A complaint of near-syncope is associated with lower risk of 30-day serious events in patients presenting to the emergency department with syncope.

**Background:** Syncope is common in older patients, accounting for frequent admission, unnecessary testing, and high costs, often without definitive results. It is unclear which of these patients are at risk for serious events.

**Objective:** To enhance risk stratification by identifying predictors of serious events at 30 days in older patients presenting with syncope or near syncope.

**Design:** Structured medical record review.

**Methods:** Patients were identified from emergency department (ED) discharge codes. ED, admission, and consultation notes were reviewed, and relevant information was abstracted in a blinded fashion. Deaths were identified from state vital statistics files. Database linkage identified subsequent admissions. Validity of chart screening for patient identification, identification of serious outcomes, and inter-rater reliability were verified. Candidate predictors were identified from published studies. Logistic regression identified related variables that formed the basis of the syncope risk score (+1 for age >90 years, male sex, prior arrhythmia, triage systolic blood pressure [SBP] >160 mm Hg, abnormal ECG, and/or abnormal troponin I, and -1 for near syncope).

**Participants:** 2584 managed-care participants aged ≥60 years presenting to 1 of 3 affiliated EDs with clear syncope or near syncope without identified cause. Patients with seizures, intoxication, lack of spontaneous return to consciousness, head trauma, or receipt of electrical or pharmacologic therapy were excluded.

**Results:** The primary outcome was any serious clinical event occurring within 30 days of ED evaluation. Eighty-six percent of patients with the primary outcome were admitted from the ED. Of the 2584 patients, 107 (7%) experienced a serious event within 30 days, most commonly arrhythmia. Six variables increased risk: prior arrhythmia (OR, 2.4), age >90 years (OR, 2.3), abnormal ECG (OR, 1.9), abnormal troponin I (OR, 1.9), male sex (OR, 1.8), and triage SBP >160 mm Hg (OR, 1.6). Reported near syncope decreased risk (OR 0.5). The syncope risk score stratified patients as low (-1 to 0 points, 2.5% 30-day risk), intermediate (1 to 2 points, 6.3% 30-day risk), and high risk (3 to 6 points, 20% 30-day risk).

**Conclusions:** Prior arrhythmia, age >90 years abnormal ECG or troponin I, male sex, and triage SBP of >160 mm Hg are associated with an increased risk of serious events within 30 days of syncope presentation. These variables are easily identifiable at presentation.

**Reviewer’s Comments:** Strengths of the study included the large cohort size and apparent internal validity. Limitations include lack of prospective data and estimation of admission rates. If externally validated, this tool may ultimately find use in risk stratification of older patients with syncope, but the level of acceptable risk as judged by ED providers and hospitalists may vary. Directing lower-risk patients to alternative monitored venues (observation units), thus circumventing admission, makes sense. In the meantime, this study underscores the value of history and inexpensive diagnostic tests, such as vital signs and ECG, as a first-line approach. (Reviewer-Jennifer Best, MD).
Point-of-care detection of nasal *S. aureus* carriage and subsequent decolonization decreases hospital-acquired MSSA infections in at-risk inpatients.

**Background:** Nasal carriage of *Staphylococcus aureus* increases the risk of health-care-acquired infection 3x to 6x. It is unknown whether decolonization prevents nosocomial *S. aureus* infection.

**Objective:** To assess whether decolonization with intranasal mupirocin and chlorhexidine soap prevents hospital-acquired *S. aureus* infection.

**Design:** Randomized, double-blind, placebo-controlled trial involving 3 university hospitals and 2 general hospitals in the Netherlands.

**Participants/Methods:** All adult surgery and medicine patients with expected length of stay ≥4 days between October 2005 and June 2006 were screened for nasal *S. aureus* colonization with real-time PCR on admission or in the week before admission. Patients were randomized to decolonization with mupirocin/chlorhexidine or placebo for 5 days. Those still hospitalized at 3 or 6 weeks had repeat therapy. Patients with known *S. aureus* infection were excluded. Surgical patients received standard preoperative prophylactic antibiotics. The primary outcome was the cumulative incidence of hospital-acquired *S. aureus* infections. All-cause in-hospital mortality, length of stay (LOS), and time from admission to health-care associated infection were secondary outcomes. Patients were followed up for 6 weeks after discharge. Analyses were performed on an intention-to-treat basis.

