Use of an electronic intensive care unit does not reduce either hospital length of stay or mortality rates.

**Background:** There will be an increasing shortage of intensivists in the future. A telemedicine system, the electronic ICU (eICU), is a potential solution to this shortage. The eICU provides continuous monitoring of ICUs from a remote centralized facility. The impact of such care on clinical outcomes is unclear.

**Objective:** To examine the association of telemedicine services with mortality, length of stay (LOS), and hospital costs.

**Design:** Observational study.

**Methods:** The study was conducted at 4 ICUs at 2 community hospitals. It included patients admitted to the ICU from a baseline period (before implementation of eICU), and 2 intervention periods (eICU wave 1 [early] and wave 2, [approximately 1 year after implementation]). Primary outcomes included ICU/non-ICU/total mortality, ICU/hospital LOS, and total hospital costs. Covariates included age, race/ethnicity, trauma status, Acute Physiology and chronic Health Evaluation III (APACHE III) score and eICU utilization (low vs high).

**Results:** A total of 4088 patients (1371 at baseline, 1287 in eICU wave 1, and 1430 in eICU wave 2) were analyzed. During wave 1, 80% of physicians opted for low-level eICU utilization compared to 50% during wave 2. When comparing the baseline period to eICU wave 1, introduction of the eICU did not affect mortality, LOS, and hospital costs. When comparing eICU wave 1 to wave 2, the continued presence of the eICU and a high-level eICU utilization did not impact mortality. There was a significant interaction between the 2 eICU waves and eICU utilization on hospital LOS and hospital cost. For high-level utilization, hospital LOS decreased from wave 1 (10 days) to wave 2 (8 days), while it increased for low-level (8 days to 8.3 days). Total hospital costs increased from wave 1 to wave 2, but were less with high-level use ($710) than low-level use ($1400). ICU LOS increased over the study periods with continued use of both eICU and high-level eICU utilization associated with this increase.

**Conclusions:** The introduction and continued presence of an eICU system at 2 community hospitals did not reduce mortality, length of stay, or hospital costs.

**Reviewer's Comments:** The results of this study are in contrast to earlier studies that were single-centered and authored by founders of telemedicine technology. This study was conducted at multiple sites by authors without potential conflicts. However, the results should be evaluated with caution. Baseline ICU mortality (6.6%) was low, making it hard to show any significant changes to mortality without a larger patient sample. Physician utilization of the eICU was of low-level involvement for the majority of patients, minimizing the degree to which the eICU could impact clinical outcomes. Larger studies with a clear and predefined role of the eICU are needed to understand the future role of telemedicine in the ICU. (Reviewer-Timothy Scialla, MD).

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Keywords: Telemedicine, Health Outcomes, ICU Staffing

Print Tag: Refer to original journal article
Use of telemedicine in the care of ICU patients does not overall impact survival or LOS, though it may improve survival in the sickest patients.

**Background:** Telemedicine, which allows remote monitoring of patients, is a potential solution for the shortage of intensivists, but its effectiveness in the ICU is unclear and its costs are high.

**Objective:** To determine the association between initiating a telemedicine system for ICU patients (tele-ICU) and mortality, length of stay (LOS), and complications.

**Design:** Observational study.

**Participants/Methods:** The study was conducted in 6 ICUs from 5 hospitals. A total of 2034 patients and 2108 patients were included in the preintervention and postintervention periods, respectively. Primary outcomes included hospital/ICU mortality, complications, and ICU survivors’ LOS. Outcomes were adjusted for severity of illness using the Simplified Acute Physiology Score II (SAPS II). Local physicians determined the degree to which the tele-ICU was used. Minimal delegation meant care was limited to life-threatening situations, while full delegation allowed the tele-ICU to initiate and adjust care.

