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Neurology [ALERT®]

Evidence-based summaries of the latest clinical neurology research

ABSTRACT & COMMENTARY

Sonographic Diagnosis of Inclusion Body Myositis

By Michael Rubin, MD

Professor of Clinical Neurology, Weill Cornell Medical College

Dr. Rubin reports no financial relationships relevant to this field of study.

SYNOPSIS: Inclusion body myositis has remained a clinical diagnosis assisted by a muscle biopsy, but now muscle ultrasound and biomarker identification may aid diagnosis.

SOURCE: Nodera H, et al. Intramuscular dissociation of echogenicity in the triceps surae characterizes sporadic inclusion body myositis. *Eur J Neurol* 2015 Dec. 26; DOI: 10.1111/ene.12899 [Epub ahead of print].

Sporadic inclusion body myositis (sIBM), the most common acquired idiopathic myopathy in patients > 50 years of age, remains a diagnosis that, when suspected, requires muscle biopsy, which itself is not always confirmatory. Creatine kinase is mildly elevated at most, acute phase reactants are usually normal, and myositis-specific antibodies are typically absent. Aside from the characteristic history of slowly progressive weakness with early involvement of knee extensors and forearm flexors, might muscle sonography distinguish sIBM and facilitate its diagnosis?

Patients with sIBM, polymyositis (PM), dermatomyositis (DM), or myositis associated with a connective tissue disorder, were recruited from the Vihara Hananosato Hospital, Tokushima University, Tokyo, Japan, and prospectively evaluated, using normal controls for comparison. Clinical diagnoses were based on guidelines and criteria from the European Neuromuscular Center. Sonography of the right arm and leg, in the supine position, was performed on all subjects by a single, blinded technician, using a LOGIQ7 with a fixed 11-MHz linear array transducer, applying the transducer to the medial head of the gastrocnemius, and 5 cm distal to the olecranon, visualizing the medial head of gastrocnemius, soleus, flexor digitorum profundus (FDP), and flexor carpi ulnaris (FCU). Muscle echo intensity (EI) was interpreted by three experienced,

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blinded examiners, who routinely performed muscle sonography and rated them as normal or slightly, moderately, or severely increased EI. Statistical analysis comprised one-way ANOVA with Games-Howell post-hoc test, intraclass correlation coefficients (ICCs), Cronbach's alpha, and, where applicable, Spearman's correlation coefficient, with $P = 0.05$ being statistically significant.

Among 11 patients each with sIBM, PM/DM, and controls, sIBM patients showed selectively and significantly increased EI in the FDP and gastrocnemius, with relatively scant EI in the adjacent FCU and soleus, respectively, in contrast to PM/DM patients where these neighboring muscles demonstrated equivalent EI. EI was greatest in sIBM gastrocnemius muscle, followed by sIBM FDP, with no correlation found between EI and patient age, disease duration, muscle strength, or creatine kinase level. In sIBM, there is sonographic dissociation between adjacent muscles in forearm muscles and in the triceps surae.

■ COMMENTARY

Two important findings have recently come to light regarding sIBM. First, anti-cN-1A autoantibodies targeting cytosolic 5'-nucleotidase 1A (cN-1A), a 44-kDa skeletal muscle protein, have been identified in the serum of sIBM patients, representing the only biomarker diagnostically useful in differentiating sIBM from other forms of inflammatory myopathy.[1-3] Sera from patients with Sjogren's syndrome and systemic lupus erythematosus often demonstrate these antibodies as well. Second, hepatitis C virus (HCV) infection appears to be statistically significantly associated with sIBM, suggesting a causative link between these two diseases.[4] Among 114 sIBM patients, anti-HCV antibodies were found in 28%, compared to only 4.5% of 44 age-matched polymyositis patients. Further research is warranted in understanding this incurable disease, but the initial steps may have already begun. ■

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ABSTRACT & COMMENTARY

Intraoperative Neurophysiologic Monitoring: Does it Change the Outcome from Spinal Surgery?

By Steven Karceski, MD

Assistant Professor of Neurology, Weill Cornell Medical College

Dr. Karceski reports he is on the speakers bureau for LivaNova.