**Results:** 6771 patients were screened; 1251 had swabs positive for *S. aureus*. All strains were methicillin-sensitive *S. aureus* (MSSA). A total of 917 patients were randomized: 504 received mupirocin/chlorhexidine, and 413 received placebo; 88% were surgical patients. Hospital-acquired infections were significantly lower in the mupirocin/chlorhexidine group than in the placebo group (3.4% vs 7.7%; RR, 0.42). The number needed to screen to prevent 1 hospital-acquired *S. aureus* infection was 250; the number needed to treat was 23. All-cause mortality was similar between groups. Thirteen patients died in each group; in the mupirocin group, 1 died of nosocomial *S. aureus* infection versus 3 in the placebo group (all 3 had undergone cardiothoracic surgery). LOS was significantly shorter in the mupirocin/chlorhexidine group; time to infection was shorter in the placebo group.

**Conclusions:** Rapid detection of nasal *S. aureus* carriage and subsequent decolonization with mupirocin/chlorhexidine decreased hospital-acquired MSSA infections in at-risk patients by almost 60%.

**Reviewer’s Comments:** This is a nicely conducted sizeable study of potential significance to hospitalists, particularly those involved in perioperative care. It would be helpful to know additional information about the specific types of surgery in this study and the potential impact of standard preoperative prophylactic antibiotics. Results may not be generalizable as prevalence of methicillin-resistant *S. aureus* (MRSA) in the Netherlands is only 0.03%, lower than has what been reported in other populations. Further study is needed in populations with higher a prevalence of MRSA. (Reviewer-Anneliese M. Schleyer, MD).
While localizing medicine patients to fewer units helps nurses and physicians recognize each other in the care of their patients, it does not improve all measures of agreement on the plan of care.

**Background:** There is little question on whether improving communication between nurses and physicians would affect patient care. Methods of facilitating this communication are unclear. Teamwork training, multidisciplinary rounds, and geographic localization of a team’s patients have all been proposed as methods to improve nurse-physician communication.

**Objective:** To assess the impact of localizing medicine team patients to fewer floors on nurse-physician communication in the areas of provider recognition, daily communication, and agreement on the plan of care.

**Methods:** The intervention consisted of assigning patients to a specific medicine team based on their physical location in the hospital. Nurses, physicians, and patients were surveyed before and after the intervention. The authors interviewed a cross-section of patients, physicians, and nurses in successive years before and after the implementation of geographic localization. The interviewers asked the name of the nurses or physicians helping take care of the patient, whether they had mutually discussed the plan of care that day, and the mode of that communication: face-to-face, text page, or phone call. Both nurses and physicians were also asked 6 questions regarding that patient's plan of care: the patient's primary diagnosis, planned tests, planned procedures, medication changes, physician consultations, and anticipated length of stay. The authors then looked at the responses for no, partial, or complete agreement.

**Results:** >300 nurses and physicians completed the pre-localization survey, and >280 completed the post-localization survey. Localization significantly improved the ability of both physicians and nurses to identify the other by name, as well as increasing the frequency of face-to-face communication. Geographic localization, however, did not improve agreement on all 6 plans of care measures. Nurses and physicians were more likely to agree on patients' planned tests and length of stay, but no change was seen in the other measures.

**Conclusions:** Although geographic localization demonstrated gains in improving provider recognition and the mode of nurse-physician communication, further interventions may be needed to improve quality of communication.

**Reviewer's Comments:** This study showed significant gains in nurse-physician communication with the implementation of geographic localization. Although one might argue that only 2 of 6 measures (agreement on planned tests and discharge date) of the patient care plan demonstrated a significant change with geographic localization, I would hesitate to limit the findings to gains on agreement of the care plan. The ability of nurses and physicians to recognize each other in the care of their patient and the increase in face-to-face communication should not be underestimated. This is the foundation for good teamwork and is an admirable gain of geographic localization. What is lacking perhaps is an intervention that can improve the quality of nurse-physician communication. Teamwork training or multidisciplinary rounds would be an excellent way to build on these already significant gains. (Reviewer-Michelle Mourad, MD).

