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Critical Care [ALERT]

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ABSTRACT & COMMENTARY

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

By Betty T. Tran MD, MSc

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Dr. Tran reports 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

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[INSIDE]

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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

Weaning with Noninvasive Ventilation in COPD

By Richard H. Kallet, MS, RRT, FAARC, FCCM

Director of Quality Assurance, Respiratory Care Services, San Francisco General Hospital

Mr. Kallet reports no financial relationships relevant to this field of study.

SYNOPSIS: Managing COPD with noninvasive ventilation following early extubation resulted in significant improvements in several patient-centered outcomes compared to current weaning practices.

SOURCE: Burns KEA, et al. Noninvasive ventilation as a weaning strategy for mechanical ventilation in adults with respiratory failure: A Cochrane systematic review. *CMAJ* 2014;186:E112-E122.

This updated systematic review analyzed 16 randomized and quasi-randomized studies examining the efficacy of aggressive extubation and management with noninvasive ventilation (NIV) in patients who had failed at least one spontaneous breathing trial (SBT). By combing the studies in the meta-analysis there were 994 patients, the majority of whom had respiratory failure from an acute exacerbation of chronic obstructive pulmonary disease (COPD). Overall quality of the included studies was moderate to good. NIV was accomplished with a variety of interfaces (e.g., nasal mask, face mask, helmet) and modes (such as pressure support [PS], bi-level, or proportional-assist ventilation). In the control arm of the studies, patients tended to be managed with PS, sometimes in conjunction with intermittent mandatory ventilation.

Among the 994 patients, the relative risk (RR) for mortality was significantly reduced in the NIV cohort (RR, 0.53; 95% confidence interval [CI], 0.36-0.80). However, the results were statistically significant only in those studies focused either exclusively on COPD (RR, 0.36; 95%CI, 0.24-0.56) or in which at least 50% of the patients had COPD (RR, 0.47; 95%CI, 0.29-0.76). NIV also significantly reduced both weaning failure (RR, 0.63; 95%CI, 0.42-0.95) and ventilator-associated pneumonia (RR, 0.25; 95%CI, 0.15-0.43). All of the above results were associated with moderate levels of heterogeneity.

Other results were associated with either variable or considerable heterogeneity. The former included significantly lower rates of extubation failure (RR, 0.65; 95%CI, 0.44-0.97) and tracheostomy (RR, 0.27; 95%CI, 0.16-0.45) in the NIV cohort. The latter included reduced median duration (MD) of invasive mechanical ventilation (MV) (MD, -7.4; 95%CI, -10.3 to -4.6 days) and length-of-stay both in the ICU (MD, -5.6; 95%CI, -7.9 to -3.3 days) and hospital (MD, -6.0; 95%CI, -9.2 to -2.9 days) favoring NIV.

■ COMMENTARY

This updated systematic review reinforces the impression that patients with COPD receiving MV can be successfully managed without an endotracheal tube once they meet standard weaning readiness criteria. This is an important finding, as these patients have traditionally been viewed as difficult to wean. In consequence, there has been justifiable skepticism whether early, aggressive extubation and reliance on NIV is a prudent approach. Concerns about NIV center on three issues: limited practical driving airway pressure (e.g., < 20 cm H_2O) to overcome altered chest impedance, adequate circuit wash-out of carbon dioxide, and finding an effective mask-interface that promotes patient comfort while minimizing circuit leaks and ineffective triggering.

As encouraging as these findings are, problems associated with both clinical and methodological variability among the studies may inhibit clinicians from fully embracing this bold approach to weaning. For example, there was variability among the clinical trials in how patients were assessed for weaning readiness, as well as the implementation and consistent use of weaning protocols. Also, in only one trial was a sedation protocol used. Furthermore, findings regarding the duration of total MV, invasive MV, and weaning were based on subgroup analyses representing 39%, 72%, and 65% of the total number of enrolled patients, respectively.