SYNOPSIS: In non-complex spine surgeries (spinal decompression and spinal fusion), intraoperative neurophysiologic monitoring improved clinical outcomes and reduced the risk of neurological complications by nearly one-half (49%).

SOURCE: Ney JP, et al. Does intraoperative neurophysiologic monitoring matter in noncomplex spine surgeries? *Neurology* 2015;85:2151-2158.

Intraoperative neurophysiologic monitoring (IONM) is often used when the surgery might cause an injury to the nervous system. There are many neurophysiologic procedures: electroencephalography (EEG), electromyography (EMG), somatosensory evoked potentials (SEPs), and motor evoked potentials (MEPs). In spinal surgeries, SEPs, MEPs, and free-run EMG are the most commonly used modalities. Using this combination of neurophysiologic monitoring techniques allows for continuous monitoring of both spinal cord and nerve root function. A significant change that occurs on one

or more of these tests informs the surgeon of a potential injury, and corrective measures can be implemented immediately.

Although this seems to be a straightforward concept, there has been much debate over how much IONM actually helps. First, complication rates are generally low in uncomplicated spine surgeries; most estimates of neurological complications are around 1%. IONM can be costly, and in an ever-increasing cost-conscious medical environment, many have questioned whether the additional cost can be justified.

Dr. Ney and his colleagues tried to answer some of these questions. They used a very large national database of all non-federal hospitals, the Nationwide Inpatient Sample. They used both surgical codes and IONM codes to identify patients who had been discharged after having spinal surgeries. Since they wanted to look at uncomplicated spinal surgeries, they excluded complicated surgical procedures, such as posterior cervical fusions, fusions involving multiple levels, and surgeries that combined an anterior and posterior approach. Between 2007 and 2012, they identified 1.1 million hospital discharges following spinal surgery.

Their first observation was that IONM was used in 4.9% of the uncomplicated spine surgeries. There was no difference in age or sex between the monitored and unmonitored patients. Interestingly, there was no difference in the rates of IONM at teaching vs non-teaching hospitals. Monitored patients tended to be "a little sicker" with three or more comorbidities, were more likely to be privately insured, and were more likely to be undergoing a fusion procedure. In addition, there was a slight preponderance of IONM in the Western United States compared to other geographical areas.

There was a significant reduction in neurologic complications in the monitored group following uncomplicated spinal surgery. The overall rates of complications were low, but in the unmonitored group, the rate of complications was 1.4% vs 0.8% in the monitored group. The use of IONM *reduced* the rate of neurological complications by nearly one-half (49%). Similar to other studies, there were more complications following laminectomy (2.7% in the unmonitored group vs 1.7% in the monitored group) compared to discectomy alone.

In terms of cost, the authors found that there was no significant change in the unadjusted length of stay (3 days in both groups). When adjusted for type of surgical procedure, comorbidities, and other hospital factors, there was a reduced length of stay of 0.3 days in the monitored group. As anticipated, the hospital charges in patients who underwent IONM increased by 9% after adjusting for type of surgery and comorbidities.

■ COMMENTARY

There were several limitations to Dr. Ney's study. The database did not provide information about the severity or duration of the postoperative neurological dysfunction. Therefore, the "cost" of the neurological dysfunction could not be measured. Although the rates of complications may be low, the costs may be high. IONM may reduce the "cost" of the neurological complications, such as ongoing medical care, time lost from work, loss of income, and malpractice liability costs. In addition, this study could not assess the type of IONM nor the expertise of the monitoring professionals. Additional prospective studies would be helpful, but this analysis of IONM in noncomplex spine surgeries clearly shows a benefit in reducing postoperative neurological complications. ■

ABSTRACT & COMMENTARY

Does Rivastigmine Prevent Falls in Parkinson's Disease?

By Claire Henchcliffe, MD

Associate Professor of Neurology and Neuroscience, Weill Cornell Medical College

Dr. Henchcliffe reports she is on the speakers bureau and advisory boards for Teva, IMPAX, and ACADIA, and receives grant/research support from Biogen and Kaneka.