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Keywords: Geographic Localization, Physician Communication

Print Tag: Refer to original journal article
A broad systematic review revealed that noncontrast CT scanning is a good test for the diagnosis of acute appendicitis, especially in patients who cannot receive intravenous contrast.

**Background:** Early and accurate diagnosis of acute appendicitis is important for patient care outcomes and to prevent unnecessary surgeries. Noncontrast CT scanning is valuable because it can be done quickly and without the hazards of contrast.

**Objective:** To determine the diagnostic test characteristics of noncontrast CT scanning for acute appendicitis.

**Design:** Systematic review.

**Methods:** A broad literature review was conducted. Studies were included if they involved patients presenting to the emergency department with abdominal pain suspicious for acute appendicitis, involved multi-slice CT scanning, and had either a surgical diagnosis or 2 weeks of uneventful follow-up as the gold standards for diagnosis or exclusion of appendicitis.

**Results:** 7 studies involving 1060 patients met the inclusion criteria. The prevalence of appendicitis ranged from 20.1% to 84.5%. The pooled sensitivity for noncontrast CT scanning was 92.7% (95% CI, 89.5% to 95.0%), and the pooled specificity was 96.1% (95% CI, 94.2% to 97.5%). The positive likelihood ratio for a positive test was 24, and the negative likelihood ratio was 0.08.

**Conclusions:** A straightforward systematic review revealed that noncontrast CT scanning has high sensitivity and specificity for the diagnosis or exclusion of acute appendicitis.

**Reviewer's Comments:** This well-done study shows that noncontrast CT scanning is quite good for the diagnosis of acute appendicitis with a false-negative rate of about 7% and excellent positive and negative likelihood ratios. Previous studies have shown similar sensitivity and specificity for contrast CT scanning. Given that contrast CT scans may do a better job of revealing other intra-abdominal causes for pain (eg, abscess), this is probably the best test for most patients. However, for those who have a contrast allergy or are at high risk for contrast nephropathy, noncontrast CT scanning appears to be an adequate test in patients with suspected appendicitis. (Reviewer-Bradley A. Sharpe, MD).

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Keywords: Acute Appendicitis, CT, Diagnostic Tests

Print Tag: Refer to original journal article
Continuous low-dose aspirin in patients with peptic ulcer bleeding increases recurrent bleeding (compared with discontinuation), but mortality rates appear to be lower.

**Background:** Aspirin is common treatment for cardiovascular and cerebrovascular disease but increases the risk of upper gastrointestinal bleeding (UGIB). The risk of recurrent UGIB with continuation of aspirin after endoscopy relative to the risk of vascular thrombotic events with aspirin discontinuation is unknown.

**Objective:** To determine if continuous aspirin therapy after endoscopic control of peptic ulcer bleeding with proton pump inhibitors (PPI) is inferior to aspirin discontinuation in the risk of recurrent bleeding.

**Design:** Parallel, randomized, placebo-controlled, double-blind, non-inferiority trial from a single academic medical center in China.

**Participants/Methods:** Consecutive patients who presented with UGIB from 2003 to 2006 were screened. Eligible patients had peptic ulcers with active bleeding, visible vessels, or adherent clots that were treated by endoscopy and continued to require aspirin for secondary prophylaxis or treatment. Patients taking concomitant anticoagulants, steroids, or non-steroidal anti-inflammatory agents were excluded. Patients on clopidogrel were included, but clopidogrel was held until ulcer healing. All patients received high-dose intravenous PPI followed by oral PPI. Patients were randomly assigned to receive aspirin 80 mg/day or placebo for 8 weeks. Follow-up was at 30 and 56 days after discharge. The primary end point was 30-day recurrent bleeding. Secondary outcomes were as follows: all-cause mortality; death from cardiovascular, cerebrovascular, or gastrointestinal causes; transfusion requirement; length of stay; surgery; and recurrence of acute ischemic events (acute coronary syndrome or cerebrovascular accident). Analyses were performed on an intention-to-treat basis.