There are several potential reasons why only patients with COPD exacerbation might benefit from early extubation to NIV. First, these patients typically have reduced respiratory muscle strength due to altered length-tension relationship, malnutrition, and loss of muscle mass, and therefore are more susceptible to

acute fatigue. Full recovery from acute fatigue may require up to 48 hours.[1] This may be enough time for other therapies (such as corticosteroids, antibiotics, bronchodilators, and pulmonary hygiene) to reverse inflammation, mobilize secretions, and improve chest mechanics. We have observed that COPD patients requiring invasive MV meet weaning-readiness criteria quickly (mean of 2.3 days) and can pass a 2-hour SBT without difficulty (mean of 1.3 days). Moreover, the minute ventilation requirement of these patients to maintain an acceptable pH of 7.30 is modest (6-7 L/min).[1]

The endotracheal tube is the primary source of resistance during invasive MV and requires 5-8 cm H_2O of PS to overcome. When minute ventilation (a primary determinant of both respiratory muscle power and output) is relatively low, it is reasonable to extubate COPD patients who fail an initial SBT. By using a similar level of PS noninvasively to counter the intrinsic muscle loads (from altered chest mechanics) rather than the imposed load from the artificial airway, patients may receive adequate support to sustain spontaneous breathing. These conditions are often absent in other causes of respiratory failure (e.g., acute respiratory distress syndrome), while minute ventilation demand is higher and chest compliance is both lower and improves more slowly in such conditions. ■

REFERENCE

1. Kallet RH. Patient-ventilator interaction during acute lung injury and the role of spontaneous breathing. Part 1. Respiratory muscle function during critical illness. *Respir Care* 2011;56:181-189.

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.

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 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

1. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N Engl J Med* 1995;333:1581-1587.

ABSTRACT & COMMENTARY

Questions Asked During Handovers Provide Insights into Ways to Improve Communication Skills

By Leslie A. Hoffman, RN, PhD

Professor Emeritus, Nursing and Clinical & Translational Science, University of Pittsburgh

SYNOPSIS: Interactive questioning, defined as how communication occurs during handovers, differed in ways that influenced message clarity when comparisons were made between those with more training (attending physicians, nurse practitioners) and less training (residents, staff nurses).

SOURCE: Rayo MF, et al. Interactive questioning in critical care during handovers: A transcript analysis of communication behaviours by physicians, nurses and nurse practitioners. *BMJ Qual Saf* 2014;23:483-489.

Most (89%) interventions designed to improve handover communication, including those endorsed by The Joint Commission, focus on promoting use of a structured format, e.g., SBAR (Situation, Background, Assessment, Recommendations).[1] Although such tools assist

in organizing information, they do not address a more important aspect of the exchange, i.e., how to ensure clarity and understanding. This study had two goals — to determine if communication patterns could be objectively analyzed for type and content, and to analyze communication styles of clinicians with more (attending physicians, nurse practitioners) and less training (residents, staff nurses). A total of 133 handover observations were conducted during randomly selected shift changes in three medical ICUs affiliated with an academic medical center. During these observations, a research team member categorized comments in real time using a digital Echo pen and notebook. Statements were coded as: 1) explain (declarative statement that conveyed information); 2) clarify (request to repeat information to confirm understanding); 3) collaborative cross-check (challenge to accuracy or appropriateness of information regarding the diagnosis, management plan, or prognosis); 4) read-back (verbatim repeat of statement); and 5) disagree (aggressively question statement).

Clinicians with less training (residents, staff nurses) were less likely to ask clarifying questions ($P = 0.04$), perform collaborative cross-checks ($P < 0.001$), or disagree ($P = 0.04$). However, they interrupted the clinician sharing information an average of three times a minute vs one time a minute for more experienced practitioners ($P < 0.001$). During the study, the research team recorded 96 cross-checks when the incoming clinician questioned appropriateness of the management plan. Resident and attending physicians were more likely to engage in statements that questioned actions or indicated disagreement than nurse practitioners or staff nurses. Overall, 45% of physician or resident statements fell into this category compared with 22% for nurse practitioners or staff nurses.

■ COMMENTARY

When providing care, we are challenged to share our management plan and perceptions in a manner that clearly and accurately conveys what has been done and what should follow. Patient handovers have repeatedly been identified as a time when accurate and clear understanding is essential. Restrictions on resident duty hours have amplified challenges associated with patient handovers, as they increase the number of times this process occurs. As noted by the authors, most attempts to improve communication during handovers have focused on how to organize the process, based on the assumption that a more structured approach will ensure better outcomes. While logical, better structure does not guarantee better communication. This study, one of few to identify specific strategies that practitioners can use to improve communication practices, provides a number of examples — fewer interruptions, greater use of clarifying questions, and cross-checks to ensure the accuracy and appropriateness of the information being shared. More assertive cross-checks also appear to be beneficial, as they were used more frequently by those with more training.