SYNOPSIS: A randomized, double-blind, placebo-controlled Phase II clinical trial of oral rivastigmine in 130 patients with moderate-stage Parkinson's disease demonstrated improved gait stability as measured by accelerometry, and suggested an association with lower rate of falls.

SOURCE: Henderson EJ, et al. Rivastigmine for gait stability in patients with Parkinson's disease (ReSPonD): A randomized, double-blind, placebo-controlled, phase 2 trial. *Lancet Neurol* 2016 Jan. 12; doi: 10.1016/S1474-4422(15)00389-0. [ePub ahead of print] .

Gait instability and falls become increasingly important as Parkinson's disease (PD) advances, but these symptoms are very challenging to treat. However, recent evidence has pointed to an associated cholinergic deficit that might be amenable to acetylcholinesterase treatment. Henderson et al undertook a Phase II, randomized, double-blind, placebo-controlled study of oral rivastigmine, up to 12 mg daily over 32 weeks in 130 patients with moderate PD at risk of falls. Participants had a median age of 69 years (range 46-88 years) in the placebo group and 71 years (range 54-90 years) in the rivastigmine group. In the placebo and rivastigmine groups, median disease duration was 9 years (range 5-13 years) and 8 years (range 5-13 years), respectively. Participants in both groups had experienced approximately five falls within the year prior to enrollment. Median MoCA scores were 26 (range 23-27) in the placebo group and 24 (range 22-27) in the rivastigmine group. Participants were administered oral rivastigmine, beginning with 1.5 mg twice daily or equivalent placebo. Every 4 weeks, the dose was increased by 3 mg daily to a target of 12 mg daily, if tolerated, by 16 weeks. This was followed by a 12-week maintenance phase, with subsequent monitoring to the 1-year time point.

Gait variability was assessed by accelerometry to record step time variability in three conditions: 1) normal walking over 22 meters, 2) simple dual task, in which subjects walked while naming words beginning with a single letter, and 3) complex dual task in which subjects walked while naming words beginning with two alternating letters. Subjects in the rivastigmine group performed better in the simple walking task, with 28% lower step time variability ($P = 0.002$), and in the simple dual task with 21% lower step rate variability ($P = 0.045$), but not in the complex dual task. Falls per month were also lower in the rivastigmine vs placebo group (1.4 ± 2.47 vs 2.4 ± 4.40, $P = 0.002$), although one subject with an extremely high number of falls in the rivastigmine arm was excluded from analysis. Freezing of gait, fear of falling, and cognition and mood measures were not significantly different between groups. In the rivastigmine group, two patients died (unrelated to trial drug) and four patients withdrew, compared with one death and no withdrawals in the placebo group. Two serious adverse events, both worsening Parkinsonism, were rated as probably or definitely rivastigmine-related. The most common adverse event in the rivastigmine arm was nausea (31%).

■ COMMENTARY

Treating gait disorders, imbalance, and falls in the clinic can be challenging, and increasing dopaminergic treatments, such as levodopa, is not always helpful. This has prompted further examination of other pathways contributing to gait instability and falls that might be amenable to treatment. Rivastigmine, a widely used acetylcholinesterase inhibitor, is currently approved for treatment of PD dementia, in which cholinergic deficits in the nucleus basalis of Meynert are recognized. Now, the importance of the cholinergic system in gait stability and imbalance has been increasingly recognized over recent years, making this system, including the pedunculopontine nucleus, a promising therapeutic target. Therefore, it is important that the present study succeeds in demonstrating an effect of rivastigmine on gait. The authors chose this primary outcome measure, measured by accelerometry, as a surrogate marker of fall risk, but the study also found a rivastigmine-associated decrease in the fall rate itself.

