STROKE CERTIFICATION

STUDY GUIDE FOR NURSES

Q&A REVIEW FOR EXAM SUCCESS

KATHY J. MORRISON
Kathy J. Morrison, MSN, RN, CNRN, SCRN, FAHA, is a certified neuroscience nurse, a certified stroke nurse, a Fellow of the American Heart Association, and a recipient of the prestigious Pennsylvania State Nightingale Award for Clinical Nursing Excellence. As the stroke program manager for the Penn State Hershey Medical Center, she oversees all aspects of stroke care, from prehospital through stroke clinic follow-up. She played a pivotal role in Penn State Hershey Medical Center’s attainment of The Joint Commission Comprehensive Stroke Center certification and has mentored many stroke program coordinators through the process of attaining Primary and Comprehensive Stroke Center certification. Ms. Morrison serves on The Joint Commission Expert Panel for Stroke Center certification standards.

Ms. Morrison’s published works have appeared in nursing journals and neuroscience course curricula. Her book, *Fast Facts for Stroke Care Nursing*, has been well received in the nursing community, both as a handy guide for stroke care nurses and as a preparation tool for the SCRN® certification exam. In addition to speaking nationally on stroke-related topics, she is active in community stroke screenings and awareness lectures and facilitates a regional stroke survivor support group. She established the Stroke Coordinators of Pennsylvania (SCoPA) in 2010—a group of stroke coordinators whose collaborative work has resulted in significant improvements in stroke care and outcomes in community hospitals across central Pennsylvania. She is a Fellow of the American Heart Association, a member of the American Heart Association Professional Education Committee and Hospital Accreditation Science Committee, a member of the American Association of Neuroscience Nurses Advocacy Committee, and a board member of the Susquehanna Valley Chapter of the American Association of Neuroscience Nurses.
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Contributor

Alicia M. Richardson, MSN, RN, ACCNS-AG, Stroke Program Clinical Nurse Specialist, Penn State Hershey Medical Center, Hershey, Pennsylvania
Preface

Stroke care nurses have known for a long time that a specialized body of knowledge and a specific skill set are involved in the complex care needs of their stroke patients. Over the past 15 to 20 years, nurses who found themselves working with this distinct population (and many did not consciously seek out the challenge) also found the need for collaboration and support from their peers across the country. As research evidence led to practice standards and Stroke Center certification, nurses recognized that a specialty was being born.

This study guide is designed to serve as a comprehensive, but efficient, tool for preparing for the American Board of Neuroscience Nursing’s Stroke Certified Registered Nurse (SCRN®) certification. My first book, *Fast Facts for Stroke Care Nursing*, published in 2014, was designed to be a practical, concise guide for nurses caring for stroke patients. I believed that the more nurses knew about this population and the care needed, the more they would embrace their role and realize that neuroscience nursing is not an intimidating field, but an exciting field—the new frontier in nursing. The feedback I received was overwhelmingly positive: I heard from nurses who discovered a passion for stroke care, nurses who utilized the book to help their organization prepare for and attain Stroke Center certification, and nurses who expressed gratitude for a pocket-sized reference that was quick and easy to use. I also heard from many nurses who described the book as a great study guide for the SCRN exam, and they asked me to add practice questions. So, I took that suggestion and created this study guide.

The book’s format follows the test content outline. I have provided 300 questions divided into categories. The number of questions in each category fits the percentage of the test dedicated to that category. For instance, the anatomy and physiology (A&P) section is weighted as 12% of the exam, so
there are 36 A&P questions (12% of 300 equals 36). I have also included medication tables, a national stroke care guidelines list, and neuroscience terms for quick reference. Case studies are a valuable tool used in nursing education, so I included a chapter of case studies to stimulate some critical thinking and application of knowledge as an additional preparation tool.

If you have any comments or suggestions for this book, or want to contact me, please do so at kmorrison98@gmail.com.