**Results:** In the postintervention period, local physicians chose minimal delegation for the tele-ICU for 1393 (66.1%) patients. Comparing the preintervention and the postintervention periods, the observed hospital mortality rate was 12.0% and 9.9%, respectively (a decrease of 2.1%; 95% CI, 0.2% to 4.1%; \( P =0.03 \)). After adjustment for illness severity, however, the differences associated with introduction of the tele-ICU were not significant (RR, 0.85; 95% CI, 0.71 to 1.03). The observed ICU mortality rates were 9.2% and 7.8%, respectively (decrease 1.4%; 95% CI, -0.3% to 3.2%; \( P =0.12 \)). After adjustment for severity of illness, the association between ICU mortality and the tele-ICU intervention was not significant (RR, 0.88; 95% CI, 0.71 to 1.08). Regression modeling demonstrated a significant interaction between telemedicine intervention and SAPS II score (\( P <0.001 \)), such that tele-ICU was associated with reduced hospital/ICU mortality for sicker patients. Tele-ICU had no impact on ICU complications or ICU survivors’ LOS.

**Conclusions:** Adoption of a tele-ICU to remotely monitor ICU patients did not improve survival or reduce LOS. It did appear to have a beneficial role in sicker patients.

**Reviewer’s Comments:** This multicenter investigation did not replicate the findings of previous single center studies. Local physician acceptance was low, with only one-third of them allowing full delegation of care to the tele-ICU. Perhaps greater autonomy to the tele-ICU would have impacted the results. The interaction between severity of illness and tele-ICU services raises the question of which patients benefit the most from remote monitoring. In the accompanying editorial, Dr. Yoo and Dr. Dudley comment that the heterogeneity of telemedicine systems and ICUs that adopt them make it nearly impossible to draw definitive conclusions from a single study. The authors suggest sequential hypothesis testing starting in settings that may provide the best impact (rural hospitals and those lacking intensivists/in-house physicians) for remote monitoring. Results could dictate further populations to study. (Reviewer-Timothy Scialla, MD).
The most frequent medical error in the intensive care unit is errors in insulin administration.

**Objective:** To determine the frequency and consequences of selected medical errors in the ICU.

**Design:** Prospective cohort study.

**Methods:** For a 1-week period in 2006, medical errors were recorded in 70 medical and surgical ICUs in France. Data collection included specific characteristics of the ICUs, patient characteristics, and safety indicators. The study physician at each participating center was responsible for determining the consequences of a medical error on a 6-point system, ranging from no consequence to direct contribution to death.

**Results:** Of the participating ICUs, 50% were university hospitals, and >50% had mixed medical and surgical ICUs. During the study period, 1,369 patients were treated, and 1,192 medical errors were reported. At least 1 medical error occurred in 26.8% of individuals, for a rate of 2.1 errors per 1000 patient-days. Errors in insulin administration were the most common medical error, accounting for 52.9% of all reported errors. Fifteen percent of medical errors were adverse events that led to clinical consequences or required additional treatments or procedures. Medical errors were felt to contribute to 4 deaths in the study period. In a multivariable regression model, experiencing >2 adverse events was an independent risk factor for ICU mortality (odds ratio, 3.09; 95% CI, 1.30 to 7.36; \( P = 0.039 \)).

**Conclusions:** Preventable medical errors commonly occur in the ICU and may contribute to mortality when multiple errors occur.

**Reviewer's Comments:** This study has systematically shown a large number of preventable medical errors that occurred over a very short period in a varied population of ICUs in France. Interestingly, the almost 1200 medical errors occurred in only 367 of the 1369 patients admitted to the ICUs during the study period. Thus, only 27% of the study population bore the burden of the medical errors, indicating most patients that experienced a medical error actually had >1. Another interesting finding was that >50% of the medical errors involved errors in insulin administration, irrespective of whether an insulin protocol was utilized. It is important to note that serious errors were rare. However, there were 23 instances in which medication was administered to the wrong patient, 9 instances during which a central venous catheter was accidentally dislodged, 6 falls, and 7 pneumothoraces following central venous catheter insertion; all of these events could potentially lead to serious consequences and should really give us pause to consider how often errors are truly occurring that lead to clinical consequences. With any study of medical errors, it is important to realize that there is likely an underreporting bias of both the medical errors as well as the consequences that result from medical errors, which should further cause us to consider better prevention, surveillance, and reporting of medical errors. (Reviewer-Cynthia D. Brown, MD).

