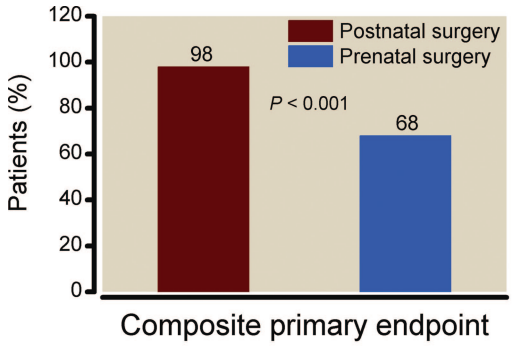
Timothy J. Brennan, Ph.D., M.D., Editor

Perioperative Medicine

J. Lance Lichtor, M.D., Editor

A randomized trial of prenatal *versus* postnatal repair of myelomeningocele. N Engl J Med 2011; 364:993–1004

Myelomeningocele is the most common form of spina bifida, and its incidence has stabilized at 3.4 per 10,000 live births. A randomized trial was performed to compare the safety and efficacy of prenatal surgery *versus* standard postnatal repair for myelomeningocele. Based on improved efficacy, the study was terminated early. After prenatal surgery (n = 78) there was a significantly lower rate of fetal or neonatal death or the need for placement of a cerebrospinal fluid shunt by the age of 12 months compared with postnatal surgery (n = 80) (*see fig. below*). Infants who had prenatal surgery also showed significant improvement compared with postnatal surgery in terms of the rates of hindbrain herniation, brainstem kinking, abnormal fourth-ventricle location, and syringomyelia at 12 months and ambulation by 30 months.



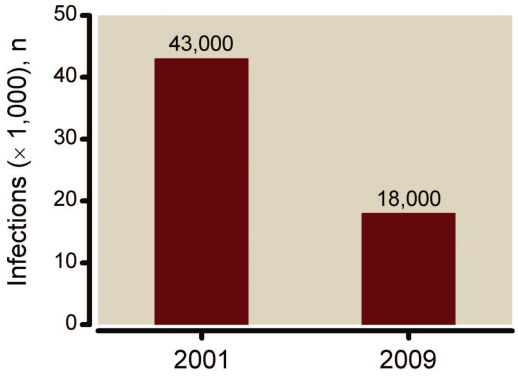
Fetal or neonatal death or the need for a cerebrospinal fluid shunt by the age of 12 months was significantly lower in infants who had prenatal surgeries.

Interpretation

Myelomeningocele can be debilitating. In this randomized study, prenatal surgery for myelomeningocele showed marked improvements in infants 12 and 30 months after birth compared with postnatal surgery. However, the risk of preterm delivery and uterine dehiscence at delivery increased. Overall this study supports prenatal intervention for myelomeningocele in certain patients.

Vital signs: Central line–associated bloodstream infections — United States, 2001, 2008, and 2009. MMWR Morb Mortal Wkly Rep 2011; 60: 243–8

The Centers for Disease Control and Prevention (CDC) monitors the incidence of central line-associated bloodstream infections (CLABSI) to evaluate potential improvements in health care. Using multiple national databases, the CDC estimated the number of CLABSI in several patient settings (*e.g.*, intensive care unit [ICU]) in 2001, 2008, and 2009. Overall, the estimated incidence of ICU CLABSI decreased by 58% from 2001 to 2009 (*see fig. below*). This reduction was the greatest for *Staphylococcus aureus* infections. The number of ICU CLABSI was lower in 2009 (18,000) than the inpatient ward CLABSI in 2009 (23,000) and the 2008 outpatient hemodialysis CLABSI (37,000).



The estimated number of CLABSI decreased by 58% from 2001 to 2009.

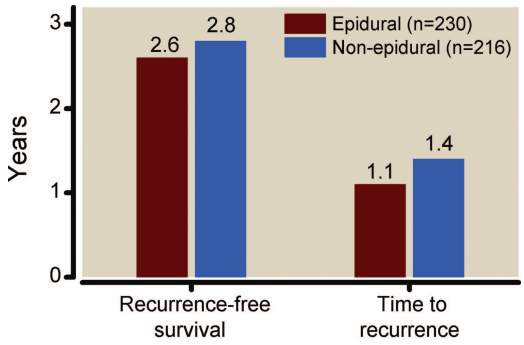
Interpretation

Based on this report from the CDC, ICU CLABSI decreased almost 60% between the years 2001 and 2009, which contributes to an estimated 27,000 lives saved and an estimated reduction in health care costs of $1.8 billion. In addition, the number of infections in hemodialysis centers in 2008 and inpatient wards in 2009 were higher than in ICUs and represent areas where improvement is needed.

Perioperative epidural analgesia for major abdominal surgery for cancer and recurrence-free survival: Randomized trial. BMJ 2011; 342:d1491

Effects of anesthesia on immune function may influence the rate of cancer recurrence after surgery intended to eradicate cancer. This study presents long-term follow-up from a prospective, multicenter, randomized controlled trial of patients (N = 503) who received general anesthesia with or without epidural block for at least 3 postoperative days. No difference in survival was observed between the two groups (*see*

fig. below). Recurrence-free survival was similar in both groups (hazard ratio 0.95; $P = 0.61$). Predictors of early death or cancer recurrence included patient age ($P < 0.001$), female sex ($P < 0.001$), and erythrocyte transfusion ($P = 0.002$).



