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Hospital Medicine

Evidence-Based Information for Hospitalists Intensivists, and Acute Care Physicians [ALERT]

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ABSTRACT & COMMENTARY

Pagers Versus Smartphones

By Kenneth P. Steinberg, MD, FACP, Editor

Professor of Medicine, University of Washington School of Medicine, Seattle, WA

Dr. Steinberg reports no financial relationships in this field of study.

SOURCE: Pryzbylo JA, et al. Smarter hospital communication: Secure smartphone text messaging improves provider satisfaction and perception of efficiency, workflow. *J Hosp Med* 2014; 9:573-578.

This is an eight-week, cluster-randomized, controlled trial at a single institution study (Stanford Hospital) comparing a traditional one-way paging system to the use of a HIPAA-compliant group messaging (HCGM) application for smartphones. Three of five inpatient medicine teams were randomized to use Medigram, a free HCGM application for smartphones. The application allows users to send and receive encrypted, password-protected text messages via the hospital wireless network or using commercial cellular networks as backup. These three teams also still used their one-way pagers but had the HCGM application to supplement the usual paging system. The other two teams were randomized to only their one-way pagers. Team-based case managers and the satellite pharmacy were also provided with HCGM-equipped smartphones to communicate with the experimental teams. Participation was voluntary, with a 96% participation rate.

Outcome measures included baseline and post-study surveys, and average length of stay and time of discharge for patients treated by control versus experimental teams. The surveys assessed baseline attitudes about the hospital paging system as well as post-study questions about perceived effectiveness, workflow integration, and overall satisfaction. A set of free-response questions was analyzed using qualitative research methods.

Twenty-six control and 49 HCGM group members were enrolled; linked baseline and

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post-study surveys were collected for 22 control and 41 HCGM participants, for completion rates of 84.6% and 83.7% respectively. The control and HCGM groups were well matched demographically, and there were no significant baseline differences in the groups' perceptions of paging effectiveness. There was significant variability in the use of HCGM by members of the experimental teams: 90% reported sending at least 1 text message, 56% sent a total of ≥ 5 texts, 44% sent ≥ 10 texts, and 28% sent ≥ 20 texts. HCGM users on the three teams sent an aggregate mean of 123 texts/week. In post-study surveys, HCGM participants rated HCGM significantly higher ($P < 0.05$) than paging in terms of ability to communicate thoughts clearly ($P = 0.01$) and efficiently ($P = 0.009$). HCGM was felt to be more effective at integrating into workflow during rounds ($P = 0.018$) and patient discharge ($P = 0.012$). Overall satisfaction with HCGM was significantly higher ($P = 0.003$). When asked if they would recommend using an HCGM system to facilitate communication on the internal medicine wards, 85% of HCGM participants said yes, 15% were not sure, and zero said no. No significant differences were noted in average length of stay or time of discharge between the two groups.

■ COMMENTARY

Hospital paging systems are inherently inefficient as they disrupt workflow to return calls, though this can be decreased by the use of alphanumeric paging. However, the use of alphanumeric paging is not considered to be HIPAA-compliant. Smartphone-based text messaging, now so common in our lives, is potentially more efficient in transmitting and receiving information, but commercial networks are also not HIPAA-compliant. Thus, secure text-messaging applications that address the security concerns and allow for efficient transmission of information could be very helpful. I view this study as the first feasibility assessment of an HCGM smartphone application, and it indeed led to subjective improvements in communication and efficiency among the participants randomized to that group. The study had significant limitations that may have minimized this positive effect: Only the three internal medicine teams used the HCGM technology. No other departments or internal medicine physicians (e.g., subspecialty consultants) had access to this application. And as best I can tell, the nurses did not utilize this technology either. Thus it is not surprising that the teams did not send more text messages and this probably underestimated the potential impact of switching to this technology.

Hospital-based paging systems have some advantages, including reliability of message transmission, ability to text-page (albeit not HIPAA compliant), ease of use, ubiquity, and speed. HCGM smartphone systems have some disadvantages, including not always being able to access wireless or commercial cellular networks in all places within the hospital. In addition, while the HIPAA-compliance is a potential major advantage for some services, on non-medical services the added security could hamper communication. Imagine a surgeon scrubbed into a case. When his or her pager goes off, another member of the team can look at the pager and return the call. That may not be true of a secure HCGM smartphone system without the divulgence of smartphone passwords.