Given the importance of this finding, a few caveats need to be mentioned. Although the study was double-blinded, the authors reported that a post-hoc analysis using a standardized blinding index suggested that more participants in the rivastigmine group were able to correctly guess their intervention than by chance. There were some differences between groups; for example women were under-represented in the placebo arm, and the levodopa equivalent dose was greater and cognition was slightly worse in the placebo arm. Nonetheless, this study strongly supports testing in a larger cohort, possibly with the more tolerable transdermal preparation of rivastigmine. With previous benefit demonstrated in smaller studies of donepezil, it looks more likely that use of an acetylcholinesterase inhibitor might in the future join current recommendations for treating gait and balance. In the meantime, we should not neglect non-pharmacologic interventions, including balance therapy or Tai Chi. ■

ABSTRACT & COMMENTARY

Tranexamic Acid-associated Seizures: Features, Mechanisms, and Treatment

By Kimberly Pargeon, MD

Assistant Professor of Clinical Neurology, Weill Cornell Medical College

Dr. Pargeon reports no financial relationships relevant to this field of study.

SYNOPSIS: Tranexamic acid (TXA) is a commonly used antifibrinolytic drug that has been associated with increased risk of postoperative seizures. The authors reviewed the incidence, risk factors, and clinical features of these seizures, as well as potential mechanisms. They also proposed treatments and interventions for preventing TXA-related seizures.

SOURCE: Lecker I, et al. Tranexamic acid-associated seizures: Causes and treatment. *Ann Neurol* 2016;79:18-26.

Tranexamic acid (TXA) is one of the most commonly used antifibrinolytic drugs, often utilized in the perioperative setting to reduce the risk of blood loss and to decrease the need for blood transfusions. TXA is a synthetic lysine-analogue that competitively inhibits the conversion of plasminogen to plasmin, thus reducing fibrin-containing clots.[1] In general, antifibrinolytic agents are safe with few serious side effects, but recent observational studies and case reports have shown an increased incidence of associated seizures, mostly with TXA, and often are associated with cardiac procedures, which can lead to increased length of stay and higher mortality rates.[2]

Per the authors, "off-label" indications and usages for TXA have greatly expanded; thus, retrospective analyses have shown an increased incidence of TXA-associated seizures from 0.5-1.0% to 6.4-7.3% as higher dosages of TXA are used.[2] Several other risk factors have also been identified, including female gender, > 70 years of age, poor overall health status, and certain health conditions, including renal dysfunction and previous neurological or cardiovascular disorders. Seizures also more commonly are associated with cardiac surgeries, particularly those with prolonged cardiopulmonary bypass time or prolonged aortic cross-clamp time, although seizures have been reported with non-cardiac and non-operative procedures.

The authors described reports of accidental intrathecal injection of TXA, which provide some insight into the clinical features. Patients initially experience severe back pain radiating below the waist with burning pain in the lower extremities and gluteal region, but most notably, this is followed by involuntary "jerking" or myoclonic movements involving the lower extremities and face, which rapidly progress to generalized tonic-clonic seizures.[2] In postoperative cardiac patients, TXA-related seizures typically manifest as generalized tonic-clonic activity, although focal seizures have been reported. Interestingly, approximately 20% may experience similar myoclonic activity. Seizures typically last a few minutes and occur within about 5 to 8 hours postoperatively when IV sedation is being weaned. Although status epilepticus typically is not seen, approximately 30-60% of patients can have recurrent episodes within 1-2 days.[2]

TXA seems to have a direct proconvulsant effect on the central nervous system. In experimental animal models, direct application of TXA to the cortex or injection into the cisterna magna leads to generalized seizures. The authors described a study in which cerebrospinal fluid (CSF) and serum levels of TXA were measured and compared at varying points in patients undergoing cardiac surgery with cardiopulmonary bypass. They found that although the peak serum concentration tended to be 10 times higher than those in the CSF, the decline in the CSF lagged behind that in serum and it often failed to decrease even after the infusion was stopped, as opposed to the serum that quickly declined after the infusion was stopped.[2]

At a molecular level, TXA appears to directly increase the excitability of neuronal networks by reducing inhibitory neurotransmission, likely either by affecting GABA-A or glycine receptors. Although TXA is a competitive antagonist of GABA-A receptors, studies have shown that TXA inhibits receptors only at concentrations higher than those typically detected in the CSF. Instead, the authors postulated that glycine receptors are the more likely target, of which TXA is a structural analogue. Glycine receptors can generate both synaptic currents and tonic inhibitory currents, and the latter have been found to be 10 times more sensitive to TXA.[2]