**Results:** 3412 patients presented with UGIB; 267 patients had aspirin-related bleeding events. Ultimately, 78 patients were enrolled in the aspirin group, and 78 received placebo. Mean age was 74 years, and groups were demographically similar. Ten percent of patients (8) in the aspirin group had recurrent 30-day bleeding versus 5% with placebo. Recurrent bleeding was always at the initial bleeding site. Blood transfusions were similar between groups. The 30-day mortality was lower with aspirin continuation than with placebo (1.3% vs 9%). All-cause mortality and mortality related to cardiovascular, cerebrovascular, or gastrointestinal complications at 8 weeks were also lower. Six non-fatal, recurrent acute ischemic events were reported: 2 in the aspirin group and 4 with placebo.

**Conclusions:** Continuous aspirin in patients with UGIB after endoscopy with PPI led to an increased risk of recurrent bleeding; bleeding appeared to be relatively mild. Notably, fewer patients with prolonged aspirin therapy died and experienced adverse cardiovascular and cerebrovascular events.

**Reviewer’s Comments:** This is a small, thought-provoking study of potential relevance to hospitalists. While continuous aspirin in patients with UGIB was inferior to discontinuation in terms of recurrent bleeding, mortality appeared to be lower when aspirin was continued. Only low-dose aspirin was studied, and aspirin was held for 8 weeks. Further larger studies are needed to examine aspirin discontinuation for shorter duration after index bleeding to identify how best to balance rebleeding risk with vascular ischemic risk. (Reviewer-Anneliese M. Schleyer, MD).

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Keywords: Peptic Ulcer Bleeding, Aspirin Therapy

Print Tag: Refer to original journal article
The use of pantoprazole is strongly advised in peptic ulcer patients who require long-term low-dose ASA therapy.

**Background:** Aspirin (ASA) is used for secondary prophylaxis of vascular events, but chronic use may lead to peptic ulcers. The best approach to prophylaxis against ulcer recurrence in patients requiring chronic ASA therapy is unclear, though proton pump inhibitors (PPIs) are commonly used. **Objective:** To compare the relative effectiveness of high-dose famotidine and pantoprazole for secondary ulcer prophylaxis in patients with healed peptic ulcers or erosions who require ongoing low-dose ASA therapy. **Design:** Prospective, randomized, double-blind trial. **Methods:** Enrolled patients were randomized to receive a combination of ASA 80 mg with either famotidine 40 mg twice daily or pantoprazole 20 mg twice daily. Patients were evaluated at 16-week intervals in the clinic for pill counts and symptom monitoring. Severity grading of dyspepsia and ulcer complications was prespecified. Repeat endoscopy was only performed for melena, hematemesis, or severe epigastric pain. **Participants:** 161 adult endoscopy patients receiving low-dose ASA for secondary prevention, who had healed *Helicobacter pylori*-negative peptic ulcers or erosions 8 weeks after initial presentation and only minimal dyspeptic symptoms, were included. **Results:** The primary end point was recurrence of peptic ulcers or erosions. A total of 130 patients were included in the analysis, 65 each in the famotidine and pantoprazole groups. Overall medication compliance was good. The primary end point was seen in 13 of 65 patients (20%) in the famotidine group, but in none of the 65 patients (0%) in the pantoprazole group, with fewer ulcer-related complications. Only 1 famotidine patient had life-threatening bleeding. **Conclusions:** Famotidine is inferior to pantoprazole for prevention of recurrent peptic ulcers/erosions in low-dose ASA users, and pantoprazole more successfully prevents ulcer-related complications. **Reviewer's Comments:** This study supports current guidelines recommending the use of PPI over H$_2$-receptor antagonists (H2RAs) for secondary prevention of ASA-related ulcers. The role of H2RAs for patients with ASA-related gastrointestinal bleeding remains unclear. Recall that all patients received 8 weeks of a PPI for ulcer healing prior to randomization. Early ASA use may not necessarily prevent ulcer healing, as some randomized patients had received ASA during the 8-week PPI period; the optimal safety window for holding ASA at the time of gastrointestinal bleeding is not explored here. These results confirm that not all peptic ulcers/erosions are heralded by significant dyspepsia. Perhaps the most important limitation of this study is the absence of endoscopic data for those patients who did not develop significant dyspepsia, melena, or hematemesis. (Reviewer-Jennifer Best, MD).