So, while this study is intriguing, and technology will continue to advance in a way that may eliminate conventional hospital-based paging systems, I do not believe that smartphone-based HCGM communication is currently able to replace traditional paging across the whole hospital. However, since the application is now readily available, it may be a helpful adjunct for secure, efficient communication on the wards within or between hospital medicine, internal medicine, and emergency medicine teams. ■

ABSTRACT & COMMENTARY

Reduced ICU Bed Availability is Associated with Worse Outcomes on the General Wards

By Betty T. Tran MD, MSc

Assistant Professor of Medicine, Pulmonary and Critical Care Medicine, Rush University Medical Center, Chicago

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

This article originally appeared in the September 2014 issue of Critical Care Alert. *It was edited by David J. Pierson, MD, and peer reviewed by William Thompson, MD. Dr. Pierson is Professor Emeritus, Pulmonary and Critical Care Medicine, 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 cohort study found that reduced ICU bed availability is associated with increased rates of ICU readmission as well as ward cardiac arrest if medical ICU beds were on shortage.

SOURCE: Town JA, et al. Relationship between ICU bed availability, ICU readmission, and cardiac arrest in the general wards. *Crit Care Med* 2014; April 25. [Epub ahead of print.]

Prior studies have reported that limited ICU bed availability is associated with various outcomes such as increased severity of illness in patients admitted to the ICU and shorter ICU length of stay.[1] Given limited knowledge of other system-related effects of ICU bed availability, Town et al aimed to explore whether ICU bed capacity was associated with rates of ICU readmission within 24 hours and cardiac arrest on the general wards.

The study was conducted at the University of Chicago Medicine, a tertiary academic center that has 63 adult ICU beds and 272 adult general inpatient ward beds. Data on ICU bed availability were collected, and rates of ICU readmission within 24 hours of discharge from the ICU and ward cardiac arrest were calculated per 12-hour shift over a period of 3 years. Care was taken to minimize incomplete data (4.7%) in defining ICU bed availability by availability of nursing rather than number of open physical beds, as well as in excluding comfort care deaths from the analysis.

Over the 3-year period consisting of 8238 discharges from the ICU, there were 245 (3%) readmissions within 24 hours, resulting in an ICU readmission rate of 2.63 per 100 discharges. The overall ward cardiac arrest rate was 2.63 per 10,000 patient-shifts during the study period, with 72% of ward cardiac arrests occurring in patients on a medical service. With each unit decrease in total ICU bed availability, the odds of ICU readmission increased significantly (odds ratio [OR] 1.06; 95% confidence interval [CI], 1.00-1.12; $P = 0.03$). A similar but non-statistically significant trend was seen between total ICU bed availability and ward cardiac arrest rates; however, MICU bed availability in particular was significantly associated with ward cardiac arrest rates (OR, 1.25; 95%CI, 1.06-1.49; $P = 0.01$).

■ COMMENTARY

ICU beds are at a premium in busy hospitals, and this study highlights important considerations when planning for and evaluating this resource on a wider, administrative scale. The authors found that ICU bed availability had indirect ripple effects throughout their hospital, particularly on the rate at which patients who transferred out of the ICU returned within 24 hours and the overall cardiac arrest rate on the wards. The first association makes intuitive sense. We have all probably received early morning pages from our bed managers requesting expedition of patient transfers out of the unit when ICU beds are full. This push to open up beds may result in moving patients who are "borderline" out of the ICU who otherwise may have spent another night there for closer monitoring.

The relationship between ICU bed availability and ward cardiac arrest rates, however, is more complicated. It is unclear whether the patients who suffered a cardiac arrest on the wards did so because there was a shortage of medical ICU beds. This association would be stronger if, for example, we knew that these patients were recently admitted to the ICU, were being evaluated for ICU transfer prior to their arrest, or had been accepted to the ICU but were waiting for an open bed, but

these data are not available in the current study. The authors note that their hospital does have a rapid response team (RRT) that is triggered by general concerns; data on whether those patients who suffered cardiac arrests on the wards had been evaluated by the RRT prior to their events would have strengthened the observed association between ICU bed availability and ward cardiac arrests as it would imply that these patients were sicker but that bed availability may have influenced triage decisions at the time. In addition, institutional policy regarding patient admission to the ICU, specifically who is the designated ICU "gatekeeper" (e.g., resident, fellow, or attending) at each medical center, can also play a role and needs to be considered. Indeed, Town et al dutifully note that their findings are based on shift level rather than patient-specific data, and only associations rather than causal relationships can be gleaned from their observational study.