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Keywords: Medical Errors, Patient Safety

Print Tag: Refer to original journal article
Use of brain BNP and echocardiographic measures of right ventricular function provide additive clinical value in predicting adverse outcomes in PE.

**Objective:** To determine the prognostic value of measures of right ventricular dysfunction on clinical outcomes in acute pulmonary embolus (PE).

**Design:** Prospective cohort study.

**Methods:** During the study period, 981 patients ≥18 years of age and with acute PE were recruited from 11 academic centers in Europe. Patients were managed according to usual practice at participating centers. All patients underwent echocardiography within 24 hours of diagnosis of PE. In addition, blood samples were collected upon admission for troponin I, n-terminal pro-brain natriuretic peptide (NT-proBNP), and BNP. Treating physicians were blinded to the results of the cardiac biomarkers. Adverse clinical outcomes were collected at 30-days, including all-cause mortality, secondary cardiogenic shock, and recurrent venous thromboembolic (VTE) events. After utilizing multivariable regression to identify factors associated with adverse outcomes, a model was developed to calculate a prognostic score.

**Results:** The total study population was 570 individuals. At 30 days, 7.4% had experienced an adverse event, including 25 occurrences of shock, 11 recurrences of VTE, and 26 deaths. Approximately 50% of the deaths were attributable to PE. After regression, altered mental status (OR, 6.8; \( P < 0.01 \)), cardiogenic shock on presentation (OR, 2.8; \( P = 0.03 \)), history of cancer (OR, 2.9; \( P = 0.02 \)), elevation in BNP (OR, 1.3; \( P < 0.01 \)), and right-to-left ventricle diameter ratio (OR, 1.2; \( P < 0.01 \)) remained predictors of adverse events at 30 days. From these factors, a risk score was developed that divided individuals into 3 risk groups. In the study population, classification as high risk was associated with a 43% likelihood of adverse clinical outcomes at 30 days compared to 2.5% in the low-risk category.

**Conclusions:** Use of BNP and echocardiographic measures of right ventricular dysfunction provide additive value in predicting adverse outcomes in acute PE.

**Reviewer's Comments:** This study verifies that abnormal right ventricular function is associated with increased risk of adverse outcomes in acute PE and provides additive value to the clinical evaluation. On face value, this makes sense, as individuals with evidence of elevated BNP or abnormal right ventricular function have poor reserve and an inability to compensate in the setting of additional stressors. These investigators have proposed the use of a risk score to identify individuals at high risk of adverse outcomes based upon the predictors identified in multivariable regression. I would not yet utilize this score clinically, as these investigators did not use an independent validation cohort. Furthermore, the overall number of adverse events was small and there was significant overlap in clinical variables in individuals who did and did not have adverse outcomes. Additionally, the overall model predicted only 20% of the variability in clinical outcomes. Validation of these findings would need to be undertaken in a larger cohort to determine if the predictor variables would provide useful prognostic strength. (Reviewer-Cynthia D. Brown, MD).

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Keywords: Right Heart Failure, Prognosis

Print Tag: Refer to original journal article
Patients using antiplatelet drugs prior to ICU admission have reduced odds of death in the ICU after adjusting for age, APACHE II score, and gender.

**Background:** Platelet activation is a common feature of systemic inflammation and sepsis. Such activation may contribute to microvascular thrombosis and organ failure. Antiplatelet drugs, specifically acetylsalicylic acid (ASA) and clopidogrel, may have a beneficial effect in critically ill patients.

**Objective:** To test the hypothesis that antiplatelet drugs used for secondary prevention in atherosclerotic patients may favorably impact the outcome in patients admitted nonelectively to the ICU.

**Design:** Retrospective cohort study of consecutive patients admitted to a tertiary care center ICU. Logistic regression and 2 x 2 analyses were used to assess the impact of ASA and clopidogrel on ICU mortality.

**Participants:** 615 patients were admitted to the ICU within 24 hours after arrival to the hospital. Exclusion criteria included elective surgery, transfer from an outside ICU, age <18 years, and pregnancy.