In addition, clinicians should be more assertive when they perceive what they are hearing is incorrect or not indicated. Using simulation, training could be structured to assess types of interruptions and the number of cross-checks and to clarify questions asked during scenarios when there are obvious and less than obvious problems with the management plan. While prior studies have identified problems associated with handover communication, few have attempted to identify objective measures that could be used to train less experienced or less assertive individuals to communicate more clearly and accurately and rate their ability to perform this skill. This study identifies ways to accomplish this goal. ■

REFERENCE

1. Abraham J, et al. A systematic review of the literature on handoff tools: Implications for research and practice. *J Am Med Inform Assoc* 2014;21:154-162.

ABSTRACT & COMMENTARY

To Improve Outcomes in AECOPD, Go Easy on the Steroids!

By David J. Pierson, MD, Editor

SYNOPSIS: In this examination of outcomes among 17,239 patients admitted to the ICU for an acute exacerbation of COPD, most of them received higher than recommended doses of corticosteroids (> 240 mg/d methylprednisolone equivalent). Patients treated with higher-dose steroids had longer lengths of stay, higher costs, and more steroid-associated adverse effects, with no evidence for added benefits in comparison with those who received lower doses.

SOURCE: Kiser TH, et al. Outcomes associated with corticosteroid dosage in critically ill patients with acute exacerbations of chronic obstructive pulmonary disease. *Am J Respir Crit Care Med* 2014;189:1052-1064.

Corticosteroids are beneficial in acute exacerbations of chronic obstructive pulmonary disease (AECOPD). It can be assumed that patients with AECOPD who are admitted to the ICU are sicker than similar patients managed on the general wards, and given that more seriously ill patients generally need more intensive therapy it seems natural to assume that higher steroid doses should be used in such patients. This study tests this assumption, using a large nationwide database by examining patient outcomes and resource use in relation to corticosteroid dosage in ICU patients with AECOPD.

In this pharmacoepidemiologic cohort study, Kiser and colleagues at the University of Colorado examined data on patients admitted to an ICU for AECOPD included in Premier Incorporated's Perspective database covering a 6-year period from 2003 through 2008. Study patients entered the ICU on day 1 or 2 of admission and had corticosteroid treatment initiated within the first 2 days. Outcomes examined included hospital mortality, ICU length of stay, hospital length of stay, initiation and length of noninvasive ventilation, total hospital costs, readmission for AECOPD within 30 days, and other measures of management and outcome. Adverse events potentially related to corticosteroid administration were examined, including hyperglycemia, need for insulin therapy, gastrointestinal bleed, critical illness polyneuropathy, fungal infection, and antifungal therapy. The patients were divided into two groups based on commonly used corticosteroid dosing regimens: 240 mg methylprednisolone equivalent (e.g., 60 mg every 6 h) or less and higher doses (e.g., 125 mg every 6 h, or more) during the first 2 days of treatment.

A total of 17,239 patients from 473 hospitals were included. A total of 6156 (36%) patients received lower-dose corticosteroids and 11,083 (64%) received higher doses. Thirty-two percent of the patients received noninvasive ventilation, 15% received invasive mechanical ventilation, and 89% were treated with antibiotics. Most patients were given the corticosteroids (generally methylprednisolone) parenterally, while only 3.9% received oral prednisone. Overall mortality was 5.3% in the low-dose group vs 6.3% in the high-dose group ($P = 0.04$), but propensity matching and adjustment for regional differences in management eliminated this significant difference (odds ratio, 0.85; 95% confidence interval [CI], 0.71-1.01; $P = 0.06$). However, lower-dose corticosteroids were significantly associated with shorter ICU (-0.31 d; 95%CI, -0.46 to -0.16; $P < 0.01$) and hospital (-0.44 d; 95%CI, 0.67 to -0.21; $P < 0.01$) lengths of stay, as well as lower hospital costs (-$2559; 95%CI, -$4508 to -$609; $P = 0.01$) and significantly less need for insulin therapy and fungus infections (both, $P < 0.01$). There were no other significant outcome associations. Thus, patients treated with higher-dose steroids had longer lengths of stay, higher costs, and more steroid-associated adverse effects, with no evidence for added benefits in comparison with those lower doses.