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Keywords: Peptic Ulcer Disease, Gastrointestinal Bleeding, PPI, H$_2$-Receptor Antagonists

Print Tag: Refer to original journal article
ABCD2 Score May Help Identify 7-Day Stroke Risk in TIA Patients

A Multicenter Evaluation of the ABCD2 Score’s Accuracy for Predicting Early Ischemic Stroke in Admitted Patients With Transient Ischemic Attack.

Asimos AW, Johnson AM, et al:

Ann Emerg Med 2010; 55 (February): 201-210

ABCD2 may be useful in identifying patients admitted with TIA who are at low 7-day risk for subsequent stroke

Background: The age (A), blood pressure (B), clinical features (C), transient ischemic attack duration (D), and diabetes history (D) (ABCD2) score, designed to risk stratify patients with transient ischemic attack (TIA), has not yet been independently and prospectively validated.

Objective: To assess the accuracy of the ABCD2 score in predicting 7-day risk of ischemic stroke in patients admitted with TIA.

Design: Medical record review.

Participants/Methods: Emergency department (ED) and admitting physicians identified a nonconsecutive sample of patients admitted with presumptive TIA at 16 stroke centers in North Carolina beginning in 2005. Patients with a stroke history, unknown symptom onset time, and presentation >24 hours after symptom onset were excluded. Stroke program physicians and nurses reviewed records at or after 90 days to identify the primary outcome of stroke within 7 days of TIA. Strokes were identified as imaging positive or negative and were classified as disabling if the Modified Rankin Scale score was >2. The ABCD2 score was calculated from age (A; >60 years, 1 point), blood pressure (B; systolic ≥140 mm Hg or diastolic ≥90 mm Hg on first assessment, 1 point), clinical features (C; weakness, 2 points and speech disturbance, 1 point), symptom duration (D; ≥60 minutes, 2 points and 10 to 59 minutes, 1 point), and diabetes (D, 1 point). Scores of 0 to 3 were low risk and scores 4+ were moderate/high risk.

Results: 1667 patients were enrolled over 35 months. Of these 373 patients (23%) were diagnosed with stroke within 7 days, and 91% were diagnosed in the first 2 days. Eighteen percent of strokes were disabling; 97% were imaging positive. Age >60 years, elevated blood pressure at TIA presentation, and weakness were significantly associated with an increased 7-day stroke risk; only weakness was associated with increased risk of disabling stroke. A low ABCD2 score was sensitive but not specific for low stroke risk; negative likelihood ratio for disabling stroke was 0.16 (0.34 with imputed missing values). Scores were unavailable for 37% of black patients, and those with high blood pressure were more likely to have missing score components. There was significant intrahospital variability.

Conclusions: The ABCD2 score may help identify 7-day stroke risk in patients admitted with TIA, particularly in those who are at low risk.

Reviewer's Comments: This is a large multicenter study designed to validate ABCD2 in patients with TIA admission, which is of potential significance for hospitalists who manage TIA and stroke. This study did not capture patients who were not admitted, and all strokes may not have been identified with record review (eg, deceased patients). Since most strokes were identified within 2 days, it is possible that some early strokes were misclassified as TIA. Notably many patients did not have complete scores although scores with imputed values did not change overall results. Additional study in a large consecutive population is needed to further validate this score. Nonetheless, ABCD2, easy to remember, may be one way to identify hospital inpatients with TIA who could safely undergo outpatient work-up. (Reviewer-Anneliese M. Schleyer, MD).

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Keywords: ABCD2 Score, Transient Ischemic Attack, Stroke Risk

Print Tag: Refer to original journal article
Multiple professional organizations have created a robust guideline for the management of complicated intra-abdominal infections, and hospital-based providers are encouraged to use this as a reference in managing these patients.

