EVIDENCE-BASED INFORMATION FOR HOSPITALISTS, INTENSIVISTS, AND ACUTE CARE CLINICIANS

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INSIDE

Financial Disclosure

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Intensive Insulin Therapy in the Medical ICU

ABSTRACT & COMMENTARY

By David J. Pierson, MD

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

This article originally appeared in the March 2006 issue of Critical Care Alert. It was peer reviewed by William Thompson, MD. Dr. Thompson is Staff Pulmonologist, VA Medical Center, Associate Professor of Medicine, University of Washington. He reports no financial relationship relevant to this field of study.

Synopsis: *The use of an insulin infusion protocol to keep blood glucose between 80 and 110 mg/dL in adult medical ICU patients had no overall effect on mortality but appeared to decrease selected complications. Survival was improved by tight glucose control among patients remaining in the ICU beyond 3 days.*

Source: Van den Berghe G, et al. Intensive Insulin Therapy in the Medical ICU. *N Engl J Med.* 2006;354:449-461.

In a previous study involving patients in a surgical ICU[1], Van den Berghe and colleagues at the Catholic University of Leuven, Belgium, showed that tight control of serum glucose levels by means of a strict insulin infusion protocol decreased both morbidity and mortality. In the present study, Van den Berghe et al sought to determine whether the same results would be found in medical ICU patients, who tended to have greater severity of illness, more co-morbidities, and higher mortality rates. In a prospective, controlled clinical trial, Van den Berghe et al randomized medical ICU patients who were predicted to require at least 3 days of ICU care to either conventional therapy with respect to serum glucose or a tight-control protocol to keep values between 80 and 110 mg/dL. Patients randomized to receive conventional therapy were administered insulin when blood glucose exceeded 215 mg/dL, but the infusion was tapered when levels fell below 180 mg/dL.

Of 2110 adult medical ICU patients screened during a 3-year period, 1200 were randomized to conventional vs tight-control glucose management. Also, 767 of these patients remained in the ICU for at

Hospital Medicine Alert's physician editor, Kenneth P. Steinberg, MD, selected and reviewed the articles contained within this issue on April 10, 2006.

least 3 days. Among all 1200 patients in the study (intention-to-treat analysis), in-hospital mortality was 40% in the conventional-treatment group vs 37% in the intensive-treatment group, a non-significant difference ($P = 0.33$). However, among the patients who remained in the ICU for at least 3 days, there was a significantly lower in-hospital mortality among those who received the tight-glucose-control therapy (52% vs 43%; $P = 0.009$). Morbidity, in the form of newly acquired renal dysfunction, delayed weaning from ventilatory support, and prolongation of ICU stay, was less with the intensive-therapy regimen, both in the overall group and in those patients staying in the ICU for at least 3 days.

COMMENTARY

In this large clinical trial conducted in the medical ICU of a single institution, the use of an intensive insulin therapy protocol to keep blood glucose levels between 80 and 110 mg/dL had no effect on overall mortality. The fact that mortality was significantly reduced among the 64% of patients who remained at least 3 days in the ICU (the investigators' target population) means that mortality had to be correspondingly increased among patients who spent less time in the ICU. This was apparently the case, a finding for which the authors offered no ready explanation. That the investigators were unable to predict in advance which patients would remain in the ICU at least 3 days—and thus, which patients would presumably be helped rather than harmed by intensive insulin therapy—makes potential application of the study's findings problematic for the clinician.

The introduction, investigation, and adoption of new ICU therapies often seem to follow a distinct sequence. An initial study—usually relatively small and from a single center—is published showing markedly positive results from the new treatment. In a number of such initial studies, mortality rates in the control population—patients receiving standard care rather than the new treatment—have been unusually high. Often, aspects of patient selection, potentially confounding conditions and therapies, and other factors have raised questions about the study and about the generalizability of its findings. These cautions notwithstanding, the new therapy tends to be widely embraced by intensivists, sometimes even to the point of becoming a standard of care. Subsequently, larger, multi-center studies are published. Sometimes these more extensive investigations confirm the effects of the new therapy and validate the findings of the initial paper. This was the case with lung-protective ventilation for acute lung injury and ARDS and also for noninvasive ventilation for acute hypercapnic respiratory failure in patients with COPD. However, in numerous other instances the larger-scale trials have failed to demonstrate the benefit found in the initial study. Therapies such as late corticosteroids and inhaled nitric oxide for ARDS, and supra-physiologic oxygen-delivery goals for severe shock come to mind here, among others.