**Results:** Of the 615 participants, 154 (25%) were receiving antiplatelet therapy for secondary prevention of vascular disease. Individuals receiving antiplatelet therapy were older and had higher Acute Physiology and Chronic Health Evaluation (APACHE) II scores (25 vs 19; \( P <0.01 \)). After adjusting for age, gender and APACHE II score, use of antiplatelet therapy was associated with a lower odds of dying (OR, 0.19; 95% CI, 0.12 to 0.33). No differences were observed in mortality between those receiving and not receiving antiplatelet therapy when stratifying by surgery versus medical department, traumatic injuries or active bleeding. Using 2 x 2 tables to match patients on APACHE II scores, no significant benefit or harm of antiplatelet therapy was observed.

**Conclusions:** Premedication with antiplatelet drugs was associated with a marked reduction in mortality in ICU patients. Antiplatelet therapy may prevent organ dysfunction and subsequent mortality in critically ill patients.

**Reviewer's Comments:** In this retrospective analysis, Winning and colleagues have demonstrated that antecedent use of antiplatelet therapy does not confer increased risk of mortality in ICU patients and may in fact offer some benefit. The retrospective nature of this analysis makes it difficult to determine any causal relationship between antiplatelet therapy and mortality. However, the results of this study provide the foundation for testing this hypothesis in a prospective manner. (Reviewer-M. Bradley Drummond, MD).

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Keywords: Antiplatelet Drugs, Critical Illness, Fatal Outcomes, Multiple Organ Failure, Sepsis

Print Tag: Refer to original journal article
Surviving Sepsis Campaign Guidelines

Effectiveness of Treatments for Severe Sepsis: A Prospective, Multicenter, Observational Study.

Ferrer R, Artigas A, et al:

Am J Respir Crit Care Med 2009; 180 (November 1): 861-866

In severe sepsis, early broad-spectrum antibiotic use and administration of activated protein C, but not low-dose steroids, are associated with improved mortality.

Background: The Surviving Sepsis Campaign Guidelines outline several interventions in the treatment of sepsis associated with survival benefit in the ICU: early antibiotic therapy; early goal-directed therapy; corticosteroids; recombinant human activated protein C (APC); tight glycemic control; and lung protective ventilation strategies.

Objective: To analyze the impact of treatments recommended by the sepsis guidelines.

Design: Prospective, observational study of all adult patients with sepsis from 77 ICUs.

Participants: A total of 2,796 patients admitted from emergency departments or inpatients wards with severe sepsis or septic shock were included in the analysis.

Methods: Compliance with 4 therapeutic goals (central venous pressure [CVP] ≥8 mm Hg for persistent hypotension, central venous oxygen saturation ≥70% for persistent hypotension, blood glucose <150 mg/dL, inspiratory plateau pressure <30 cm H₂O) and 4 treatments (early broad spectrum antibiotics, fluid challenge for hypotension, low-dose steroids for septic shock, APC for multiorgan failure) was determined. The primary outcome measure was hospital mortality. Effectiveness of individual treatments was assessed with propensity scores.

Results: The overall hospital mortality for this cohort was 41.6%. The mean age was 62 years, and the mean Acute Physiology and chronic Health Evaluation II (APACHE II) score was 21.2. All therapeutic goals, except CVP ≥8 mm Hg, were achieved more often in survivors than in nonsurvivors (P < 0.01 in all cases). After using propensity scores to adjust for measured and unmeasured confounders, 2 recommended treatments were associated with lower hospital mortality: administration of broad-spectrum antibiotics in the first hour of severe sepsis (OR, 0.67; 95% CI, 0.50 to 0.90; P < 0.01) and administration of APC in multiorgan failure (OR, 0.59; 95% CI, 0.41 to 0.84; P < 0.01). Fluid challenge and low-dose steroids did not show benefit or harm.

Conclusions: In severe sepsis, early administration of broad-spectrum antibiotics and use of APC in multiorgan failure reduces mortality. The use of low-dose steroids in septic shock was not supported by this study.