Kathy J. Morrison
1. Of the following antiplatelet agents, one is indicated for primary prevention, while others are indicated for secondary prevention. Which is the primary prevention agent?
   A. Dipyridamole/aspirin (Aggrenox)
   B. Aspirin
   C. Clopidogrel (Plavix)
   D. Ticlopidine (Ticlid)

2. The term “antiplatelet” agent is used because the mechanism of action is to
   A. Increase platelet resistance of the blood–brain barrier
   B. Inhibit platelet production in the liver
   C. Decrease platelet passage through the cell membrane
   D. Decrease platelet aggregation in the bloodstream

3. Your patient with atrial fibrillation has just been started on warfarin. What will be part of your medication education for them?
   A. Eliminate salads and foods rich in vitamin K
   B. Intake of salads and foods rich in vitamin K should be consistent
C. Never take medication on an empty stomach  
D. Avoid physical activity to limit bruising risk

4. Your patient has just had a nasogastric (NG) tube inserted for enteral feeding. You have received confirmation of correct placement in the stomach, and initiated feeding 2 hours ago. Which of the following is now safe to administer via this route?  
A. Rivaroxaban (Xarelto)  
B. Dabigatran (Pradaxa)  
C. Apixaban (Eliquis)  
D. Abciximab (ReoPro)

5. Which of the statements below best describes the action of alteplase?  
A. Promotes fibrinolysis of fibrin clots  
B. Directly inhibits free and fibrin-bound thrombin  
C. Directly inhibits free and clot-bound factor Xa  
D. Inhibits activation of vitamin K–dependent clotting factors

6. In the emergency department (ED), alteplase has been ordered for Mr. Paine. The following is the patient’s home medication list. Which of the medications would make you more alert for orolingual angioedema?  
A. Metformin  
B. Simvastatin  
C. Lisinopril  
D. Aspirin

7. For Mr. Paine, which of these home medications might be responsible for his dry, nonproductive cough?  
A. Metformin (Glucophage)  
B. Simvastatin (Zocor)  
C. Lisinopril (Prinivil, Zestril)  
D. Aspirin

8. Which of these lipid-lowering agents has the best primary and secondary risk reduction?  
A. Atorvastatin (Lipitor)  
B. Gemfibrozil (Lopid)
9. Your patient has been ordered to receive 23.4% saline, 30 mL, over 20 minutes. What do you tell the patient and the family about this treatment?
   A. The patient will need to be transferred to the long-term acute care (LTAC) unit in order for insurance to cover this therapy
   B. Reducing blood viscosity reduces risk of seizure
   C. Saline is equivalent to blood viscosity and it helps to hydrate
   D. Concentrated saline helps to reduce brain swelling

10. For which of the lipid-lowering agents would you include education about a possible side effect of flushing?
    A. Atorvastatin (Lipitor)
    B. Niacin
    C. Cholestyramine (Questran)
    D. Simvastatin (Zocor)

11. Your patient’s list of home medications includes a long-acting insulin. Which of the following would that be?
    A. Insulin lispro (Humalog)
    B. Insulin aspart (NovoLog)
    C. Insulin glargine (Lantus)
    D. Insulin glulisine (Apidra)

12. Your patient just returned from having a CT angiogram. You might have an order to hold which of the following medications for 48 hours?
    A. Simvastatin (Zocor)
    B. Metformin (Glucophage)
    C. Aspirin
    D. Cardizem (Diltiazem)

13. During the morning assessment, Mr. Smith tells you that he does not think recovery will be sufficient to make him want to keep living. What is your responsibility? Choose all that apply.
    A. Reassure Mr. Smith that his feelings are not unusual, and that he will have help to deal with these feelings
    B. Report this conversation to the provider
C. Realize that stroke patients often say things like this and it is best to let it pass quietly to avoid embarrassing them
D. Monitor Mr. Smith’s mood and behavior for further changes

14. Which medication do you anticipate to be ordered for a patient with signs of depression?
   A. Escitalopram (Lexapro)
   B. Paroxetine (Paxil)
   C. Sertraline (Zoloft)
   D. Any of the above

