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HOSPITAL MEDICINE ALERT

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INSIDE

Stroke in Patients Undergoing PCI

ABSTRACT & COMMENTARY

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Dr. Boyle reports no financial relationship relevant to this field of study.

This article originally appeared in the June 2011 issue of Clinical Cardiology Alert. *It was edited by Michael H. Crawford, MD, and peer reviewed by Ethan Weiss, MD. Dr. Crawford is Professor of Medicine, Chief of Clinical Cardiology, University of California, San Francisco, and Dr. Weiss is Assistant Professor of Medicine, Division of Cardiology and CVRI, University of California, San Francisco. Dr. Crawford is a speaker for Astra-Zeneca, and Dr. Weiss reports no financial relationships relevant to this field of study.*

Source: Hoffman SJ, et al. Trends, predictors, and outcomes of cerebrovascular events related to percutaneous coronary intervention. A 16-year single-center experience. *J Am Coll Cardiol Intv* 2011;4:415–422.

Cerebrovascular events (CVE), including stroke and transient ischemic attack (TIA), are recognized complications of percutaneous coronary intervention (PCI). Recent years have seen refinements in PCI techniques that have allowed older and sicker patients to undergo PCI. At the same time, improvements in antithrombotic and antiplatelet medications have reduced the ischemic coronary complications of PCI. Whether these changes have altered the risk of CVE in patients undergoing PCI is not known. Accordingly, Hoffman and colleagues examined the Mayo Clinic database of 24,126 PCI hospitalizations between 1994 and 2009 to determine the temporal trends in the incidence and predictors of CVE, as well as the outcomes in patients who suffer CVE following PCI.

The authors compared patients undergoing PCI based on whether they did or did not suffer a CVE during the hospitalization. There were numerous differences in the baseline demographics between those who suffered a CVE and those who did not. Those who suffered a CVE were older (74 ± 11 years vs. 66 ± 12 years, $P < 0.001$), more likely to be female (51% vs. 29%, $P < 0.001$), have had a recent myocardial infarction (MI; 60% vs. 32%, $P < 0.001$) or pre-procedural shock (11% vs. 4%, $P < 0.001$), have a history of prior CVE

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(32% vs. 11%, $P < 0.001$), or renal failure (8% vs. 4%, $P < 0.05$). Interestingly diabetes, dyslipidemia, and congestive heart failure (CHF) were not associated with an increased risk for CVE. Angiographic and procedural variable also differed between groups. Those who suffered a CVE had more diseased vessels and more vessel segments treated, higher incidence of visible thrombus (55% vs. 31%, $P < 0.001$), higher rates of intra-aortic balloon pump use (6% vs. 2%, $P = 0.03$), and were more likely to be undergoing PCI for emergent indications (40% vs. 19%, $P < 0.001$). The use of glycoprotein IIb/IIIa inhibitors, unfractionated vs. low molecular weight heparin, and radial vs. femoral approaches were not associated with the occurrence of CVE.

The incidence of CVE was 0.37%, of which 78% were stroke and 22% were TIA. Of the strokes, 92% were ischemic, 7% were hemorrhagic, and 1% unknown (no imaging). Over 16 years, the rate of CVE remained similar. The authors performed multivariate analysis and found four independent predictors for CVE (with odds ratio in parentheses): age, per decade (1.47); female gender (1.8); MI within 7 days (2.2); and previous CVE (2.7) (all $P < 0.01$). Interestingly, the rate of peri-procedural CVE has not changed significantly over the past 16 years. After multivariable adjustment, the rate numerically decreased from approximately 0.6% to 0.3%, but this did not reach statistical significance.

As expected, both short- and long-term outcomes were significantly worse in patients who suffered a CVE. Procedure-related MI, access-site complications, hemodynamic instability, requirement for emergency balloon pump or coronary artery bypass surgery, and post-procedural renal failure were all more likely to occur in patients who suffered CVE. In-hospital mortality was 19% vs. 2% ($P < 0.001$) and long-term mortality was also significantly higher ($P < 0.01$). The authors conclude that the incidence of PCI-related CVE has remained steady over a 16-year period, despite an increase in baseline risk profile. Age and prior history of CVE were the strongest independent demographic predictors. PCI-CVE had a markedly adverse impact on early and late outcomes.