Reviewer's Comments: Assessing the effectiveness of published guidelines is essential to ensure appropriate care is being delivered in the ICU. In this large, multisite study, Ferrer and colleagues have demonstrated that early broad spectrum antibiotics and use of APC (in multiorgan failure) reduces mortality, while use of fluid boluses and low-dose steroids conferred no benefit. While early antibiotic use is generally accepted as beneficial, the use of APC remains controversial. It is possible that the findings in this study represent a potential selection bias as treatment was not randomized. Similarly, the lack of a benefit of fluid boluses may simply represent the high percentage of patients with severe sepsis, characterized by a poor response to fluids. As supported by the recent Corticus trial, there was no association between low-dose steroids and death in septic shock, suggesting no benefit of this intervention. (Reviewer-M. Bradley Drummond, MD).

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Keywords: Intensive Care Unit, Guidelines, Mortality, Propensity Score

Print Tag: Refer to original journal article
Does Rifampin Improve Outcomes in MRSA Pneumonia?

Effect of Vancomycin Plus Rifampicin in the Treatment of Nosocomial Methicillin-Resistant Staphylococcus aureus Pneumonia.

Jung YJ, Koh Y, et al:

Crit Care Med 2010; 38 (January): 175-180

Rifampin might improve outcomes in MRSA pneumonia, but evidence of benefit is not strong.

**Background:** Methicillin-resistant *Staphylococcus aureus* (MRSA) pneumonia is associated with high morbidity and mortality. Rifampicin (RFP) is sometimes added to vancomycin in MRSA infections, but has not been studied in pneumonia.

**Objective:** To determine if RFC improves cure rates in treatment of nosocomial MRSA pneumonia.

**Design:** Randomized, open-label, single-center study.

**Participants:** Medical ICU (MICU) patients in Korea with chest x-rays consistent with a diagnosis of pneumonia, a clinical pulmonary infection score (CPIS) score of ≥6 and MRSA by culture were included. Patients with MRSA resistant to RFC, end-stage AIDS, or abnormal liver function were excluded.

**Methods:** Patients were assessed for clinical cure (primary outcome at day 14), microbiologic cure, and mortality.

**Interventions:** Vancomycin at 1 gm IV every 12 hours with or without RFC 300 mg orally every 12 hours for 14 days (VR compared to V). Patients were deemed per protocol cases if they received at least 5 days of treatment. Vancomycin dosing was adjusted to goal trough ≥10 µg/mL.

**Results:** 41 VR patients and 42 V patients were assessed as intent-to-treat patients. Thirty patients in the VR group and 34 patients in the V group completed at least 5 days of treatment (per protocol groups). Virtually all patients received concurrent antibiotics covering Gram-negative organisms. The median CPIS score was 8 at enrollment for both intent-to-treat groups. Clinical cure at day 14 was higher in the VR intent-to-treat group. In the per-protocol group, clinical cure was not different. Microbiologic cure was not different in any groups comparisons at day 14. Resistance to RFC developed in one-third of the VR patients. Mortality at 60 days was lower in the VR intent-to-treat group.

**Conclusions:** Vancomycin plus rifampin seems to be more effective than vancomycin alone in the treatment of nosocomial MRSA pneumonia.

**Reviewer’s Comments:** These results must be assessed with caution. This was an unblinded study with clinical cure highly reliant on chest x-ray assessment. Microbiologic cure at day 14 did not differ. Mortality assessments were made at 28 days and 60 days in the intent-to-treat groups, but not in the per-protocol groups. One-quarter of the VR patients failed to complete at least 5 days of treatment. It seems implausible that <5 days of RFC will improve survival at 60 days, but not at 14 days. RFC resistance also developed in one-third of the patients receiving RFC. The rise in MRSA infections has prompted a re-review of research literature to inform best practice. In contrast to statements by the authors, RFC as a second agent is currently only recommended in treatment of prosthetic-valve MRSA endocarditis, where it is presumably beneficial in decreasing hardware biofilm. RFC has toxicities and many drug interactions. Evidence from this study alone does not support routine use of RFC for MRSA pneumonia. (Reviewer-Annette M. Rowden, PharmD).

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Keywords: Pharmacotherapy, MRSA Pneumonia, Vancomycin, Rifampicin

Print Tag: Refer to original journal article
The use of IV or oral acetylcysteine in the management of acute acetaminophen poisoning is associated with extremely low mortality.