The effect of reduced ICU bed availability on patient outcomes remains an important topic for continued investigation, not only for patient care but also in ICU organization and management, particularly in times of expected strain such as influenza season or during outbreaks. ■

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ABSTRACT & COMMENTARY

Colchicine for Recurrent Pericarditis

By Michael H. Crawford, MD

This article originally appeared in the September 2014 issue of Clinical Cardiology Alert. *It was peer reviewed by Susan Zhao, MD. Dr. Crawford is Professor of Medicine, Chief of Clinical Cardiology, University of California, San Francisco, and Dr. Zhao is Director, Adult Echocardiography Laboratory, Associate Chief, Division of Cardiology, Department of Medicine, Santa Clara Valley Medical Center. Dr. Crawford and Dr. Zhao report no financial relationships relevant to this field of study.*

SOURCE: Imazio M, et al. Efficacy and safety of colchicine for treatment of multiple recurrences of pericarditis (CORP-2): A multicenter, double-blind, placebo-controlled, randomised trial. *Lancet* 2014;383:2232-2237.

Although colchicine has been shown to be effective for the treatment of acute pericarditis and first recurrences, little information exists about its use in patients with multiple recurrences. Thus, Imazio et al reported on the results of the colchicine for recurrent pericarditis 2 (CORP-2) trial. CORP-2 was a randomized, controlled trial performed at four general hospitals in Italy. Recurrent pericarditis was defined as another episode after a 6-week or more symptom-free interval. Recurrence was diagnosed as recurrent pain and at least one of the following: a pericardial friction rub, typical ECG changes, pericardial effusion on echocardiography, or elevated inflammatory biomarkers (white blood cell count, erythrocyte sedimentation rate or C-reactive protein concentration). Two or more recurrences of pericarditis caused by idiopathic/viral, post-cardiac injury, or connective tissue disease were required for enrollment. Patients with purulent pericarditis, myopericarditis, or a contraindication to colchicine (e.g., liver disease) were excluded. Colchicine was given to half the subjects (randomized) at a dose of 0.5 or 1.0 mg daily for 6 months without a loading dose. Recurrences were also treated with non-steroidal anti-inflammatory drugs (NSAIDs) as needed. Corticosteroids were given to those already on them or those who could not take NSAIDs. All patients received a proton pump inhibitor. The primary endpoint was recurrent pericarditis during at least 18 months of follow-up.

Of the 260 patients screened, a total of 240 patients were enrolled, 120 in each group, over about 6 years. No one was lost to follow-up. Adherence to both treatments was 95%. Pericarditis recurred in 22% of the colchicine group vs. 43% of the placebo group (relative risk, 0.49; 95% confidence interval [CI], 0.24-0.65; $P < 0.001$; number needed to treat = 5). The Kaplan-Meier curves of event-free survival separated at 2 months and stayed separated for the 18-month minimum follow-up. Colchicine also significantly improved the following secondary endpoints: the frequency of symptom persistence, the number of recurrences, hospital admissions, and recurrences within 1 week. In a multivariate analysis, pericardial effusion at presentation was the only independent risk

factor for multiple recurrences (odds ratio, 3.1; 95% CI, 1.7-5.8; P = 0.0001). Adverse effects occurred in 12% of the colchicine group and 8% in the placebo group (P = NS). Gastrointestinal side effects were most common and occurred at the same frequency in both groups (7.5%). The authors concluded that colchicine added to conventional NSAID therapy reduces the frequency of pericarditis recurrence in patients with two or more recurrences.

■ COMMENTARY

This study completes the Imazio et al trilogy on the treatment of pericarditis and suggests that colchicine is the drug of first choice for acute pericarditis, first recurrences, and multiple recurrences.[1,2] In this study, its beneficial effects were not related to the type of underlying NSAID or corticosteroid therapy. It basically halves the rate of recurrent pericarditis in these challenging patients.