■ COMMENTARY

Stroke remains perhaps the most devastating complication of PCI. In assessing a patient's risk for invasive therapies such as PCI, an accurate assessment of the likelihood of complications is paramount. This study gives us pertinent information to relay to our patients in deciding on whether or not to pursue PCI. The four independent predictors of CVE identified by Hoffman and colleagues (age, female gender, recent MI, and previous CVE) identify the highest risk patients. In fact, the risk of PCI-related CVE is 9-fold higher in an octogenarian than a patient younger than 50 years of age, and in an octogenarian with prior CVE it is 19-fold higher than a younger patient without prior CVE. With such dramatic differences in the rate of CVE, it is paramount that we accurately counsel our patients on their individual risk.

This study is limited by its retrospective observational nature. Thus, no changes in management based on these observations can be recommended at this time. In addition, we are not provided with information on the level of anticoagulation during the procedure, the procedure length, or the rate of atrial fibrillation. All these factors, and others, may influence the rate of CVE. Thus the dataset in not complete. However, this study improves our ability to individualize risk assessment for an individual who is considering PCI, based on clinical factors before going to the cath lab, and may therefore improve our clinical decision-making. ■

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Compliance with Antihypertensive Therapy

ABSTRACT & COMMENTARY

By Michael H. Crawford, MD

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This article originally appeared in the June 2011 issue of Clinical Cardiology Alert. *It was peer reviewed by Ethan Weiss, MD. Dr. Weiss is Assistant Professor of Medicine, Division of Cardiology and CVRI, University of California, San Francisco. Dr. Crawford is a speaker for Astra-Zeneca, and Dr. Weiss reports no financial relationships relevant to this field of study.*

Source: Kronish IM, et al. Meta-analysis: Impact of drug class on adherence to antihypertensives. *Circulation* 2011;123:1611-1621.

Hypertension is usually asymptomatic, so adherence to drug therapy is an issue, especially if the drugs used cause symptoms. Thus, these investigators performed a meta-analysis of 17 studies that measured adherence to antihypertensive drugs based upon medication refill data in order to determine the adherence rate of different antihypertensive drug classes.

The selected studies involved more than 900,000 patients and showed a range of adherence values across drug classes from 28% to 65%. Angiotensin receptor blockers (ARBs) had the best adherence compared to all other classes ($P < 0.05$). Almost all studies showed a lower adherence to diuretics than all other classes ($P < 0.05$). The relative adherence of the drug classes from highest to lowest were ACE inhibitors, calcium blockers, and beta-blockers. Various analytic methods were used that did not change the overall results, but the statistical significance between ARBs and angiotensin-converting enzyme (ACE) inhibitors or between diuretics and beta-blockers was lost with some analyses. The authors concluded that there are important differences in adherence to antihypertensive therapy by drug classes with the highest rate of adherence in renin-angiotensin system blockers and the lowest in beta-blockers and diuretics. However, even the best adherence rates observed were suboptimal in these trials.

■ COMMENTARY

In hypertension, compliance with antihypertensive drugs is the key to effective treatment. This may explain why treatment based on renin-angiotensin system blockers and calcium antagonists have shown better outcomes than those based upon beta-blockers and diuretics. There may be several reasons for these observed differences in compliance with drug therapy, but the most obvious is adverse effects. The drugs with the least adherence have the most side effects and vice versa. The high adherence drugs are the newest drugs, so some have claimed there is a physician bias toward heavily marketed drugs. As this study shows, patients vote with their adherence rate and these new drugs just have lower side effects. In fact, in the outpatient setting, I always start with an ARB because I do not want 10% of my patients stopping therapy because of ACE inhibitor cough.

There are limitations to this study. ARBs were the least prescribed drug; probably because until recently there was no generic one available in the United States. This may have biased the results in favor of ARBs. Not all drug classes were studied (e.g., alpha blockers). The study does not address the current recommendations and practice of initially prescribing drug combinations, especially in patients with very high blood pressures. Almost every combination of two antihypertensive drugs are available now in one tablet with a few tablets containing three drugs. Of course cost continues to be an important factor in patients' preference for drugs, but interestingly the relative costs of the drugs in this study did not seem to affect adherence significantly. ■

Long-Term Psychological Effects of Critical Illness

ABSTRACT & COMMENTARY

By Saadia R. Akhtar, MD, MSc

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Dr. Akhtar reports no financial relationship to this field of study.