**Background:** The Food and Drug Administration (FDA) approved the 72-hour oral acetylcysteine (AC) protocol in 1985 for acetaminophen overdose. In 2004, the 20-hour IV protocol was approved. Many poison centers advocate IV therapy to decrease hospitalization time, but superiority of either strategy versus the other is unknown.

**Objective:** To compare outcomes after acute acetaminophen ingestion in patients treated with the 20-hour IV and the 72-hour oral AC protocols.

**Design:** Retrospective cohort study.

**Participants:** Patients in Canada treated with IV therapy from 1980 to 2005 and U.S. patients treated with oral therapy from 1976 to 1985 were reviewed. Patients had to have an acute ingestion, potentially toxic serum acetaminophen levels and therapy initiated between 4 and 24 hours of ingestion.

**Methods:** For the Canadian patients, a medical record review was conducted. For U.S. patients, information was obtained from the National Multicenter Study data set. The primary outcome was hepatotoxicity, defined as peak aspartate aminotransferase (AST) or alanine aminotransferase (ALT) >1,000 IU/L. Secondary outcomes were death or transplant. Analysis of the primary outcome was performed for relative risk with adjustment for associations such as age, time to treatment, acute or chronic alcohol ingestion, acetaminophen level, and sex. Time to treatment versus outcome was assessed to see if superiority of the treatment modality changed based on time to treatment.

**Results:** 2086 patients were assessed in the IV group and 1962 in the oral group. Median time to treatment was shorter in the IV group. The unadjusted rate of hepatotoxicity did not differ (13.9% IV and 15.8% oral). One patient in the IV group and 3 patients in the oral group died. One patient received a transplant. Relative risk of hepatotoxicity was lower in the IV group when therapy was started in <12 hours and lower in the oral group when started after 18 hours.

**Conclusions:** The 20-hour protocol is better in early presentation, while the 72-hour protocol is better in late presentation.

**Reviewer's Comments:** This study has several serious design flaws that make interpretation virtually impossible. It compares retrospective data from 2 very different sets of records. Each was collected over a prolonged period, which introduces biases as medical care evolves. Furthermore, they were collected in separate eras, and the 2 therapies were administered in 2 different nations. Confounders, such as differences in medical systems, prevalence of preexisting liver disease, and evolution of medical care, likely differed between groups. Furthermore, it is not clear if treatment differences would be due to dose, route of administration, or treatment duration. The primary outcome, liver enzyme increases to >1000, is clinically unimportant. The bottom line is that both treatments worked. Mortality was <1% in each group. In acute acetaminophen ingestion, both IV and oral AC save lives. Therapy with either regimen should continue at least until acetaminophen is no longer detected in the serum. (Reviewer-Annette M. Rowden, PharmD).
Targeted Screening for MRSA Identifies High Proportion of Carriers

The Use of a Critical Care Consult Team to Identify Risk for Methicillin-Resistant Staphylococcus aureus Infection and the Potential for Early Intervention: A Pilot Study.

Keene A, Lemos-Filho L, et al:

Crit Care Med 2010; 38 (January): 109-113

Use of the critical care consult team to identify risk for MRSA and perform early testing may be a simple and rationale step to improve infection control in the ICU

Background: The time to recognition of methicillin-resistant Staphylococcus aureus (MRSA) nasal colonization may impair infection control efforts and render decolonization ineffective in reducing MRSA infections.

Objective: To determine whether a critical care consult team could be used to identify patients with MRSA nasal colonization early for whom MRSA decolonization treatment might be effective.

Design: Prospective cohort study.

Participants: Patients from 2 adult tertiary care hospitals were included. All were seen by the critical care consult service, expected to stay in hospital for >72 hours, and had at least 1 risk factor for MRSA nasal colonization.

Methods: Patients underwent nasal cultures for MRSA and were followed for 2 months or until hospital discharge for any MRSA clinical isolates.