15. When you bring the first dose of antidepressant to your patient, and she says she does not want to take “crazy people pills,” what is your best response?
   A. Antidepressants may enhance neurogenesis and thus functional recovery
   B. Antidepressants facilitate pain management and will make therapy less painful
   C. Antidepressants inhibit appetite which may result in weight loss
   D. If you do not take this medication, your doctor will be angry

16. Your 20-year-old right-middle cerebral artery (MCA) territory stroke patient is awake and complaining of left shoulder pain. He has a history of a severe back injury from a snow boarding accident last year. He asks for his lollipop. What is he referring to?
   A. Fentanyl buccal route
   B. Dilaudid oral solution frozen
   C. Oxycontin oral solution frozen
   D. MS Contin buccal route

17. Which antipyretic could be given to your febrile, postoperative patient without concern for antiplatelet effect?
   A. Ibuprofen (Advil, Motrin)
   B. Aspirin
   C. Acetaminophen (Tylenol)
   D. None, they all impact platelet aggregation
18. Which of the following medications dissolves blood clots?
   A. Warfarin (Coumadin)
   B. Alteplase (Activase)
   C. IV heparin
   D. Rivaroxaban (Xarelto)

19. Your emergency department (ED) patient has arrived at 2 hours 30 minutes from symptom onset and Dr. Jones says to get the IV alteplase ready stat. The patient’s weight is 250 lbs. How much of the dose will be given as a bolus?
   A. 10 mg
   B. 14 mg
   C. 9 mg
   D. 20 mg

20. In the sign-off report at 7 p.m., the nurse tells you that the patient arrived at 2 p.m. to the stroke unit with a diagnosis of middle cerebral artery (MCA) stroke. Aspirin 81 mg orally was ordered, but was held owing to the patient failing the dysphagia screen. How do you respond?
   A. Antithrombotics are to be administered by end of hospital day 2 or the length of stay will be extended
   B. Antithrombotics need to be given early for best patient outcomes, so you will get an order for suppository right away
   C. Antithrombotics are really only important in lacunar strokes, so a delay is not a problem
   D. If this patient got alteplase, antithrombotics need to be given within 24 hours of alteplase dose

21. In the emergency department (ED), a patient became somnolent after complaining of a headache. After reviewing the CT and labs (intracerebral hemorrhage and international normalized ratio [INR] 2.5), the provider orders stat fresh frozen plasma (FFP). Which oral anticoagulant was the patient taking prior to admission?
   A. Apixaban (Eliquis)
   B. Dabigatran (Pradaxa)
   C. Rivaroxaban (Xarelto)
   D. Warfarin (Coumadin)
22. In the stroke clinic, Mr. Small and his wife are arguing when you enter the room. He has recently been started on warfarin and they cannot agree about whether it is important to mention the following item. When you hear what it is, you tell them that it is important.
   A. He started taking gingko for memory help
   B. He has developed an appetite for peaches
   C. He is regaining sensation in his left thumb
   D. He has been having unusual dreams about cats

23. Headache occurs in up to 40% of patients taking which medication?
   A. Dipyridamole/aspirin (Aggrenox)
   B. Metoprolol (Lopressor)
   C. Rivaroxaban (Xarelto)
   D. Nicardipine (Cardene)

24. The neuroscience ICU nurse notified the intensivist team that the patient just had three seizures, each of 50 seconds’ duration. Which medication is the first-line agent for this situation?
   A. Levetiracetam (Keppra)
   B. Valproic acid (Depakote)
   C. Lorazepam (Ativan)
   D. Pentobarbital (Nembutal)

25. How often should patients with insulin drips have their blood glucose checked?
   A. Every 3 to 6 hours
   B. Every 2 to 4 hours
   C. Every 1 to 2 hours
   D. Every other day