This article originally appeared in the June 2011 issue of Critical Care Alert. *It was edited by David J. Pierson, MD, and was peer reviewed by William Thompson, MD. Dr. Pierson is Professor, Pulmonary and Critical Care Medicine, Harborview Medical Center, University of Washington, Seattle, and Dr. Thompson is Associate Professor of Medicine, University of Washington, Seattle. Drs. Pierson and Thompson report no financial relationships relevant to this field of study.*

Synopsis: *This observational study noted that critically ill patients provided with clinical psychological support during their ICU stay had less anxiety, depression, and post-traumatic stress disorder at one year post-discharge compared to historical controls.*

Source: Peris A, et al. Early intra-intensive care unit psychological intervention promotes recovery from post traumatic stress disorders, anxiety and depression symptoms in critically ill patients. *Crit Care* 2011;15:R41.

The authors investigated whether intra-ICU clinical psychological support could impact anxiety, depression, and post-traumatic stress disorder (PTSD) rates in patients one year after ICU discharge. This was a single-center study focusing on patients with major trauma (defined by injury severity score > 15) as the primary reason for ICU admission. Inclusion criteria were: age 18-75 years, ICU length of stay (LOS) > 72 hours, mechanical ventilation, ability to be interviewed during ICU stay, and absence of pre-existing psychiatric illness or drug abuse. The study period spanned about 4 years from 2005 to 2009 (the first 2 for historical control data; the second 2 for intervention). The psychological interventions provided are described as "educational interventions, counseling, stress management [cognitive and emotional restructuring], psychological support, coping strategies designed to ease the management of anxiety, depression, fear, hopelessness...."

These were provided several times a day by clinical psychologists who were available in-house from 12 a.m. – 4 p.m. and also by other ICU staff. Similar but separate interventions were administered to patients' family members. Validated standard questionnaires were used for assessment of PTSD (Impact of Event Scale Revised, IESR), anxiety and depression (Hospital Anxiety and Depression Scale, HADS), and quality of life.

In the 4-year study period, 376 patients met inclusion criteria and, of these, based on availability and willingness for interview and follow-up, 86 were enrolled in the control arm and 123 in the intervention arm. The two groups were well matched in demographic and diagnostic features as well as ICU course and LOS. At one year after ICU discharge, patients in the intervention group were less likely to have anxiety or depression by HADS score but results did not reach statistical significance. They were significantly less likely to have PTSD (21% vs 57%) or need anxiolytics or antidepressants; they also had better overall subjective assessment of quality of life. Logistic regression with some predefined variables and some selected post hoc found no clear predictors of long-term anxiety, depression or PTSD; small associations with Glasgow coma scale at admission and ICU discharge were noted.

■ COMMENTARY

Psychological effects of critical illness and ICU care are an extremely important — but poorly understood and studied — aspect of intensive care medicine. Rates of PTSD are high though variable, estimated at 20% in one meta-analysis of 15 studies of general ICU populations, 28% in survivors of ALI, and upwards of 60% in other reports.[1] Symptoms such as long-term anxiety and depression are similarly commonly noted. Thus, Peris et al are to be commended for considering this issue and trying to provide an intervention that may improve psychological outcomes after critical illness; they are the first investigators to do this.

The study has several limitations. One key deficiency is that the interventions provided are not clearly defined or documented in the report, either in terms of the methods or the time spent per patient and family member; this will make it difficult for others to repeat the study or apply the interventions. There are several issues with the study design that limit the accuracy, validity, and utility of the results. Some examples include use of historical controls; lack of a priori planning of sample size thus inadequate powering for assessment of outcomes and predictive factors for anxiety, depression, and PTSD; and absence of specific data about sedative and analgesic use. There are considerable differences in the rates of PTSD observed in the historical controls here compared to rates reported for trauma ICU populations in other publications; as a result, the observed treatment effect may be exaggerated.