Although there are no IV selective glycine receptor agonists, drugs that reverse this inhibitory effect may be useful in treating TXA-related seizures. For instance, anesthetics, such as isoflurane and propofol, have been shown to fully reverse TXA inhibition of tonic glycine receptors, thus increasing receptor function. Under appropriate circumstances, anesthetics can be considered for treatment and/or prevention of TXA-associated seizures. In cases where the patient is not intubated, benzodiazepines could also be considered, but these will upregulate GABA-A receptors, as opposed to affecting glycine receptors. Finally, prevention may be the best treatment by reducing the dosage of TXA when the patient may be at increased risk for postoperative seizures, such as the case with renal dysfunction. However, this should be weighed against reducing the efficacy the drug.[2]

■ COMMENTARY

TXA-associated seizures are a relatively infrequent complication, but the incidence is increasing, especially as the off-label indications are expanding and as higher dosages are used. The primary goal of this review, however, is recognition that seizures in the postoperative period can be a potential complication related to this medication. If clinicians do not recognize this key point, treatment selection and potential outcomes can be significantly affected. Because TXA seems to involve glycine receptors, anesthetics, such as isoflurane or propofol, are likely to be more effective treatments than traditional anti-epileptic drugs in the acute setting. In general, however, the

more prudent strategy may be to prevent TXA-related seizures by using the lowest effective dosage, especially for patients who are at higher risk, such as older patients or those with underlying chronic disease, such as renal dysfunction. ■

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ABSTRACT & COMMENTARY

Overdiagnosis of Idiopathic Intracranial Hypertension

By Louise M. Klebanoff, MD

Assistant Professor of Clinical Neurology, Weill Cornell Medical College

Dr. Klebanoff reports no financial relationships relevant to this field of study.

SYNOPSIS: Idiopathic intracranial hypertension is over-diagnosed because of a lack of physician expertise in performing accurate ophthalmoscopy. When considering the diagnosis, referral to a neuro-ophthalmologist is strongly recommended.

SOURCE: Fisayo A, et al. Overdiagnosis of idiopathic intracranial hypertension. *Neurology* 2016;86:341-350.

Idiopathic intracranial hypertension (IIH) with papilledema is a clinical syndrome characterized by elevated intracranial pressure (ICP) of unknown etiology. The condition is seen primarily in young, obese women presenting with headaches, visual obscuration, double vision due to sixth nerve palsies, and pulsatile tinnitus. Although rare cases of IIH without papilledema have been described, the vast majority of patients have optic nerve head edema. As awareness of IIH increases, there is a risk of overdiagnosis of IIH. Primary headache disorders are common in young women. The incidence of obesity in this population is also on the rise. Physicians may be biased in making a diagnosis of IIH in young, obese women with chronic headaches. Physicians, even those trained in ophthalmology and neurology, are not adequately trained in performing and interpreting the fundoscopic examination, potentially leading to incorrect diagnoses, invasive diagnostic testing, and inappropriate treatments.

[This retrospective study highlights the challenges of making a correct diagnosis of idiopathic intracranial hypertension.]

Fisano et al performed a retrospective study of patients referred for neuro-ophthalmological consultation at a tertiary health care institution. Over an 8-month period, 165 patients were referred for evaluation of previously diagnosed IIH (86) or suspected IIH (79). Almost 40% (34 patients) with previously diagnosed IIH did not have IIH; 16 had pseudopapilledema and nine had primary headache disorders. Of the 79 patients referred with a suspicion of IIH, < 20% (15 patients) were diagnosed with IIH after re-assessment.

Most of the diagnostic errors resulted from the inability to perform an accurate ocular fundus examination coupled with the challenges of deviating from a previously suspected diagnosis (often due to the bias of assuming that obese woman with headaches have IIH). In this study, 20% of referring providers did not attempt to perform ophthalmoscopy, and 44% of those who performed the examination misinterpreted the appearance of the optic nerve over-diagnosing papilledema.