**Background:** Complicated intra-abdominal infections are characterized by perforation of a hollow viscous into the peritoneal space and are associated with either abscess formation or peritonitis.

**Objective:** To provide a broad and robust guideline for the diagnosis and management of complicated intra-abdominal infections.

**Design:** Literature review and consensus guideline development. Methods/

**Participants:** Representatives from multiple physician societies representing infectious disease, surgery, microbiology, and pharmacology performed a literature review related to the diagnosis and management of complicated intra-abdominal infections. The specific recommendations were based on consensus according to the best evidence.

**Results:** 111 specific recommendations were made. Some key recommendations include the following. (1) Contrast CT scanning is the best diagnostic test for suspected intra-abdominal infection. (2) All patients with suspected intra-abdominal infection should receive IV fluids. (3) The main bacteria in intra-abdominal infections are *Escherichia coli*, *Bacteroides* species, *Clostridium* species, and streptococcal species (especially, *Streptococcus milleri*). (4) For mild-to-moderate community-acquired intra-abdominal infection, recommended initial antibiotic regimens include ticarcillin-clavulanate, fluoroquinolone + metronidazole, or ceftriaxone + metronidazole (cefotetan and clindamycin are not recommended). (5) For severe community-acquired intra-abdominal infection, recommended regimens include meropenem or imipenem, piperacillin-tazobactam, fluoroquinolone + metronidazole, or cefepime + metronidazole. (6) For health care-associated intra-abdominal infection, recommended initial regimens are meropenem or imipenem, piperacillin-tazobactam, or cefepime + metronidazole. (7) For health care-associated intra-abdominal infections, vancomycin can be added if the patient is severely ill or has a known history of enterococcal infection. (8) Appropriate duration of therapy for complicated intra-abdominal infection is 4 to 7 days (unless there is evidence of ongoing infection).

**Conclusions:** A robust and comprehensive guideline provides specific recommendations for the diagnosis and management of complicated intra-abdominal infections.

**Reviewer's Comments:** Although most complicated intra-abdominal infections will be managed primarily by surgeons, we are often involved in co-management and consultation, before or after surgery. This guideline provides specific, evidence-based recommendations for management. Although there are no major surprising recommendations, the guideline helps to fine tune management of these patients and use the best evidence; hospital-based providers are strongly encouraged to reference them when pertinent. (Reviewer-Bradley A. Sharpe, MD).

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**Keywords:** Intra-Abdominal Infection, Guidelines, Infectious Diseases

**Print Tag:** Refer to original journal article
Background: β-blockers (BBs) have been shown to decrease perioperative myocardial infarction (MI), but may also incur an increased risk of perioperative stroke and mortality, often associated with hypotension and bleeding. This effect may be a result of BB-mediated blunting of normal physiological responses.

Objective: To compare the effects of acute anemia on adverse cardiac outcomes in 2 matched groups of surgical patients, one group that received BBs and a second group that did not.

Design: Retrospective cohort study.

Methods: Demographic, medical, laboratory, medication, transfusion, and mortality data were obtained from electronic medical record, pharmacy, blood bank, and hospital datasets. Statistical analysis examined the relationship between percent drop in hemoglobin and the likelihood of the composite outcome. Two propensity matched cohorts, one with and the other without BBs, were created and compared. Two sensitivity analyses were also performed, one addressing transfusion requirements and a second equalizing troponin measurement between groups.

Participants: 4378 noncardiac, nontransplant adult surgical patients at a single Canadian hospital were included. Patients with preoperative hemoglobin ≤90 g/L and same day discharge were excluded.

Results: The primary outcome was major adverse cardiac events (MACE), defined as a composite outcome of MI, nonfatal cardiac arrest, and in-hospital mortality. Patients on BBs had increased comorbidities and took more medications. The risk of MACE was 7 times greater for patients on BBs; after propensity matching, this risk remained greater with BBs, though the study was underpowered to demonstrate significance for individual outcomes. In sensitivity analysis, transfusion amount was not associated with BB use, and increased MI incidence persisted after equalizing troponin measurements between groups. In patients experiencing a >35% decrease in hemoglobin, BBs were associated with an increase in the incidence of MACE (RR, 3.15); this held in sensitivity analysis.