■ COMMENTARY

This was not a clinical trial prospectively examining the effects of higher- vs lower-dose corticosteroids in ICU patients with AECOPD, treated in the same units by the same clinicians with the dosage difference being the only variable. It is pretty unlikely that such a trial will be done — particularly with anything like the numbers of patients included in this pharmacoeconomic cohort study — and this study's results seem to me compelling enough for many intensivists to reevaluate their practice in managing this condition. The logical notion that if some corticosteroids are good for patients with AECOPD treated as outpatients or on the general wards, then those sick enough to be admitted to the ICU should be treated with substantially larger doses is refuted by this study. And bigger doses are not just wasteful of unnecessary medication, they are actually worse for the patient (more complications, longer stays) as well as for the health care system (longer stays, higher costs).

An interesting if not surprising finding of this study was that fewer than 1 in 20 patients with AECOPD were treated with oral prednisone as opposed to a parenteral steroid such as methylprednisolone. When COPD patients have exacerbations, we treat them with prednisone if they do not require hospitalization, but we nearly always use parenteral steroids when they have to be admitted. The latter is vastly more expensive and inconvenient, and it is not evidence-based in any but the most unusual circumstances. Prednisone's bioavailability is such that, unless a patient is actively vomiting or on continuous gastric suction, it is essentially completely absorbed, even in critical illness. A recent, very large study of patients hospitalized with AECOPD (but not admitted to the ICU) found no evidence for any worse outcome among those treated with oral prednisone as compared to parenteral corticosteroids, even after extensive statistical manipulations to eliminate confounding variables such as underlying COPD severity or severity of the acute episode.[1] ■

REFERENCE

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CME QUESTIONS

1. In the study by Town et al, reduced ICU bed availability was associated with:

a. higher mortality rates on the wards.
b. higher rates of ICU patient readmission.
c. higher ICU patient/family satisfaction scores.
d. lower rates of total hospital admissions.
e. lower rates of physician burnout.

2. Which of the following is true regarding the meta-analysis on NIV and weaning?

a. In all studies, all patients had COPD as the primary source of respiratory failure.
b. In all studies, patients were managed by strict weaning protocols.
c. All NIV patients were managed using a closed-loop pressure-support ventilation algorithm.
d. In all studies, patients were managed with a strict sedation protocol.
e. The mortality benefit of NIV was only seen in trials that exclusively or primarily studied COPD.

3. Based on the review by Fugate et al, tissue plasminogen activator use is indicated for:

a. a 65-year-old female who presents with slurred speech. Her blood glucose level is 50 mg/dL.
b. a 45-year-old female that presents with a 1 cm intracranial hemorrhage and acute onset left hemiparesis.
c. a 22-year-old male with acute onset dysarthria 15 minutes ago. His head CT shows no bleeding or infarct and he has no other known medical problems.
d. a 78-year-old male with diabetes, heart disease, and peripheral vascular disease who was last known to be normal 5 hours ago.
e. All of the above

4. Which of the following statements is true about TPA in acute stroke?

a. It should be given as soon as safely possible when indicated.
b. It has been shown to reduce mortality by 30% when used within 3 hours.
c. It should never be given if more than 3 hours have passed since the patient was last in his normal state of health.
d. It should not be given if it is not absolutely clear that a patient's symptoms are due to stroke.
e. It is currently given to nearly all patients who present with acute ischemic strokes.

5. Which of the following statements is true about patient handovers?

a. Restrictions on resident duty hours increase the number of times they occur.
b. Few prior studies have attempted to identify objective measures that could be used in training less experienced team members to communicate better during handovers.
c. Most interventions designed to improve communication during handovers focus on structure.
d. Clinicians with less experience tend to ask fewer clarifying questions than their more experienced counterparts, but they tend to interrupt the presenter more often.
e. All of the above

6. What outcome benefits were found for managing patients with AECOPD with higher, as opposed to lower, doses of corticosteroids?

a. Shorter ICU stay
b. Shorter hospital stay
c. Less hyperglycemia requiring insulin therapy
d. Lower overall hospital costs
e. None of the above