What will the bottom line prove to be with respect to intensive insulin therapy when the more extensive studies called for by Van den Berghe et al are done? Such studies are reportedly underway at the present time.[2] How should the clinician manage blood glucose levels in critically ill patients, based on current information? In an editorial accompanying the paper by Van den Berghe and colleagues, Malhotra[3] lists 3 possible courses of action. One would be to go along with current trends and simply adopt the "tight glucose control" approach, on the rationale that it seems to benefit some patients and its adverse effects do not seem to be too severe. This approach has already become a standard of care in many ICUs around the world, and is included in the most recent guidelines for the management of sepsis.[4] Another approach would be to withhold intensive insulin therapy until its evidence base is more complete and more confident conclusions about when and how to use it can be drawn. A reasonable case could be made for either of these approaches.

Malhotra suggests a third, more middle-of-the-road approach.[3] During the first 3 days in the ICU, try to keep blood glucose levels below 150 mg/dL. If critical illness continues and the patient remains in the ICU beyond 3 days, consider tighter glucose control to blood levels between 80 and 110 mg/dL, as employed by Van den Berghe et al. While the effects of tight glucose control starting at ICU day 3 have not specifically been investi-

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Questions & Comments

Please call Leslie Hamlin, Associate Managing Editor, at (404) 262-5416 or e-mail at leslie.hamlin@thomson.com between 8:30 a.m. and 4:30 p.m. ET, Monday-Friday.

gated, this approach seems reasonable, and would be supported by the current study, as well as other currently available data. ■

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Intensivist-to-Bed Ratio Impacts Length-of-Stay in the Medical ICU

ABSTRACT & COMMENTARY

By Leslie Hoffman, PhD, RN

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

This article originally appeared in the March 2006 issue of Critical Care Alert. It was peer reviewed by William Thompson, MD.

Synopsis: *Differences in intensivist-to-bed ratio ranging from 1:7.5 to 1:15 were associated with an increased ICU length-of-stay.*

Source: Dara SI, et al. Intensivist-to-Bed Ratio: Association with Outcomes in the Medical ICU. *Chest*. 2005;128:567-572.

THIS STUDY EXAMINED THE EFFECT OF VARIATIONS IN ICU staffing, defined in terms of intensivist-to-ICU bed ratio, on ICU length-of-stay (LOS) and ICU and hospital mortality. The study was conducted at the Mayo Clinic in Rochester, MN over a 9-month period when the medical ICU underwent a series of planned changes which resulted in its capacity increasing from 15 to 24 beds. As a consequence of these changes, the intensivist-to-bed ratio varied from 1:15 (initial ratio) to 1:7.5, 1:9.5, and 1:12 (final ratio), yielding 4 periods of comparison. Other than the change in bed ratio, the role of the intensivists did not undergo any major change. The intensivists were responsible for the delivery of all care in the ICU, made rounds at least twice daily, supervised all invasive procedures, wrote daily progress notes, and supervised educational activities of the critical care fellows and first and third year internal medicine residents who rotated through the unit. During the study period, there were no changes in the nurse-to-patient ratio (1:1 or 1:2) or frequency of house staff rotation (4-5 weeks).

A total of 2,492 patients were admitted to the medical ICU during the 9-month study interval. There were no statistically significant differences in severity of illness (APACHE III scores), predicted mortality rate after case-mix adjustment, or ICU readmission during the 4 periods of comparison. Also, there were no statistically significant differences in the ICU admission source (predominately the Emergency Department) during the 4 periods.

The ICU period with a 1:15 intensivist-to-bed ratio had a longer adjusted ICU LOS compared to the period with a 1:75 ($P < .0001$), 1:9.5 ($P = .0003$), and 1:12 ratio ($P < .0001$). The difference was not significant when comparisons were made between periods with a 1:75 bed ratio vs 1:9.5 ($P = .20$) or 1:12 ($P = .51$) ratio. Differences in bed ratio were not associated with significant differences in ICU or hospital mortality or hospital LOS.

■ COMMENTARY

In this study, there were no statistically significant differences in severity of illness during the 4 time periods, suggesting that changes in the number of available ICU beds did not influence the threshold for admission to the medical ICU. Also, there was no change in ICU or hospital mortality after case-mix adjustment, suggesting that variations in intensivist-to-bed ratio did not influence patient survival. However, there was an increase in ICU, but not hospital, LOS. This suggests that patients were stabilized and transferred from the medical ICU more quickly during periods when the intensivist-to-bed ratio was 1:7.5 compared to 1:15.