Conclusions: Patients on BBs may not tolerate surgical anemia, as suggested by an increase in MACE in the setting of a >35% drop in hemoglobin.

Reviewer's Comments: This study further elucidates a potential mechanism behind the observed adverse effects of BBs in surgical patients, though it was underpowered to detect significant differences in individual cardiac outcomes. The authors offer that only a small percentage of these patients had vascular surgery, a population which, according to practice guidelines, may stand to benefit most from BBs. The retrospective study design does not allow statements regarding causality of the observed association. Furthermore, based on the information provided, we are unable to stratify effects of anemia based on a given patient's indication for BBs, BB dose or Revised Cardiac Risk Index (although this was accounted for in propensity matching). Though patients on BBs may benefit from earlier transfusion, this study was not designed to identify specific thresholds. (Reviewer-Jennifer Best, MD).
In patients with septic shock receiving corticosteroids, intensive insulin treatment does not improve outcomes compared with conventional insulin, and there is no benefit to adding fludrocortisone to corticosteroids.

**Background:** Prolonged courses of low-dose corticosteroids are indicated in patients with vasopressor-refractory severe septic shock. Prior evidence shows that these patients have higher blood sugar levels.

**Objective:** To examine the efficacy of intensive glucose control and the possible benefit of adding fludrocortisone therapy in patients receiving corticosteroids in severe septic shock.

**Design:** Randomized, controlled trial.

**Participants/Methods:** Patients with severe sepsis and septic shock and receiving hydrocortisone (HC) 50 mg IV every 6 hours were enrolled and randomized to 1 of 4 groups: HC + intensive insulin; HC + intensive insulin + fludrocortisone; HC + conventional insulin; or HC + conventional insulin + fludrocortisone. The intensive insulin group was managed with insulin infusion with a goal blood sugar of 80 to 110 mg/dL, and the conventional insulin group was managed with a rough goal of 150 mg/dL. The fludrocortisone was given 50 mg per feeding tube daily (as had been done in prior studies).

**Results:** 509 patients were enrolled between 2006 and 2009. The average blood sugar in the intensive insulin group was approximately 120 mg/dL, and in the conventional insulin group, the average blood sugar was approximately 150 mg/dL. There was no difference in mortality rates (180 days) between the intensive insulin and conventional insulin groups (45.9% vs 42.9%; \( P = 0.50 \)). There was also no difference between these 2 groups in ICU days, vasopressor-free days, mechanical ventilation-free days, or overall length of stay. Patients in the intensive insulin group has significantly more episodes of severe hypoglycemia, defined as a blood sugar \( \leq 40 \text{ mg/dL} \) (16.4% vs 7.8%; \( P = 0.003 \)). There was no difference in mortality in the fludrocortisone group versus no fludrocortisone (42.8% vs 45.8%; \( P = 0.50 \)). There was also no benefit to fludrocortisone for other outcomes, but patients receiving fludrocortisone had higher rates of superinfection.

**Conclusions:** This randomized, nonblinded, controlled trial revealed that there is no benefit to intensive insulin therapy compared to conventional treatment in patients receiving corticosteroids for severe septic shock. There was also no benefit to the addition of fludrocortisone in this patient population.

**Reviewer's Comments:** This well-done study adds to the overwhelming evidence regarding intensive glucose control in critically ill patients (both with and without septic shock); there is probably not a real benefit and there is a real risk of hypoglycemia. The best summary of the evidence suggests a rough goal of 150 to 180 mg/dL is probably optimal. This study also showed that there probably is not a benefit and there may be harm (superinfection) associated with the addition of fludrocortisone to hydrocortisone in patients with severe septic shock. Lastly, the study should act as a reminder that patients with severe septic shock who have vasopressor-resistant shock (still hypotensive despite pressors) should receive hydrocortisone, likely 50 mg IV every 6 hours for 7 days. (Reviewer-Bradley A. Sharpe, MD).

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**Keywords:** Septic Shock, Intensive Insulin, Blood Sugar, Mortality

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