Why is colchicine so effective and conventional treatment not? The pathogenesis of recurrences is poorly understood, but most believe it is immune-medicated. Colchicine concentrates up to 16-fold in white blood cells and disrupts microtubules, even at the low dose used in this trial. Often, multiple recurrent pericarditis patients are treated with more potent immune-suppressant drugs such as azathioprine, intravenous immunoglobulins, and interleukin antagonists. However, there is little evidence of their effectiveness. Also, they are expensive and have potentially worse adverse effects. Thus, this colchicine protocol is a welcome addition to the treatment of recurrent pericarditis patients.

For acute pericarditis, Imazio recommends a loading dose of 1 mg (1.2 U.S. formulation) every 12 hours for 1-2 days, then 0.5 mg (0.6 U.S. formulation) once a day for those < 70 kg, and 0.5 (0.6 U.S. formulation) twice a day for those > 70 kg for 3 months. Recurrent pericarditis is treated without a loading dose in the same fashion for 6 months. This only applies to immune-mediated pericarditis — e.g., viral, idiopathic or post pericardiotomy, not bacterial, neoplastic or myopericarditis. Also excluded from these studies were children and pregnant or lactating women. Finally, the duration of therapy in these studies was arbitrary and we don't know if shorter or longer durations would be equally or even more effective. ■

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ABSTRACT & COMMENTARY

Tissue Plasminogen Activator and Acute Ischemic Stroke Reviewed

By Eric C. Walter, MD, MSc

Pulmonary and Critical Care Medicine, Northwest Permanente and Kaiser Sunnyside Medical Center, Portland

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

This article originally appeared in the September 2014 issue of Critical Care Alert. *It was edited by David J. Pierson, MD, and peer reviewed by William Thompson, MD. Dr. Pierson is Professor Emeritus, Pulmonary and Critical Care Medicine, 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: The authors present an updated review of the use of tissue plasminogen activator in patients with acute ischemic stroke.

SOURCE: Fugate JE, Rabinstein AA. Update on intravenous recombinant tissue plasminogen activator (TPA) for acute ischemic stroke. *Mayo Clin Proc* 2014;89:960-972.

The use of tissue plasminogen activator (TPA) in acute ischemic stroke is not new. The landmark randomized, controlled trial establishing the effectiveness of intravenous TPA was published in 1995.[1] This well-written review summarizes what we have learned about TPA use in the 2 decades since this publication.

BENEFITS

In the original trial, the use of TPA within 3 hours of symptom onset improved the chances

of a complete or nearly complete neurologic recovery at 3 months by at least 30% (26% in the placebo group vs. 39% in the TPA group). Numerous subsequent studies have confirmed these results. Studies have also shown that earlier TPA use is associated with improved neurologic outcomes, decreased risk of intracranial hemorrhage (ICH), and lower mortality. For every 15 minutes from symptom onset until TPA administration, the risk of intracranial hemorrhage and mortality increases. Time lost truly is brain lost.

RISKS

The most devastating complication from TPA is ICH. In the original trial, ICH occurred in 6.4% of patients who received TPA. This equates to about 1 in 15 patients. Subsequent studies have confirmed the low incidence of ICH following TPA with reported rates as low as 1.7% for symptomatic ICH at 24 hours. TPA is more likely to cause severe ICH in patients who are older and/or have severe neurologic deficits or large areas of ischemia at presentation. Since these patients are already at high risk of death or severe disability even without TPA, few patients are ultimately harmed by TPA. Because of this, the number needed to harm is estimated to be 1 in 126. Other risks of TPA include angioedema (1-5%) and other rare life-threatening complications.

PATIENT SELECTION

The most important part of patient selection is to determine the exact time of symptom onset — defined as the exact time a patient was last at their baseline or symptom free. The ideal window is less than 3 hours from symptom onset, but studies have shown that TPA is still effective when given at up to 4.5 hours in certain populations. Very limited testing is needed prior to administration of TPA. A non-contrast head CT is required to exclude ICH and large established infarction, both of which are contraindications. Blood glucose concentration is required to exclude hypoglycemia as a cause of symptoms. Other laboratory testing, including coagulation testing, is not needed unless patients are taking anticoagulants or have a history of thrombocytopenia, liver disease, or hematologic disorders. In general, TPA should be administered if patients have stroke-like symptoms, even if it is not clear if the symptoms are due to stroke. The risk of symptomatic ICH is extremely low if a patient's symptoms are due to seizures, migraines, or functional disorders.