As noted by Alan Morris,[1] humans are limited in their ability to simultaneously analyze large quantities of information, a concern given the thousands of pieces of information analyzed by ICU clinicians each day. By one estimate, an intensivist may be confronted with 1,000 pieces of information on each patient each day. In addition, as the number of patients managed increases, contact is more intermittent, increasing the likelihood that changes in the management plan will not occur as quickly.

In ICUs, the nurse-patient ratio is commonly varied from 1:1 to 1:2 dependent on patient needs. In contrast, the number of intensivists is usually determined by the size of the ICU and does not fluctuate dependent on changes in patient acuity or increased needs for teaching, supervision and consultation due to rotation of house staff. Findings of this study should be of interest to policy makers as they consider the projected increase in demand for critical care service. Although no differences were seen in mortality or hospital LOS, changes in ICU LOS can translate into substantial cost savings. The ability to focus on fewer patients has a number of additional advantages, including improved family and patient satisfaction, better end-of-life care, and improved interdisciplinary coordination. ■

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Under Pressure to Heal an Ulcer?

ABSTRACT & COMMENTARY

By Allan J. Wilke, MD

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

This article originally appeared in the March 2006 issue of Internal Medicine Alert. It was reviewed by the physician editor, Stephen Brunton, MD, and peer reviewed by Gerald Roberts, MD. Dr. Brunton is Clinical Professor at the University of California, Irvine. He is a consultant for Sanofi-Aventis, Ortho-McNeil, McNeil, Abbott, Novo Nordisk, Eli Lilly, Endo, EXACT Sciences, and AstraZeneca, and serves on the speaker's bureau for McNeil, Sanofi-Aventis, and Ortho-McNeil. Dr. Roberts is Clinical Professor of Medicine at Albert Einstein College of Medicine. He reports no financial relationship relevant to this field of study.

Synopsis: *Healing of Stage II-IV pressure ulcers is associated with use of moist dressings and adequate nutrition. An additional factor for Stage III and Stage IV ulcers is cleansing with soap and water or saline.*

Source: Bergstrom N, et al. The National Pressure Ulcer Long-Term Care Study: Outcomes of Pressure Ulcer Treatments in Long-Term Care. *J Am Geriatr Soc*. 2005; 53:1721-1729.

THE NATIONAL PRESSURE ULCER LONG-TERM CARE Study (NPULTC) was a retrospective cohort study with convenience sampling conducted between February 1, 1996, and October 31, 1997. Using data from medical records, Minimum Data Sets, physician orders, and medication logs, the researchers examined the resident, the ulcer, and the care to identify factors that are associated with prevention and healing. The patients were studied over 12 weeks. Each pressure ulcer (PrU) was measured and described (ie, presence of eschar, necrosis, granulation tissue, drainage, undermining, tunneling, or infection, and wound bed color, location, and stage). Stage I PrUs, PrUs smaller than 0.25 cm^2 and PrUs in unusual locations (navel, chin, penis, etc) were excluded. The primary outcome was change in PrU area. Treatment modalities were grouped into broad categories: cleansing, dressing, support surfaces, and nutritional supplements. No attempt was made to evaluate specific products.

After exclusion there were 882 subjects with 1,589 PrUs. Most common locations were coccyx, back, or buttocks (44%), foot or malleolus (36%), trochanter (2%), and ischial tuberosities (5%). Stage III and Stage IV ulcers had the greatest reduction in size when patients were receiving sufficient enteral feedings (≥ 30 kcal/kg/day), when cleansing consisted of soap and water or saline, and when moist, rather than dry, dressings were used. Two patient characteristics were also associated with better healing: having no or uncomplicated dementia or having dementia with agitation or depression. Stage II PrUs followed the same pattern, except that cleansing with soap and water or saline healed more slowly. Not surprisingly, debridement was associated with an increase in ulcer size. Factors not associated with healing were diabetes, incontinence, age, cardiovascular disease, requiring assistance with activities of daily living, and type of bed (support surface).

■ COMMENTARY

Pressure ulcers are a common and costly problem in acute care, nursing home, and home care populations. In 1994 the cost of treatment in the United States was estimated to exceed $1.335 billion.[1] Liability related to PrUs is increasing.[2,3] Judgments were highest for PrUs caused by multiple factors. The highest awards for PrUs caused by a single factor were seen when that factor was inadequate nutrition.