Despite these issues, this remains an important and at least hypothesis-generating pioneer study; it suggests that there may be some positive outcomes from early psychological support/intervention for patients and families in the ICU. It also reminds us that considerable additional work is needed to understand the factors that predispose or contribute to development, long-term, of anxiety, depression, and PTSD in critically ill patients; targeted interventions based on such data may be most effective. I can only hope that there will soon be several more robustly designed investigations into this topic that will provide clear answers and direction to guide preventive care. In the meantime, I suggest we continue to acknowledge the short- and long-term psychological side effects of critical care and provide as much general support as possible to our patients and their families. ■

Reference

1. Davydow DS, et al. *Gen Hosp Psychiatry* 2008;30:421-434.

Does COPD Worsen Outcomes When Mechanical Ventilation Is Required for Other Reasons?

ABSTRACT & COMMENTARY

By David J. Pierson, MD

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This article originally appeared in the June 2011 issue of Critical Care Alert. *It was peer reviewed by William Thompson, MD. Dr. Thompson is Associate Professor of Medicine, University of Washington, Seattle. Drs. Pierson and Thompson report no financial relationships relevant to this field of study.*

Synopsis: *In a cohort of mechanically ventilated patients admitted with a variety of acute diagnoses, those diagnosed with COPD (but not in exacerbation) had higher ICU mortality but no difference in risk for ventilator-associated pneumonia as compared to patients without the diagnosis of COPD.*

Source: Rodríguez A, et al. Impact of non-exacerbated COPD on mortality in critically ill patients. *Chest* 2011; March 10. [Epub ahead of print.]

Rodríguez and colleagues report on a prospectively enrolled cohort of 235 consecutive patients admitted to two ICUs in Spain who required mechanical ventilation for at least 48 hours and had indications for ventilatory support other than respiratory infection or acute

exacerbation of chronic obstructive pulmonary disease (COPD). The goal was to determine whether the existence of underlying COPD worsened survival of the critical illness and also whether having non-exacerbated COPD predisposed patients to ventilator-associated pneumonia (VAP).

The authors used a standard definition of COPD as characterized by chronic airflow obstruction, but they made the diagnosis using "clinical criteria" (not further described), medical records, and/or evidence of hyperinflation on chest radiograph if the patients had not had pulmonary function testing. The diagnosis of VAP required compatible findings on chest radiograph plus either purulent sputum, a leukocyte count exceeding 10,000/mL (or 20% higher than the admission value), or fever; microbiologic criteria were not used.

The 235 patients included 60 (26%) diagnosed with COPD and 175 (74%) without this diagnosis. Patients in the COPD group were more often admitted for medical (vs. surgical or trauma) reasons; they were also older, had more comorbidities, and had higher APACHE II scores, all these differences from the non-COPD group being statistically significant. Overall ICU mortality was 26% and was higher in the COPD group (37%) than in the non-COPD group (23%; $P < 0.05$). The magnitude of the difference (14%) was attributed to the presence of COPD in the former group. Duration of mechanical ventilation in survivors was not different in the two groups.

The incidence of VAP as defined in this study was 11.9/1000 ventilation days in the COPD group and 16.0/1000 ventilation days in the non-COPD group ($P = 0.40$). By multivariate analysis, the statistically significant predictors of increased mortality were the presence of COPD, being in shock on admission to the ICU, and having a medical (vs. surgical/trauma) diagnosis. The authors conclude that patients with underlying but non-exacerbated COPD have higher ICU mortality than patients without COPD, but no increased risk for developing VAP during their ICU stay.

■ COMMENTARY

Three aspects of this study diminish the confidence with which its findings can be accepted. First, although it was generally in line with ICU practice in my experience, the diagnosis of COPD was imprecise and likely inaccurate in at least some patients. Airflow obstruction was acknowledged as the primary defining characteristic of the disorder, but in only 11 of the 60 "COPD" patients could severity be determined according to the criteria of the Global Initiative for Chronic Obstructive Lung Disease. This means that only one-sixth of the patients in the COPD group had had spirometry to confirm the diagnosis and determine severity, and that in the others the diagnosis was based on vaguely stated clinical grounds. Because the history, physical exam, and chest X-ray are much less reliable for detecting the presence of COPD than spirometry, especially when it is only moderate in severity, the possibility exists that at least some of the "COPD" patients did not in fact have this disorder — or, alternatively, that if they all had COPD it was most likely severe.