POST ADMINISTRATION CARE

All patients should be admitted to a specialized stroke unit or ICU after receiving TPA. Neurologic exams should be done every 15 minutes for the first 2 hours, then every 30 minutes for the next 6 hours, and then hourly until 24 hours post administration. Blood pressure should be maintained < 180/105 mmHg. Invasive procedures should be avoided, or at least delayed for several hours, to reduce the risk of bleeding. Antiplatelet agents may be started 24 hours after TPA to help prevent recurrent stroke.

If a patient has a decline in neurologic status, TPA administration should be stopped and repeat head CT obtained immediately to exclude ICH. Systolic blood pressure goal should be lowered to < 160 mmHg, and complete blood count, coagulation labs, and a type and screen drawn. Treatment for ICH depends on the extent of bleeding. Small petechial hemorrhages, especially if found incidentally, should be monitored but generally do not require treatment. Larger parenchymal hemorrhages may require reversal of TPA. While admitting there are no universally accepted guidelines for TPA reversal, the authors suggest that cryoprecipitate be given for fibrinogen levels < 150 mg/dL, platelets should be transfused for platelet counts < 100×10^9/L, and anti-fibrinolytics such as tranexaminic acid should be considered. Neurosurgical intervention may be required depending on the site and size of bleeding.

■ COMMENTARY

The authors of this review are clearly advocating for increased use of TPA, noting that only about 3-5% of patients with acute ischemic stroke receive TPA. They support this point of view with well-referenced data. However, it is important to consider that reviews such as this are always influenced by the biases and preferences of the authors.

The intensivist's involvement in TPA cases is often limited either to the mundane 24 hours of ICU observation or to the nerve-wracking response to devastating complications. This review is helpful for both scenarios. The discussions of fibrinolytic reversal and of treatment of ICH will be of particular interest to intensivists. It would have been nice to have some discussion related to the risks and treatment of non-intracranial hemorrhage and to have more discussion related to the use of specialized stroke units for observation of post-TPA patients rather than in the ICU. Nevertheless, this was a well written, easy-to-read review on an important topic in critical care. ■

REFERENCE

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ABSTRACT & COMMENTARY

Should Patients with Acute Respiratory Failure be Extubated at Night?

By David J. Pierson, MD

This article originally appeared in the August 2014 issue of Critical Care Alert. *It was peer reviewed by William Thompson, MD. Dr. Pierson is Professor Emeritus, Pulmonary and Critical Care Medicine, 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: In this retrospective study of extubation outcomes in five ICUs at a single medical center, patients extubated at night had no increase in adverse events and their mortality rates and lengths of ICU stay were lower. However, these results were likely affected by the high proportion of post-cardiac-surgery patients in the nighttime extubation group.

SOURCE: Tischenkel BR, et al. Daytime versus nighttime extubations: A comparison of reintubation, length of stay, and mortality. *J Intensive Care Med* 2014; Apr 24. [Epub ahead of print.]

This is a retrospective study of extubation outcomes in the five ICUs of Montefiore Medical Center in New York during a recent 23-month period. Institutionwide, respiratory therapist-driven weaning and extubation protocols (incorporating physician input for marginal data or clinician concern) and 24/7 intensivist ICU presence were in place at the time of the study. Once patients were clinically improved, with spontaneous respiratory rate and required inspired oxygen fraction and positive end-expiratory pressure requirements in an acceptable range, and were hemodynamically stable with manageable respiratory secretions and acceptable arterial blood gas results, they underwent a 30-minute spontaneous breathing trial with added pressure support to keep their tidal volumes at least 5 mL/kg ideal body weight. If the results of this trial were satisfactory according to standardized objective and subjective criteria, the patients were extubated. Outcomes with respect to the need for reintubation, hospital length of stay, and mortality were compared for patients extubated between 7 p.m. and 7 a.m. (coinciding with shift changes for nurses, respiratory therapists, and intensivists) vs. those extubated during the day.