■ COMMENTARY

Incidental non-specific findings on MRI, such as empty sella, dilatation of the optic nerve sheath, or anomalies of the transverse venous sinuses, also contribute to the overdiagnosis of IIH and lead to additional testing such as lumbar puncture. However, the cerebrospinal fluid (CSF) opening pressure is not always helpful in accurately identifying patients with IIH. The diagnosis of IIH cannot be made on the basis of CSF opening pressure alone. In adults, the cutoff for normal opening pressure is 25 cm of water; however, the measurement of opening pressure can be affected by poor positioning, the use of sedation, failure to relax the legs, or poor needle position. Most headache patients with moderately elevated ICP but without papilledema have primary headache disorders rather than IIH.

This retrospective study highlights the challenges of making a correct diagnosis of IIH. Patients presenting with chronic headache, even obese young women, need careful physical examination, especially accurate examination and interpretation of the ocular fundus, before embarking on invasive diagnostic testing and treatments for IIH. ■

Stroke Alert

By Matthew E. Fink, MD

Symptomatic Carotid Artery Stenosis Requires Urgent Revascularization

SOURCE: Johansson E, et al. Recurrent stroke in symptomatic carotid artery stenosis awaiting revascularization. A pooled analysis. *Neurology* 2016;86:498-504.

To determine the risk and predictors of recurrent stroke or retinal artery occlusion in patients with symptomatic carotid artery stenosis who are awaiting a revascularization procedure, the authors combined data from three prospective European studies of patients who had 50% to 99% symptomatic internal carotid artery stenosis and were scheduled for revascularization procedures. Current guidelines recommend that these procedures be performed within 2 weeks of the initial ischemic event, but the urgency and the risk of a recurrent stroke within those 2 weeks is uncertain.

From the pooled analysis, 377 patients met prespecified inclusion criteria, and their recurrent stroke events were analyzed. The rate of recurrent stroke or retinal artery occlusion was 2.7% after 1 day, 5.3% after 3 days, 11.5% after 14 days, and 18.8% at 90 days. They also demonstrated that if initial presentation was a cerebral ischemic event, compared to an ocular event, the risk of recurrent stroke was higher. The only other risk factor for recurrent stroke identified on a multivariate regression analysis was increased age, but not the degree of carotid stenosis, nor other vascular risk factors, nor any medications. The authors identified a significant early risk of recurrent stroke in patients with symptomatic carotid artery stenosis, and advise a prospective randomized trial to determine when the optimal time for revascularization should take place. ■

Intracerebral Hemorrhages Associated with Non-vitamin K Oral Anticoagulants Appear to Be Smaller than Those Associated with Warfarin

SOURCE: Wilson D, et al. Volume and functional outcome of intracerebral hemorrhage according to oral anticoagulant type. *Neurology* 2016;86:360-366.

Intracerebral hemorrhage is the most dangerous complication of treatment with oral anticoagulants, and this complication carries a high mortality. Because of the increasing prevalence of atrial fibrillation in the elderly population, and the increasing use of oral anticoagulants, the overall prevalence of intracerebral hemorrhage is increasing. In recent years, there has been a rapid transition of treatment from the use of warfarin to the non-vitamin K oral anticoagulants (NOAC – dabigatran, rivaroxaban, apixaban), and randomized trials comparing these agents with warfarin indicate a lower risk for intracerebral hemorrhage. However, it is not clear if the volume and severity of hemorrhages are different between these two classes of medications.

The investigators studied patients from a prospective registry in the United Kingdom of patients with anticoagulant-associated intracerebral hemorrhages, and compared the size and clinical consequences of hemorrhages associated with warfarin and the NOAC agents. From a population of 344 anticoagulant-associated intracerebral hemorrhages, 11 were related to NOAC treatment and 52 were related to warfarin treatment. The median size of hematomas in the NOAC group was 2.4 mL, compared to 8.9 mL for the warfarin group. In a linear regression analysis, use of warfarin and lobar location of the hematoma predicted a larger hematoma size. A multivariate linear regression to identify confounding variables, including sex, hypertension, previous ischemic stroke, and white matter disease, did not show any other significant variables. In addition, the warfarin-associated hemorrhage group had a worse clinical outcome.