The second weakness is that the patients assigned to the COPD group differed in important ways from those in the non-COPD group, apart from the presumed presence of COPD. They were older and had more comorbid conditions such as diabetes and cardiomyopathy. Their illness severity was greater on ICU admission, by APACHE II scores, and they were more likely to be admitted because of medical illness as compared to surgery or trauma. These important potential confounders make it more difficult to ascribe the observed outcome differences to the presence of COPD, despite at least some of them failing to be independent predictors by multivariate analysis.

Third, the diagnostic criteria used for VAP — purely clinical without the use of microbiologic data — were not as robust as those used in the most rigorous studies of this entity. In the methods it is stated that all patients had quantitative cultures performed on endotracheal aspirates, but the results were not used in diagnosing VAP.

These drawbacks notwithstanding, this study supports the concept that the presence of COPD as a background comorbidity in patients requiring mechanical ventilation for reasons other than an acute exacerbation predisposes patients to worse outcomes than individuals not having COPD, all other conditions being equal. It also supports the concept that VAP is primarily a complication of endotracheal intubation, and that underlying COPD is not a major determinant of its acquisition in the context of critical illness. ■

CRP in Acute Pericarditis

ABSTRACT & COMMENTARY

By Michael H. Crawford, MD

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This article originally appeared in the May 2011 issue of Clinical Cardiology Alert. *It was peer reviewed by Ethan Weiss, MD. Dr. Weiss is Assistant Professor of Medicine, Division of Cardiology and CVRI, University of California, San Francisco. Dr. Crawford is a speaker for Astra-Zeneca, and Dr. Weiss reports no financial relationships relevant to this field of study.*

Source: Imazio M, et al. Prevalence of C-reactive protein elevation and time course of normalization in acute pericarditis. Implication for the diagnosis, therapy and prognosis of pericarditis. *Circulation* 2011;123:1092-1097.

The utility of inflammatory markers in acute pericarditis is not well understood. Thus, these investigators from Italy prospectively evaluated serial high sensitivity C-reactive protein (hs-CRP) serum levels in patients with acute pericarditis followed for 24 months on average.

Of the 240 cases diagnosed as acute pericarditis, 200 had idiopathic (152) or viral (48) pericarditis and are the subjects of this report. Hs-CRP testing was done at presentation and every week until normalization. Values > 3.0 mg/L were considered elevated. All patients received empirical anti-inflammatory therapy: aspirin or non-steroidal anti-inflammatory drugs (NSAIDs) in 170; colchicine in 100; and corticosteroids in 30. Drug therapy was usually tapered in 3 to 4 weeks.

Symptom persistence at 1 week, recurrent cardiac tamponade, and constrictive pericarditis were considered adverse events. Patients ranged in age from 18 to 90 years old (mean 53), and about 50% were female. All presented with chest pain, about 85% had diagnostic ECG changes, about one-third had pericardial rubs, and about 50% had pericardial effusions. At presentation, 78% had elevated hs-CRP, which steadily declined to 5% at 3 weeks and none at 4 weeks. Negative hs-CRP values on presentation may have been due to early presentation (15 of 44) or previous anti-inflammatory therapy (22 of 44). A normal hs-CRP value at 1 week was highly predictive of a recurrence-free survival ($P < 0.001$). An incomplete response to initial anti-inflammatory therapy and the use of corticosteroids also were independent predictors of recurrence. The authors concluded that hs-CRP is elevated in three-quarters of patients with acute pericarditis and serial measurements identify patients at higher risk of recurrence.

■ COMMENTARY

This prospective observational study of patients with acute idiopathic or viral pericarditis is an important contribution because it suggests a procedure for managing these patients.

They clearly identify acute pericarditis clinically as patients who have two of the following four criteria: chest pain consistent with pericarditis; a friction rub; diagnostic ECG changes; or a pericardial effusion on echocardiography. They find that hs-CRP is elevated in three-fourths of them and persistently negative in 3.5%. However, there is no control group of patients with chest pain, but no evidence of pericarditis to determine the false-positive rate. Thus, it is not an absolute diagnostic criterion, but if elevated does support the diagnosis.