Results: Of the 200 patients enrolled, 29 (14.5%) had MRSA nasal colonization and were significantly more likely to be male, admitted from a nursing home, and not admitted for surgery. Nasal cultures were performed an average of 15 hours before ICU arrival. Seven patients (24%) with MRSA nasal colonization developed MRSA infection compared with 1 of the 171 noncolonized patients. MRSA was found in clinical specimens in 52% of MRSA carriers compared with 1.2% of patients without nasal colonization. Median hospital length of stay was significantly longer in the MRSA colonization group (12 vs 8 days) compared with noncolonized patients.

Conclusions: Critical care patients with MRSA nasal colonization have an increased risk for MRSA infection. A consult team can be used to identify MRSA carriers early during the period of greatest potential benefit from topical decolonization.

Reviewer's Comments: This study confirms the usefulness of targeted screening using predefined risk factors to identify a high proportion of MRSA carriers. It suggests that early testing at time of considering ICU admission may be a preferred strategy. The caveats to applicability of these conclusions are the following. First, the average 15-hour delay between nasal cultures and ICU admission seems unacceptably long for many critical care patients. Even with shorter delays, however, earlier testing may be beneficial especially in reducing the risk for cross-transmission. Secondly, the conclusions assume that early detection, by allowing MRSA decolonization, would significantly reduce the impact of severe MRSA infections. However, decolonization techniques have not been studied in prospective randomized trials in ICU patients, and have not been shown to decrease MRSA infections in general medical and surgical patients. Early screening will be most effective if there is effective early intervention, although it could help prevent nosocomial MRSA spread by isolating patients sooner. (Reviewer-Wendy C. Ziai, MD).

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Keywords: Staphylococcus aureus, Nasal Colonization, Nosocomial Infection, Infection Prevention

Print Tag: Refer to original journal article
Early BP Reduction Reduces ICH Growth


Anderson CS, Huang Y, et al

307-312

A lower BP goal (<140 mm Hg) started early for patients with small to moderate ICH attenuates hematoma growth over the first 3 days

**Background:** A significant association between very high blood pressure and worse outcomes after intracerebral hemorrhage (ICH) is reported.

**Objective:** To determine whether early intensive blood pressure (BP) reduction reduces hematoma growth and perihematomal edema in acute ICH.

**Design:** Randomized controlled trial.

**Participants:** 404 patients with acute ICH on CT scan, initial systolic blood pressure (SBP) 150 to 220 mm Hg, and early presentation such that BP-lowering treatment could be started within 6 hours of ICH onset.

**Methods:** Patients were randomized to undergo 1 of 2 strategies—early intensive BP lowering to achieve SBP <140 mm Hg within 1 hour of randomization and for 7 days or a guideline group to achieve a goal SBP <180 mm Hg for the same time period. CT scans of the brain were obtained at baseline and at 24 and 72 hours.

**Results:** Baseline characteristics in the guideline group and the intensive group were similar. Median time from ICH onset to randomization was 3.6 and 3.8 hours, respectively. The intensive group had significantly lower SBP compared to the guideline group at 1 hour during the first 24 hours and for the first 3 days until the 72-hour CT scan. Baseline hematoma volumes were 12 mL (guideline group) and 13 mL (intensive group). The intensive group had a significantly lower mean hematoma absolute growth at both 24 hours (difference of 3.2 mL) and 72 hours (difference of 2.45 mL). The mean absolute increase and proportional increase in edema volumes were not significantly different between treatment groups at either 24 or 72 hours.

**Conclusions:** Rapid intensive BP lowering in acute ICH reduced hematoma growth over 72 hours, but had no significant effects on perihematomal edema.

**Reviewer's Comments:** The current study was limited to assessing growth of hematoma and edema volume. Based on the modest reduction in hematoma growth, we should remain skeptical at this point that early intensive BP reduction will translate into improved clinical outcomes. However, BP reduction is a low cost and widely applicable treatment, and in a disease for which the only proven management strategy is stroke unit-based supportive care, early intensive BP lowering treatment is a good strategy in patients with smaller ICH. This study was limited by a relatively small sample size and only 73% compliance with the 3 sequential CT scans. A larger trial to assess clinical outcomes is underway. (Reviewer-Wendy C. Ziai, MD).

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Keywords: Blood Pressure, Clinical Trial, Hypertension, Intracerebral Hemorrhage, Tx

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