This group has previously written about prevention of PrUs.[4,5] The factors that help prevent PrUs include adequate nutritional support, fluid orders, medications, and nursing staffing patterns. Most studies of PrUs have looked at single interventions. The NPULTC is unique in that it examined multiple factors that influenced each other. For instance, a treatment that failed to heal a PrU might be followed by debridement, which in turn, increased the size of the ulcer. The 12-week study period was too short to allow healing of all ulcers. The fact that a PrU is getting smaller does not necessarily mean it will eventually heal completely. Ross Products Division of Abbott Laboratories provided funding for this study.

The Agency for Health Care Policy and Research, now the Agency for Healthcare Research and Quality (AHRQ) published guidelines for the prevention and treatment of pressure ulcers in 1992 and 1994, respectively. These guidelines were reviewed in 2001 and were found to be valid still. Physicians caring for bed- or chair-bound patients would do well to review them now. ■

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A Normal Temperature May Not Be What We Were Taught

ABSTRACT & COMMENTARY

By Mary Elina Ferris, MD

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

This article originally appeared in the March 2006 issue of Internal Medicine Alert. It was reviewed by the physician editor, Stephen Brunton, MD, and peer reviewed by Gerald Roberts, MD.

Synopsis: *Mean oral temperatures decline with age, ranging from 97.3ºF at 6 am to 97.8ºF at 10 pm in persons older than 65 years. The majority of both nursing home and community elderly have normal mean temperatures below 98.6ºF.*

Source: Gomolin IH, et al. Older is Colder: Temperature Range and Variation in Older People. *J Am Geriatr Soc*. 2005;53:2170-2172.

ORAL TEMPERATURES FOR 100 NURSING HOME residents were measured on 3 consecutive days using a single digital electronic thermometer, and once during mid-day office visits for 50 community dwellers. Nursing home residents all had their measurements on the same days at 3 times: 6 AM, 4 PM, and 10 PM, and had not taken antipyretics, nor taken anything by mouth for 30 minutes before the reading. Average age was 80.7 years (range, 65-98 years old); 111 were women and 39 men. No statistical differences were present between the two measurement sites or genders. Although the individual range of measurements was 94.0ºF to 99.6ºF, the variability of the mean for each time period was less than 0.82ºF. Mean oral temperatures declined with age, from 98.2ºF for age 65-74 years old to 97.4ºF for age 85 years and older.

■ COMMENTARY

This simple yet important study confirms that the majority of healthy elderly persons have normal oral temperatures lower than the usually accepted 98.6ºF, ranging from 98.2ºF down to 97.4ºF. Geriatric specialists have suggested that recognition of fevers in this group should start at 99-100ºF, and should especially be compared to the baseline established for that particular patient, since we know the normal reading can decline with advancing age.[1] The maxim that older patients have "atypical presentations of disease" may actually represent our ignorance of their normal baseline measurements.

In fact, the accepted normal temperature of 98.6ºF may not be accurate for younger persons either. Previous studies have shown that 98.2ºF is a more accurate mean oral temperature in healthy adults aged 40 years or younger, with a variability of 0.9ºF.[2] There are also clear diurnal variations of temperature, with lowest temperatures at 6 AM and highest at 4-6 PM. As we accumulate more specific data to adjust our expectations of normal values, we should be able to assess developing diseases more accurately in the future. ■

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Rescue Angioplasty: The REACT Trial

ABSTRACT & COMMENTARY

By Michael H. Crawford, MD

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Dr. Crawford is on the speaker's bureau for Pfizer.

This article originally appeared in the March 2006 issue of Clinical Cardiology Alert. It was peer reviewed by Rakesh Mishra, MD, FACC. Dr. Mishra is Assistant Professor of Medicine, Weill Medical College, Cornell University, Assistant Attending Physician, NewYork Presbyterian Hospital. He reports no financial relationship relevant to this field of study.

Synopsis: *Event-free survival after failed thrombolytic therapy was significantly higher with rescue PCI than with repeated thrombolysis or conservative treatment.*

Source: Gershlick AH, et al. Rescue Angioplasty After Failed Thrombolytic Therapy for Acute Myocardial Infarction. *N Engl J Med*. 2005;353:2758-2768.