Current therapy for acute idiopathic or viral pericarditis is empiric. Acute inflammatory agents are currently given until the pain resolves or for some predetermined interval. Hs-CRP offers a more informed approach. The authors suggest weekly values with full dose initial therapy continuing until hs-CRP is < 3.0 mg/L; then tapering therapy off. Of course this would be modified if the patient does not improve symptomatically or there is evidence of recurrence.

Their experience supports previous observational results on the course of treated acute pericarditis. About one-third had persistent symptoms at one week and about one-third had a reoccurrence during follow up. Only 2% developed pericardial tamponade and none developed constriction over a 2 year average follow-up. These data confirm the relatively benign prognosis of idiopathic or viral acute pericarditis with the biggest problem being recurrence.

In this study, there were three independent predictors of reoccurrence: incomplete response to therapy at one week, use of corticosteroids, and an elevated hs-CRP at one week. These observations confirm that corticosteroids should not be used as first-line therapy, but reserved for refractory cases. In my experience, using colchicine for those who do not improve quickly on NSAIDs has almost eliminated the need for corticosteroids. In the future, I will use hs-CRP to tailor the duration of therapy. ■

Psychogenic Nonepileptic Seizures

ABSTRACT & COMMENTARY

By Steven Karceski, MD

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Dr. Karceski reports he is on the speakers bureau for GlaxoSmithKline, Cyberonics, and Pfizer; and receives research support from Novartis and Cyberonics.

This article originally appeared in the June 2011 issue of Neurology Alert. *It was edited by Matthew E. Fink, MD, and peer reviewed by M. Flint Beal, MD. Dr. Fink is Interim Chair and Neurologist-in-Chief, Department of Neurology and Neuroscience, Weill Cornell Medical College, New York Presbyterian Hospital, and Dr. Beal is Anne Parrish Titzel Professor, Department of Neurology and Neuroscience, Weill Cornell Medical Center. Drs. Fink and Beal report no financial relationships relevant to this field of study.*

Synopsis: *Frontal lobe dysfunction may predispose people to have psychogenic nonepileptic seizures; this dysfunction can be measured by analyzing a brief period of the awake EEG.*

Source: Knyazeva MG, et al. Psychogenic seizures and frontal disconnection: EEG synchronization study. *J Neurol Neurosurg Psychiatry* 2011;82:50-58.

Knyazeva and her colleagues used EEG in a novel way to look for differences in brain wave activity in people with psychogenic nonepileptic seizures (PNES). Like epileptic seizures, nonepileptic psychogenic seizures are episodes of transient neurological dysfunction. However, unlike epileptic seizures, PNES occur *without* the simultaneous, abnormal, evolving electrical potentials that are recorded during epileptic seizures. The lack of changes during the event (aka, the *ictus*) is one of the features of PNES that distinguishes it from other nonepileptic events like syncope. In short, the EEG is normal during PNES. EEG, and very often video-EEG, is the medical test that is most helpful when trying to differentiate between these types of events.

Knyazeva et al used the EEG in a novel way. Instead of looking at the *ictal* EEG (i.e., the EEG during the *ictus*), they looked at a 3-4 minute segment of awake-only EEG. They analyzed the *interictal* (between event) EEG, looking for patterns of synchronization between the hemispheres. They studied 13 patients with PNES and compared these to age- and sex-matched controls (people without seizures). They found that in the group with PNES, there was a hypersynchronization of brain wave activity in the left frontotemporal, left parietotemporal, and left central brain regions. They concluded that interictal EEG, when analyzed in this way, suggests that there is a brain substrate for PNES. Further, the region of abnormality may reside in the left frontal lobe. In short, the frontal lobe dysfunction may predispose the person to PNES.

■ COMMENTARY

PNES largely has replaced the older term *pseudo*-seizures. The reason for this is simple: the prefix *pseudo*- suggests that the seizures are "fake." In other words, a person who has PNES is "faking it." This could not be further from the truth in the vast majority of instances. Although true malingering is rarely encountered, most people with PNES are experiencing a somatization disorder, which falls under the broader category of conversion disorder. In other words, the person is subconsciously manifesting a psychic trauma in a physical way.

