changes.
B. A single dilated and nonreactive pupil may indicate CNS injury or cerebral hypoxia.
C. Delays in pupillary response to light can be indicative of drugs that depress the CNS, injury, or cerebrovascular compromise
D. Unilateral dilation of a pupil always indicates hemisphere compromise of the opposite side (right hemisphere injury produces left pupillary dilation and vice versa).
E. None of the above.

97. Bilateral pupillary dilation with very delayed or absent response to light (fixed) may be attributed to all of the following, except

A. brain stem injury
B. bilateral hemisphere injury or hypoxia
C. herniation of the brain stem through the foramen magnum
D. substance abuse
E. a congenital defect common to a small percentage of the population

98. Which of the following statements regarding mannitol is false?

A. Mannitol is rapid-acting, potent diuretic used to decrease cerebral edema
B. Mannitol decreases pulmonary edema
C. Mannitol may increase intracranial hemorrhage
D. Mannitol can cause dehydration or electrolyte disturbances
E. none of the above is false

99. Which of the following statements regarding furosemide (Lasix) is false?

A. Lasix is a systemic diuretic that may be used for treatment of cerebral edema.
B. The vasodilation effect of Lasix can lower the patient's blood pressure.
C. Use of Lasix may diminish cerebral blood flow, thus increasing cerebral hypoxia and hypercarbia.
D. All of the above are false.
E. None of the above is false.

100. Which of the following statements regarding methylprednisolone (Solu-Medrol) is true?

A. Methylprednisolone is an anti-inflammatory steroid believed to reduce the tissue irritation that produces edema.
B. Even in short-term treatment of cerebral edema, high doses of Solu-Medrol
can produce serious steroidal side effects.
C. Solu-Medrol is administered by IV infusion only.
D. both answers a and b
E. both answers a and c