THROMBOLYSIS THERAPY OF ACUTE MYOCARDIAL infarction (MI) results in TIMI 3 flow in about 60% of patients. What to do with the remaining patients is controversial. Thus, the results of the Rescue Angioplasty versus Conservative Treatment or Repeat Thrombolysis (REACT) trial are of interest. The multicenter, randomized, parallel group trial was conducted in the United Kingdom between 1999 and 2004. Patients with acute ST-segment elevation MI treated with thrombolytics within 6 hours of pain onset, in whom ST-segment elevation failed to decrease > 50% in 90 minutes, were eligible for inclusion. Crossovers were allowed if the clinical results were unfavorable. Over half of the 35 centers participating had no cardiac catheterization facilities, so patients were transported to a center that did, if randomized to rescue angioplasty. The primary end point was the combination of major adverse cardiac and cerebral events at 6 months (death, recurrent MI, stroke, heart failure). Secondary end points included revascularization and bleeding. The 427 patients were randomized to the 3 groups (about 140 in each group). Event-free survival was 85% for rescue angioplasty, 70% for conservative therapy, and 69% for repeat thrombolysis ($P = .004$). There was no difference in mortality for all causes. Freedom from revascularization was more frequent with rescue angioplasty; 86% vs 78% conservative therapy and 74% repeat thrombolysis ($P = .05$). Nonfatal bleeding was more common with rescue angioplasty, mainly from the sheath site. The results were the same whether intention to treat or actual therapy were used. The median transfer time for rescue angioplasty, if necessary, was 85 minutes (range, 55-120). Rescue angioplasty was accomplished in a median of 414 minutes after pain onset (range, 350-505). Stents were used in 67%, and 43% received platelet glycoprotein IIb/IIIa receptor inhibitors.

There was a trend for lower mortality at 6 months with rescue angioplasty (5% vs 13% for both other groups combined $P < .05$). Stroke and heart failure were not different between groups. Recurrent MI was less with rescue angioplasty (2% vs 11% and 9%, $P = .004$).

Gershlick and colleagues concluded that rescue angioplasty, even if intra-hospital transfer is required, is superior to repeat thrombolytic therapy or conservative therapy for preventing major adverse cardiac and cerebral events.

COMMENTARY

Rescue angioplasty has been controversial, and the recently published MERLIN trial (*J Am Coll Cardiol*. 2004;44:287) showed only a decrease in subsequent revascularization with rescue angioplasty. This study showed a reduction in the composite end point of major cardiac and cerebral events, recurrent MI and revascularization compared to conservative therapy and repeat thrombolysis. There was a trend toward lower mortality in the rescue group. These beneficial effects occurred despite the necessity to transfer about 40% of the patients to another facility for angioplasty, which cost a median of 84 minutes.

Why this study showed more benefit than the MERLIN study is probably related to study details that change with time. The MERLIN study is at least 2 years older, and streptokinase was the thrombolytic used in 96% vs 59% in this study. Also, less stents and IIb/IIIa agents were used in MERLIN. In addition, there was considerable cross-over from the conservative arm to the repeat thrombolysis arm, which did not happen in this study, which only had 4% of patients who did not receive their assigned treatment. Finally, only 8% of rescue angioplasty attempts failed in this study. This is important because observational data suggest that patients with failed rescue angioplasty have a worse prognosis.

Nonfatal bleeding, mainly from the sheath site, was more common in the rescue group, but fatal bleeding was more common in the other 2 groups ($P = .005$). Also, when the rescue group was compared to both other groups combined, the lower mortality in the rescue group was significant. This trial was stopped

early because of falling enrollment and a finite funding period by the steering committee. The 80% power calculation suggested that about 156 patients per group would be required, but when the study ended there were 141-144 patients in each group. Had the trial continued, more robust results may have occurred, but certainly the direction of the results would not have changed. These results suggest that rescue angioplasty is now the treatment of choice for failed thrombolysis in acute ST elevation MI. ■

Troponin vs CKMB in ACS

ABSTRACT & COMMENTARY

By Michael H. Crawford, MD

This article originally appeared in the March 2006 issue of Clinical Cardiology Alert. It was peer reviewed by Rakesh Mishra, MD, FACC.

Synopsis: *Among patients with NSTE ACS, an elevated troponin level identifies patients at increased acute risk regardless of CK-MB status, but an isolated CK-MB+ status has limited prognostic value.*

Source: Newby LK, et al. Frequency and Clinical Implications of Discordant Creatine Kinase-MB and Troponin Measurements in Acute Coronary Syndromes. *J Am Coll Cardiol*. 2006;47:312-318.