26. Which is true of the U.S. Food and Drug Administration’s (FDA) approval of alteplase (Activase)?
   A. It was based on the National Institute of Neurological Disorders and Stroke (NINDS) recombinant tissue plasminogen activator (rt-PA) Stroke Trial of 1995
   B. It was approved despite a 12% intracerebral hemorrhage rate
   C. It was approved for 3 to 4.5 hours from onset in select populations
   D. It was approved for 3 hours from onset
27. The appropriate administration of alteplase includes which of the following?
   A. It should be given with an 18-gauge or larger needle
   B. 10% is given as a bolus over 1 minute
   C. Shaking the vial vigorously enhances the dissolution of the powder
   D. If anaphylaxis is suspected, the rate should be reduced by 50% and the provider notified

28. Which medication is Class I, Level of Evidence A for use in aneurysmal subarachnoid hemorrhage?
   A. IV magnesium sulfate
   B. Oral nimodipine
   C. Oral papaverine
   D. Oral amlodipine

29. On what schedule will a patient who receives alteplase have vital signs and neurologic checks monitored?
   A. Every 15 minutes for 2 hours, then every 30 minutes for 6 hours, then hourly for 16 hours
   B. Every 15 minutes for 1 hour, then every 30 minutes for 3 hours, then hourly for 20 hours
   C. Every 15 minutes for 2 hours, then every 30 mins for 2 hours, then hourly for 8 hours
   D. Every 15 minutes for 3 hours, then every 30 minutes for 3 hours, then hourly for 3 hours

30. Which medication is not indicated for the control of shivering during therapeutic cooling?
   A. Buspirone
   B. Magnesium
   C. Meperidine
   D. Botulinum toxin
1. **B** Aspirin 81 mg is the only antiplatelet agent with indication for primary prevention (Meschia et al., 2014).

2. **D** The mechanism of action of each antiplatelet agent varies, but they all inactivate different aspects of platelet metabolism, thus inhibiting the normal platelet function. When an injury causes a blood vessel wall to break, platelets are activated, that is, they change shape from round to spiny, stick to the broken vessel wall and to each other, and begin to plug the break. They interact with other blood proteins to form fibrin strands that, in turn, form a net that catches more platelets and blood cells, producing a clot that plugs the break. This function is essential with an injury or surgical incision. The problem is when the innermost lining of blood vessels, the intima, gets roughened by uncontrolled hypertension or uncontrolled diabetes, platelets tend to aggregate along the rough patches of the vessel walls and eventually accumulate, which results in atherosclerosis or thrombus formation (Moake, 2016).

3. **B** Stroke or transient ischemic attack (TIA) patients taking warfarin should not eliminate salads and foods rich in vitamin K, but should be consistent because vitamin K inhibits the action of warfarin. They should
also not be told to limit physical activity as that is an important part of a healthy lifestyle. There is no specific indication for warfarin to be taken with or without food; either is acceptable.

4. **A** Rivaroxaban (Xarelto) can be crushed and administered via a feeding tube, as long as the tube is not in the postpyloric position. Dabigatran should not be crushed; apixaban can be given via a feeding tube but the stomach must be empty as food interferes with the crushed version of this drug. Abciximab is not administered enterally.

5. **A** Alteplase’s action is via the promotion of lysis (breaking down) of fibrin clots, also called fibrinolysis.

6. **C** Lisinopril is an angiotensin-converting enzyme inhibitor (ACEI), and combination therapy with alteplase has shown an increased incidence of orolingual angioedema (5%).

7. **C** Lisinopril is an angiotensin-converting enzyme inhibitor (ACEI), and via a complex chemical process, proinflammatory mechanisms occur in the lungs, resulting in a dry cough in up to 20% of patients.

8. **A** In numerous studies, atorvastatin (Lipitor) was compared to placebo, pravastatin, and simvastatin, and was shown to reduce the risk of death or major cardiovascular events more effectively.

9. **D** In numerous studies, IV bolus administration of 23.4% saline has been found to reduce intracranial pressure (ICP) and augment cerebral perfusion pressure (CPP) in patients with resistant increased ICP.

10. **B** Owing to its vasodilation effect, niacin can cause flushing, which can be uncomfortable. Pretreatment with aspirin can be helpful in mitigating this effect.