This is a small prospective observational study, but it does suggest that warfarin-associated intracerebral hemorrhages may be larger and have worse clinical outcomes then hemorrhages associated with the newer anticoagulant agents. ■

Isolated Dizziness and Vertigo Are Rarely Caused by Stroke

SOURCE: Atzema CL, et al. Outcomes among patients discharged from the emergency department with a diagnosis of peripheral vertigo. *Ann Neurol* 2016;79:32-41.

Dizziness and vertigo are common reasons for patients to seek help in an emergency department (ED). There is always fear and concern on the part of the providers that a stroke may have caused the symptoms. These investigators reviewed all patients discharged from the ED in a large hospital in Ontario, Canada, between 2006 and 2011 with a diagnosis of peripheral vestibular disorder to determine which patients subsequently had a stroke.

They reviewed the records of 41,794 qualifying patients, and only 76 subsequently had a stroke (0.18%). However, when comparing a similar group of patients discharged from the ED with renal colic, as a control group, the relative risk of 30-day stroke in the vertigo group was 9.3 times the risk of stroke in the renal colic group. The time of greatest risk for stroke was 1 week after hospital discharge. However, the rate of stroke in this group of patients is extremely low, and unless there are associated neurological symptoms and signs, there is no need for extensive ED evaluation. But, close follow-up after discharge is certainly recommended. ■

We Need Your Help!

The *Neurology Alert* editors are planning topics for 2016 issues and would like your feedback on topics recently covered. Please help us by answering three questions at the following link: https://www.surveymonkey.com/r/NA0316. Thank you for your help!

CME OBJECTIVES

Upon completion of this educational activity, participants should be able to:

- discuss current scientific data regarding the diagnosis and treatment of neurological disease;
- discuss the pathogenesis and treatment of pain;
- describe the basic science of brain function;
- discuss new information regarding new drugs for commonly diagnosed neurological conditions and new uses for traditional drugs;
- identify nonclinical issues of importance for the neurologist.

CME QUESTIONS

1. **Which of the following statements is true regarding sporadic inclusion body myositis (sIBM)?**
   a. sIBM is the most common inflammatory myopathy.
   b. There are no serological biomarkers available for the diagnosis of sIBM.
   c. sIBM patients show selectively and significantly increased muscle echo intensity in the flexor digitorum profundus and gastrocnemius on sonography of the leg.
   d. sIBM patients show selectively and significantly increased muscle echo intensity in the flexor carpi ulnaris and soleus on sonography of the leg.
   e. None of the above

2. **In reviewing the use of intraoperative neurophysiologic monitoring (IONM) and the rates of neurological complications after noncomplex spine surgery, which of the following is true?**
   a. IONM was used in < 5% of cases.
   b. When IONM was used in noncomplex spine surgeries, the rate of neurological complications was reduced by 49%.
   c. The cost of hospitalization was greater for people who had IONM.
   d. All of the above

3. **Acetylcholine deficits in Parkinson's disease are best associated with which of the following symptoms?**
   a. Gait instability
   b. Tremor
   c. Impaired visual contrast discrimination
   d. Motor fluctuations
   e. "Off" dystonia

4. **Tranexamic acid-related seizures are likely related to effects at what type of receptors?**
   a. GABA-B
   b. NMDA
   c. Glycine
   d. AMPA

5. **A 30-year-old woman presents with chronic headache. On examination, she is obese with a non-focal neurological examination. You are unable to visualize the fundus. Her MRI shows an empty sella but is otherwise normal. What is the appropriate next step?**
   a. Diagnose idiopathic intracranial hypertension and start treatment with acetazolamide.
   b. Refer to neurosurgery for lumbar shunt.
   c. Refer to nutritionist for weight loss.
   d. Perform lumbar puncture.
   e. Refer for neuro-ophthalmology consultation to check for papilledema.

6. **After an ischemic stroke, and the demonstration of > 70% stenosis of the symptomatic internal carotid artery, carotid endarterectomy should be performed within 1 month.**
   a. True
   b. False

7. **The NOAC anticoagulants have a lower rate of serious bleeding complications than warfarin.**
   a. True
   b. False

8. **Vertigo is rarely caused by an ischemic or hemorrhagic stroke.**
   a. True
   b. False

[IN FUTURE ISSUES]

Update from the 2016 International Stroke Conference