PNES is a relatively common illness. It can occur at any age (ranges include as young as 4 years old to 77 years old). The prevalence of PNES is estimated to be 0.5% of the general population. In comprehensive epilepsy centers, up to 20%-50% of patients will carry the diagnosis of PNES, whether as a sole diagnosis or in combination with epileptic seizures. Fifty percent to 70% of people with PNES have an associated psychiatric illness.

PNES and epileptic seizures can be difficult to distinguish from each another. Video-EEG records both the clinical manifestation of the event and the electroencephalogram. Both are then reviewed and carefully analyzed. Although there are pitfalls to the analysis, in most instances, this technology can separate epileptic seizures from PNES.

In their paper, the authors suggest that the EEG between events is also important. By analyzing this, there may be subtle differences in brain wave patterns. These differences suggest that there is a brain substrate for PNES. Their findings (primarily in the left frontal lobe; more specifically the prefrontal region) are similar to other reports of prefrontal dysfunction. For instance, prefrontal activation has been shown to occur in other conversion disorders like psychogenic paralysis (using functional MRI and positron emission computed tomography studies). In short, the findings coincide with other studies of somatization disorders.

This idea is not new. For many years, PNES has been observed to occur after traumatic brain injury. PNES have also occurred in people with prior CNS infection, stroke, and demyelinating disease. The most common association is between PNES and another psychiatric illness like depression or anxiety.

The authors admit that their study is limited. The population is small in number. Most of the study patients were taking medication (most often a benzodiazepine) and controls were not. Benzodiazepines cause changes in EEG — increase in frontal lobe fast frequencies. It is possible that the benzodiazepines were responsible for the subtle changes in recorded synchronization.

All patients had video-EEG to confirm the diagnosis of PNES. However, it is not clear whether some of them also may have had epilepsy. This is an important distinction to make, especially since the two conditions can overlap.

Finally, it is not clear whether the observed changes could be due to a psychiatric illness. Focal dysfunction, as measured by functional brain imaging, has been reported in people with depression. Most often, this has been reported in the right hemisphere. In other words, the focal brain synchronization that Knazeva reported could indicate a brain substrate for the psychiatric illness, and not PNES.

It is clear that more study is needed. Careful analysis of interictal EEG may reveal abnormalities in many different medical illnesses. They also may occur as a result of medications that are active in the central nervous system. By studying these differences carefully, scientists may uncover information that expands the understanding of illnesses like PNES. Improved diagnostic testing may lead to earlier diagnosis, and ideally, improved treatments. ■

CME Questions

1. **In the retrospective, observational study by Hoffman, et al, which of the following were found to be independent risk factors for stroke in patients undergoing percutaneous coronary intervention?**

a. age

b. female gender

c. MI within 7 days of PCI

d. history of previous stroke

e. all of the above

2. **In the study by Peris and colleagues, clinical psychological support provided to critically ill patients during their ICU stay led to which of the following outcomes?**

a. a statistically significant reduction in post-traumatic stress disorder (PTSD)

b. shorter hospital lengths of stay

c. improved hospital survival

d. all of the above

3. **Based on their prospective cohort study of patients with COPD who were mechanically ventilated for reasons other than respiratory infection or a COPD exacerbation, Rodríguez, et al, found that:**

a. COPD was not associated with a higher mortality in critically ill patients.

b. Mechanically ventilated patients with COPD had a higher rate of ventilator-associated pneumonia compared to patients without COPD.

c. Duration of mechanical ventilation in survivors was not different in patients with COPD compared to patients without COPD.

d. Patients with COPD received less enteral nutrition than patients without COPD.

CME/Objectives

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

- discuss pertinent safety, infection control and quality improvement practices;
- explain diagnosis and treatment of acute illness in the hospital setting; and
- discuss current data on diagnostic and therapeutic modalities for common inpatient problems. ■

CME Instructions

1. Read and study the activity, using the provided references for further research.

2. Log on to **www.cmecity.com** to take a post-test; tests can be taken after each issue or collectively at the end of the semester. *First-time users will have to register on the site using the 8-digit subscriber number printed on their mailing label, invoice, or renewal notice.*

3. Pass the online tests with a score of 100%; you will be allowed to answer the questions as many times as needed to achieve a score of 100%.

4. After successfully completing the last test of the semester, your browser will be automatically directed to the activity evaluation form, which you will submit online.

5. Once the evaluation is received, a credit letter will be sent to you. ■