11. **C** Insulin glargine (Lantus) is a long-acting insulin.

12. **B** Historically, metformin (Glucophage) was held after IV contrast to avoid kidney burden while the contrast was being excreted. Guidelines from 2015 have indicated that this is no longer believed to be a fact, and there should be no need to hold metformin, but it will likely be seen in practice for some time.
13. **A, B, D** Stroke patients are at high risk for depression, so you should never just let this type of comment pass without taking action. Reassure Mr. Smith that his feelings are not unusual, and that he will have help to deal with these feelings. Report this conversation to the provider and monitor Mr. Smith’s mood and behavior for further changes.

14. **D** Any of the above; there is no clear advantage of one over the other selective serotonin reuptake inhibitors (SSRIs).

15. **A** It has been shown that antidepressants may enhance neurogenesis and thus functional recovery. There have been suggestions that antidepressants may augment pain therapy, but no clinical trial has shown it to make physical therapy less painful. Antidepressants vary in their effect on appetite, with many actually causing weight gain. For patients with concerns about the stigma of psychiatric medications, it is helpful to point out other benefits of the medications to reassure these patients of physical recovery reasons to justify taking the medications, and that they are not taking them because they are crazy.

16. **A** Fentanyl buccal route is available in oral “lollipop” form.

17. **C** Acetaminophen has a very weak antiplatelet effect, and only at very high doses. Ibuprofen and aspirin have a stronger antiplatelet effect and should not be given periprocedurally.

18. **B** Alteplase (Activase) is the only drug that dissolves blood clots. The others inhibit clot formation, but do not dissolve them.

19. **C** The standard dosing is 0.9 mg/kg over 60 minutes, with 10% of the total dose given as bolus over 1 minute. This patient was 250 lbs, or 113 kgs, but the maximum dose is 90 mg, regardless of weight, so bolus would be 9 mg.

20. **B** Research has shown that antithrombotics given early facilitate better patient outcomes, so you will get an order for a suppository right away. Antithrombotics are not to be given within 24 hours after IV tissue plasminogen activator (tPA) however.

21. **D** Warfarin (Coumadin) is the only anticoagulant to be measured by INR; the use of an INR to determine the effectiveness and safety of the others is meaningless because INR is calibrated for use with vitamin K antagonists.
22. A The fact that he started taking gingko for memory help is important because it is an herbal supplement that happens to have several drug interactions, as do many of the herbal supplements. Patients often do not consider them drugs, and may fail to mention that they are using them. Education about this is critical.

23. A Dipyridamole/aspirin (Aggrenox) produces headache most frequently in patients with a history of migraine, and can be mitigated with careful dose titration.

24. C Lorazepam (Ativan) is considered the first-line agent for treatment of seizure poststroke.

25. C Patients with an insulin drip should have their blood glucose monitored every 1 to 2 hours to ensure that the target is maintained and to prevent the extremes of hypoglycemia or hyperglycemia.

26. D It was approved by the FDA in 1996 for 3 hours from onset. While many guidelines have recommended that it is safe in select populations up to 4.5 hours from onset, it was not approved by the FDA for that timeframe, so its use in the 3- to 4.5-hour window is considered “off-label.”

27. B Ten percent of the total dose is given as a bolus over 1 minute. There is no indication for a larger gauge needle. It should not be shaken, but twirled, to mix. If anaphylactic reaction is noted, the drug should be stopped immediately and action taken to treat the anaphylaxis.

28. B Oral nimodipine should be administered to all aneurysmal subarachnoid hemorrhage (SAH) patients, a Class I, Level of Evidence A recommendation. It has been shown to improve outcomes, but not necessarily to control vasospasm (Connolly et al., 2012).

29. A The schedule for monitoring was defined in 2003 in the first Guidelines for the Early Management of Patients With Ischemic Stroke, and remains today to be every 15 minutes for 2 hours, then every 30 minutes for 6 hours, then hourly for 16 hours.

30. D Botulinum toxin is not indicated for controlling of shivering; it is used for treatment of poststroke spasticity.
References

