Certification Corner

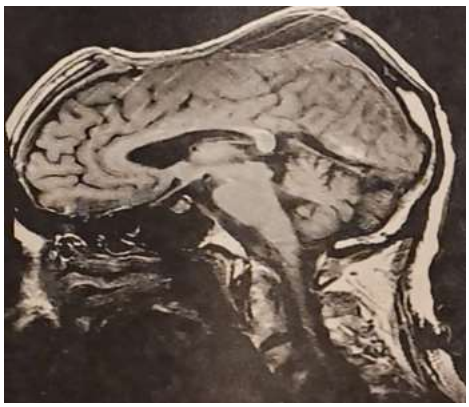
Are you preparing for stroke certification as a Neurovascular Registered Nurse (NVRN), Advanced Neurovascular Practitioner (ANVP), Certified Neurointerventional Clinician (CNIC), or an Advanced Stroke Coordinator (ASC)? Use these questions to gauge your preparedness to test.

Part I: ANVP Questions

1. The highest level of evidence supports recommendations for testing with transcranial Doppler for which of the following?
    a. Imaging intracranial occlusions for ultrasonic clot breakdown
    b. Serial monitoring in patients with sickle cell to determine timing for blood transfusion
    c. Bubble-testing for measurement of right-to-left intracardiac shunt
    d. Assessment of downstream emboli in patients with dissection

2. Which of the following is used to differentiate hyperemia from vasospasm in patients with aneurysmal subarachnoid hemorrhage?
    a. Mean flow velocity vessel variance score
    b. DO_2 : CBF quotient
    c. Breath-holding index
    d. Lindegaard ratio

3. The following image reflects _____ which can be prevented by _____.



    a. Decompressive hemicraniectomy; reperfusion therapy.
    b. Syndrome of the trephined; early cranioplasty.
    c. Uncal herniation; posterior fossa hemicraniectomy.
    d. Subgaleal fluid collection; lateral ventricle shunt placement.

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Part II: NVRN, ASC & ANVP Questions

4. Which of the following is true about stroke systems of care?
    a. Non-White race is associated with higher ambulance use for stroke than White race.
    b. Community stroke education fairs are associated with long-term knowledge retention of stroke warning signs.
    c. Emergency medical service calls are less common in male patients than female patients.
    d. Ambulance dispatchers are more accurate than ambulance personnel at identifying likely stroke patients.

5. The biggest limitation to the Los Angeles Prehospital Stroke Scale is:
    a. Inclusion of level of consciousness as part of the scored assessment.
    b. The need to take a patient history prior to examining the patient.
    c. Hand grip strength as an assessment component.
    d. Requiring age to be greater than 45 years to be considered a stroke patient.

6. Which of the following is true about large vessel occlusion (LVO) prehospital stroke scales:
    a. LVO scales are now a requirement in most major cities for use by ambulance personnel.
    b. Ambulance personnel easily master use of the RACE scale but find use of the VAN scale more difficult.
    c. Prehospital LVO scales miscode patients as LVO approximately 20% of the time.
    d. The LAMS is the most sensitive and specific scale for identification of LVO signs and symptoms.

Part III: ASC Questions

7. An acute ischemic stroke patient is to receive thrombolytic treatment. The stroke nurse prepares the agent for administration and tries to scan the medication into the electronic medical record however, the bar code will not scan. The nurse overrides the scanning portion of the medication administration process and co-signs the order with another nurse after verifying the patent's weight, the order, and the dosage. This is an example of which of the following:
    a. Near miss
    b. A workaround
    c. Normalized deviance
    d. Weak signal interpretation

8. While reviewing performance data, you note a steady increase in door to puncture (D2P) times over the last few months. In collaboration with the emergency department and the neurointerventional team, a new process approach is developed to reduce D2P times in thrombectomy patients. Which of the following aim statements would best support the process improvement plan?
    a. Beginning immediately, all thrombectomy patients will be rapidly transferred to the neurointerventional suite.
    b. All thrombectomy cases will have D2P times less than 90 minutes.
    c. The physician will contact the neurointerventionalist as soon as the CTA is read.