More than twice as many patients (n = 1555) had been extubated during daytime hours as during the night (n = 685). Reintubation occurred twice as frequently among patients extubated during the day (7.7%) as among those extubated at night (3.8%; odds ratio 0.5; $P = 0.01$). Total hospital length of stay was significantly shorter for patients extubated at night ($P = 0.002$; actual data not provided), despite adjustment for demographic factors, Elixhauser Comorbidity Measure, and other variables. Although it was not statistically significant, there was a trend toward lower mortality among patients extubated at night. The authors conclude that a practice of delaying extubation until morning in patients who meet weaning and extubation criteria during the night is not supported by their results, and that patients should be extubated as soon as these criteria are met.

■ COMMENTARY

A number of recent studies pertain to the context and findings of the current report. First, outcomes for patients admitted at night have been shown to be worse in comparison with patients admitted during daytime hours, at least in some institutions. The risk for medical errors is higher at night. And adding the in-unit presence of a qualified intensivist has been shown to improve patient outcomes. These findings suggest that the results of critical care during the night may not be as good as those during the day, at least in some settings.

However, although the prediction of successful weaning and extubation are not perfect, many studies have shown improved success rates (including getting patients extubated sooner) with the use of evidence-based criteria and standardized protocols. Numerous studies have shown associations between shorter durations of mechanical ventilation and improved ICU and hospital outcomes, and it is well established that ventilator-associated pneumonia and other ventilator-associated complications are strongly related to the duration of endotracheal intubation. Thus, it is reasonable to reconsider the traditional approach of many intensivists not to extubate patients recovering from acute respiratory failure during the nighttime hours.

On the surface, this study would appear to refute that time-honored, cautious approach. However, despite the authors' attempts to reduce confounding by diagnosis, severity of illness, and other factors, I am concerned by the differences between the patients who were extubated at night and those extubated during the day in this study. More than half of all the study patients (1171 of 2240) were managed in a cardiac surgery ICU (CSICU), and patients in

these units comprised 81.8% of all those who were extubated at night. As the authors state, in their CSICUs, "a protocol is set in place so that patients are to be extubated within 6 hours of the end of their surgery." They acknowledge that patients undergoing elective cardiac surgical procedures, which typically begin in the morning, "would undergo extubation during the study's defined nighttime hours (after 7 p.m.)," and, in fact, the CSICUs had a disproportionate number of extubations between 7 p.m. and 10 p.m. compared to the other units.

Patients ventilated after cardiac surgery have acute respiratory failure mainly due to anesthesia, and studies have shown improved outcomes with early extubation in such patients. Retrospective studies are inherently limited in terms of establishing causal relationships, and despite the authors' statistical adjustments, I think their inability to associate nighttime extubation with any unfavorable consequences could be due to the marked differences between the patients who were extubated at night vs. during the day.

However, this study shines useful light on the long-standing debate as to whether extubation should be deferred until the next morning when a patient first meets criteria during the evening or nighttime hours. The table provides a reasonable approach to this question. It is based more on experience and common sense than on explicit published evidence, but is generally consistent with the results of this study and others in the literature. ■

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CME QUESTIONS

1. In the study by Pryzbylo and colleagues comparing hospital-based paging to smartphone-based HIPAA-compliant group messaging, what outcomes were improved by the use of smartphones?

a. Average length of stay decreased by 0.75 days.

b. The time of discharge occurred 1.5 hours earlier in the day.

c. The total number of pages decreased by 27%.

d. Overall satisfaction with smartphone-based messaging was significantly higher than with paging.

e. All of the above

2. In the study of ICU bed availability by Town, et al., decreased ICU bed availability was significantly associated with which of the following outcomes?

a. An increased rate of ICU readmissions in the first 24 hours of discharge from the ICU.

b. An increase in hospital length of stay.

c. Increased nursing staff turnover rates.

d. A decrease in hospital mortality.

3. In a randomized, controlled trial of treatment for recurrent pericarditis by Imazio and colleagues, the addition of colchicine to NSAIDs led to which of the following outcomes?

a. Decreased risk of another episode of pericarditis.

b. Decreased frequency of symptom persistence.

c. No difference in gastrointestinal side effects.

d. All of the above

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.