Cardiac biomarker testing is part of the standard approach to evaluating patients with suspected acute coronary syndromes (ACS). Although troponin has become the diagnostic standard for myocardial infarction (MI), CKMB is often tested as well. Thus, Newby and colleagues evaluated the use of dual marker testing in patients with non-ST elevation ACS in the CRUSADE quality improvement initiative database. The end point chosen was in-hospital mortality. They specifically focused on the significance of discordant results of troponin and CKMB, which occurred in 28% of the 29,357 patients who had both measured. Most patients had concordant cardiac marker values; 12% were CKMB negative and troponin (Tn) negative and 60% were CKMB+/Tn+. CKMB+/ Tn- occurred in 10%; CKMB-/ Tn+ occurred in 18%. Hospital mortality was highest in the concordant positive (CKMB+/Tn+) patients at 5.9% and lowest in the concordant negative patients at 2.7%. Hospital mortality in the discordant patients was 3.0% in the CKMB+/Tn- patients and 4.5% in the CKMB-/Tn+ patients. Baseline characteristics showed that Tn+ patients were older, had more evidence of vascular disease, and more often had heart failure. After adjustment for baseline characteristic differences, troponin was more strongly associated with mortality than CKMB (chi square 23 for troponin and 8 for CKMB). Hospital therapy was similar for all cardiac marker groupings. Newby et al concluded that in patients with non-ST elevation ACS, an elevated troponin is associated with an increased risk of death regardless of the CKMB value, but an elevated CKMB alone is of little prognostic value.

■ COMMENTARY

The major conclusion of this study is that an elevated troponin value defines the highest risk patients among non-ST elevation ACS patients who are admitted. However, all the patients in this database were treated similarly, despite their troponin values. For example, those who were CKMB- and Tn- were most likely to have an early cardiac catheterization approach as compared to either group with discordant results. Newby et al argue that cardiac biomarker results should be used to direct the most aggressive therapy to the highest risk patients, those who were troponin positive. They believe CKMB adds little to the troponin results, yet most centers do both in ACS patients. Should CKMB be eliminated? Perhaps it should in the triage of ACS patients, but it may be useful later to estimate infarct size in selected patients.

Why are we not responding more aggressively to an elevated troponin? Perhaps because of troponin desensitization. We are used to seeing elevated troponins in many hospitalized patients. We are annoyed by consultation requests to see terminally ill non-cardiac patients with slight troponin elevations. Thus, in ACS patients where an elevated troponin is of value, we may not react appropriately anymore. Also, troponin assays have been a moving target; troponin T, then I; changes in cutoff values; test inaccuracies. In this study, they used each center's test and values; there was no core laboratory. So, Newby et al note that as more centers convert to the latest troponin I system there could be changes in this ongoing database. Finally, it was pointed out that these results may not apply to lower risk patients who are not hospitalized, but held in chest pain observation units. ■

CME Questions

4. **In the study by Van den Berghe and colleagues, intensive insulin therapy in medical ICU patients, with a target blood glucose level of 80-110 mg/dL, improved which of the following outcomes?**
   a. mortality in patients remaining in the ICU for more than 3 days
   b. duration of weaning from mechanical ventilation
   c. incidence of new-onset renal dysfunction
   d. All of the above
   e. None of the above

5. **Which of the following factors was associated with healing of stage III or IV pressure ulcers in the National Pressure Ulcer Long-Term Care Study?**
   a. diabetes mellitus
   b. the type of bed or support surface
   c. the use of moist rather than dry dressings
   d. Rregular debridement
   e. patient age

6. **In patients with non-ST elevation acute coronary syndromes, patients at highest risk of hospital death are those with the following cardiac biomarker pattern:**
   a. elevated troponin regardless of CKMB
   b. normal troponin with an elevated CKMB
   c. normal troponin and normal CKMB
   d. elevated CKMB and elevated ESR

Answers: 4. (d); 5. (c); 6. (a)

CME Objectives

The objectives of *Hospital Medicine Alert* are to:

• review pertinent safety, infection control, and quality improvement practices;

• discuss diagnosis and treatment of acute illness in the hospital setting; and

• review current data on diagnostic and therapeutic modalities for common inpatient problems. ■

Readers are Invited

Readers are invited to submit questions or comments on material seen in or relevant to *Hospital Medicine Alert*. Send your questions to: Leslie Hamlin—Reader Questions, *Hospital Medicine Alert*, c/o American Health Consultants, PO Box 740059, Atlanta, GA 30374. ■