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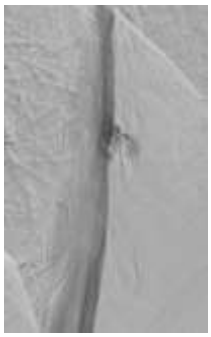
d. Within 6 months, 75% of all thrombectomy cases will have D2P times less than 75 minutes.

9. Your hospital is working on reducing serious accidents and events on a system level. Education focusing on safety as a top priority and situational awareness has been created by experienced quality managers and disseminated throughout all levels of the hospital. Which of the following best reflects this organization's assurance of quality standards?
    a. Lean methodology
    b. The five rules of causation
    c. Six Sigma methodology
    d. High reliability principles

Part IV: CNIC Questions

10. The Bern Score is used to:
    a. Predict functional outcomes following thrombectomy.
    b. Characterize dural arterial venous fistulas.
    c. Estimate the probability of a cerebral spinal fluid leak.
    d. Determine the severity of vasospasm in patients with aneurysmal subarachnoid hemorrhage.

11. Based on the image below, what is the cause of the CSF leak depicted?



    a. Traumatic subarachnoid hemorrhage
    b. Venous fistula
    c. Dural tear
    d. Ruptured spinal arteriovenous malformation

12. Pseudoaneurysm:
    a. Presents as a pulsatile mass with bruit on Doppler due to hematoma continuity with the arterial lumen.
    b. Carries a higher risk with radial artery canulation than with femoral artery canulation.
    c. Occurs when a vein is catheterized over an artery resulting in a tract between structures.
    d. Is often associated with nerve compression and development of deep vein thromboses.

13. Which of the following is true about endovascular research and practice evolution:
    a. The retrievable stents used for thrombectomy originated from endovascular treatment of wide neck aneurysms.
    b. PROACT II showed superiority of intra-arterial pro-urokinase compared to alteplase tPA.

c. The main reason for failure of thrombectomy studies completed before 2014 was low skill level among the early neurointerventionalists participating in clinical trials.
d. Findings from numerous studies show that intravenous thrombolysis can be withheld when thrombectomy patients present directly to comprehensive stroke centers.

Part V: NVRN Questions

14. The most commonly assigned Emergency Severity Index (ESI) score at triage for stroke is which of the following?
    a. Level 1
    b. Level 2
    c. Level 4
    d. Level 5

15. Stroke mimic diagnoses:
    a. Are likely in patients with a negative noncontrast CT scan and no occlusion on CTA.
    b. Must be exhaustively ruled out prior to considering treatment with an intravenous thrombolytic agent.
    c. Generally, are safely managed with low risk for sICH if treated with an intravenous thrombolytic agent.
    d. Are most commonly diagnosed in elderly, diabetic male patients.

16. Which of the following is true about hyperglycemia in hyperacute stroke patients?
    a. Hyperglycemia is less of a concern than hypoglycemia since it is less likely to produce a stroke mimic presentation.
    b. Tight control of blood glucose to near normal levels should be initiated in all hyperglycemic patients to ensure improved outcomes.
    c. Hyperglycemic patients have worse outcomes from reperfusion treatment compared to normoglycemic patients.
    d. Stress-related hyperglycemia in stroke patients commonly produces blood glucose levels in excess of 180 mg/dL (10 mmol/L).

Part I: Answers

1. **B**. While TCD is used for all the options listed in the question, the one carrying the highest level of evidence is serial monitoring in patients with sickle cell. Findings from the STOP trial showed that as mean flow velocities peak, risk for sickle cell related stroke increases significantly; the trial was closed early for efficacy showing that early transfusion significantly decreases stroke risk in patients with sickle cell disease.
2. **D**. The Lindegaard ratio is used to differentiate vasospasm from hyperemia in patients with aneurysmal subarachnoid hemorrhage because mean flow velocities can increase with induced hypertension treatment, as well as with vasospasm.
3. **B**. Syndrome of the trephined is associated with delayed cranioplasty/replacement of bone removed for decompressive hemicraniectomy causing a sunken appearance to the head.

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Part II: Answers

4. **A**. Higher ambulance use is associated with non-White race. Although most all stroke programs hold community stroke education fairs in an attempt to increase stroke awareness, sadly, these programs have never been shown to produce retention of stroke signs and symptoms or early recognition. Interestingly, female patients have fewer ambulance service calls; while it remains unclear exactly why this is, some have suggested it may be due to male family member reluctance to call for emergency medical services assistance. Ambulance personnel are considerably more skilled than dispatchers at identifying potential stroke patients.
5. **D**. By far the greatest limitation to use of the Los Angeles Prehospital Stroke Scale is the requirement for patients to be older than 45 years of age to be considered a stroke diagnosis.
6. **C**. While prehospital LVO scales are sensitive to symptoms that are commonly associated with large vessel occlusion strokes, they are not specific, resulting in about 20% misdiagnosis. Examples of this are cases that lack LVO signs yet still have an occlusion requiring thrombectomy, patients with seizures that cause deficits mimicking LVO, and patients with intracerebral hemorrhage that can present with deficits similar to LVO.

Part III: Answers

7. **B**. A workaround is not always a bad thing. In the scenario featured in the question, the nurse finds a way to get the patient treated that is safe; however, she should also follow through with notifying her manager of the issue encountered so that it can be quickly resolved.
8. **D**. Aim statements must be specific so that it is clear what will be measured AND everyone is aware of the target that has been set up.
9. **D**. High reliability organizations aim to ensure safe, accurate, equitable care delivery for all patients.

Part IV: Answers

10. **C**. The Bern score is used to estimate the likelihood of a CSF leak.
11. **B**. A venous fistula is depicted in the image.
12. **A**. Pseudoaneurysms are classically pulsatile because of arterial flow moving into and out of the hematoma cavity during systole and diastole.
13. **A**. Retrievable stents first emerged for use in treatment of wide neck aneurysms, and were later used for other aspects of endovascular treatment. PROACT II compared pro-urokinase to heparin and was a phase II trial that although successful, failed to lead to FDA approval for the drug. Many reasons led to failed early trials of endovascular treatment, including inferior devices, enrollment of patients with unsalvageable tissue, and delayed treatment times. Patients pre-treated with intravenous thrombolysis have better outcomes from thrombectomy; therefore, thrombolytic treatment should never be withheld in patients that are candidates, even if they arrive directly to a comprehensive stroke center.

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Part V: Answers

14. **B**. ESI level 2 is the most common assignment for stroke because it ensures that patients are seen right away, yet also do not require immediate airway, breathing, and circulation management.
15. **C**. Treating a suspected stroke patient with intravenous thrombolytics that turns out to have a stroke mimic diagnosis is generally considered safe. These patients have low rates of complications, and in most hospitals it would take a significant amount of time and additional diagnostic imaging with MRI to completely rule out stroke; this would incur substantial delays in treatment that could result in greater infarct volume if the patient is diagnosed as having a stroke. Practitioners that never have treated a mimic with thrombolysis, are typically so conservative that they are also likely not treating actual ischemic stroke patients.
16. **C**. Numerous studies have shown that acute ischemic stroke patients that are hyperglycemic have worse outcomes following reperfusion therapy (intravenous thrombolysis and/or thrombectomy) even if the reperfusion therapy is successful. Tight control of blood glucose is dangerous however, due to hypoglycemic events, and should be avoided. No clinical trials have examined whether glycemic control initiated before or at the time of reperfusion therapy would make a difference in patient outcomes.

Are you an NVRN, ANVP, ASC, or CNIC board certified clinician and interested in writing test items for the Neurovascular Clinicians Certification Corporation (NVC-3)? Contact info@anvc.org at your earliest convenience to learn how to contribute!