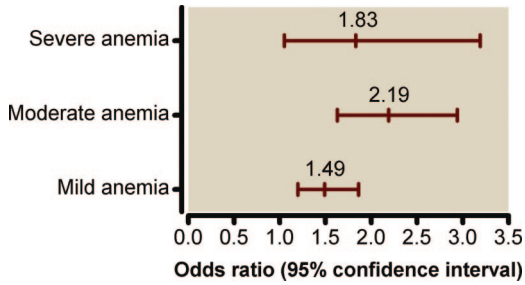
There was no difference between anesthesia type and survival after major abdominal surgery for cancer.

Interpretation

There are some data to show that the rate of cancer recurrence after regional block is decreased in comparison with that after general anesthesia. The authors, using data from the MASTER (Multicentre Australian Study of Epidural Anaesthesia and Analgesia in Major Surgery) trial, a clinical trial designed to determine whether combined epidural and general anesthesia was associated with less mortality, showed that in the subset of patients who had surgery for cancer, their risk of cancer recurrence and survival was not different than that of patients who received general anesthesia at surgery.

Does preoperative anemia adversely affect colon and rectal surgery outcomes? J Am Coll Surg 2011; 212:187–94

Blood transfusion is not without risk, and the availability of blood is also limited. For that reason, transfusion practices are conservative even when there is evidence of preoperative anemia. This study retrospectively analyzed data from the American College of Surgeons' National Surgical Quality Improvement Program. Preoperative anemia and a composite outcome consisting of myocardial infarction, stroke, progressive renal insufficiency, or death within 30 days of operation, or an increased hospital length of stay were assessed in patients who underwent colon and rectal surgery. Even after propensity matching and controlling for confounders, patients with anemia were more likely to experience adverse outcomes (*see fig. at top of right column*). However, the degree of anemia *versus* no anemia did not seem to have an effect. Patients with severe or moderate anemia experienced significantly longer hospital length of stay compared with patients with a normal hematocrit ($P < 0.01$).



Interpretation

In this large, multicenter, retrospective study, anemic patients undergoing colon and rectal surgery had an increased risk for postoperative complications including cardiovascular complications and death compared with patients with normal hematocrit. Therefore, blood transfusion or alternative treatments such as preoperative iron and vitamin supplementation should be considered to reduce postoperative complications in anemic patients.

Long-term survival of adult trauma patients. JAMA 2011; 305:1001–7

Trauma is a significant cost and source of morbidity and mortality. This retrospective cohort study evaluated predictors of long-term mortality of trauma patients (N = 14,421) over a 14-yr period. The 3-yr mortality rate was 16%, which was 10% higher than that expected based on the general population. Older patients and patients discharged to a skilled nursing facility had the highest risk of death (odds ratios of 1.54 and 1.38 for patients 66 to 75 yr old and 76 to 80 yr old, respectively). Type and severity of injury were also predictors of mortality, with more severe injuries leading to an increased risk of mortality.

Interpretation

Although limitations of a retrospective study exist, the 1- and 3-yr mortality rates were much greater in trauma patients. Long-term outcomes in trauma patients and factors influencing mortality require additional study.

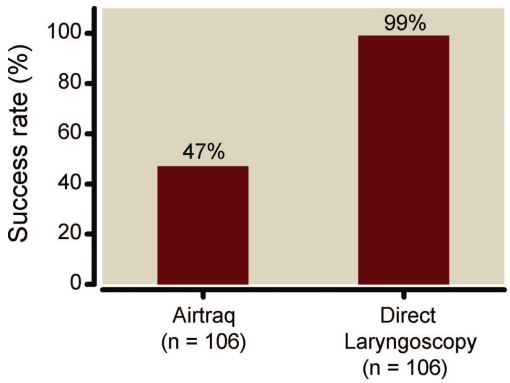
Critical Care Medicine

Jean Mantz, M.D., Ph.D., Editor

Use of the Airtraq laryngoscope for emergency intubation in the prehospital setting: A randomized controlled trial. Crit Care Med 2011; 39:489–93

New devices, such as the Airtraq laryngoscope (Prodol Meditec, Vizcaya, Spain), have been developed to improve the success rate for endotracheal intubation in the field. A prospective, randomized controlled trial was conducted to com-

pare the success rate of Airtraq intubation *versus* direct laryngoscopy when used by anesthesiologists or emergency physicians in patients (N = 212) requiring endotracheal intubation outside of the hospital. The success rate was significantly higher in patients who received direct laryngoscopy compared with Airtraq intubation ($P < 0.001$; *see fig. below*). Airtraq failure was attributed to impaired view during intubation because of the presence of blood and vomit (n = 11) or assumed handling problems (n = 24). In most cases in which Airtraq intubation failed, direct laryngoscopy was successful on the first attempt (54 of 56). Times until endotracheal intubation ($P = 0.001$) and first end-tidal carbon dioxide reading ($P = 0.005$) were significantly longer when Airtraq was used compared with direct laryngoscopy.



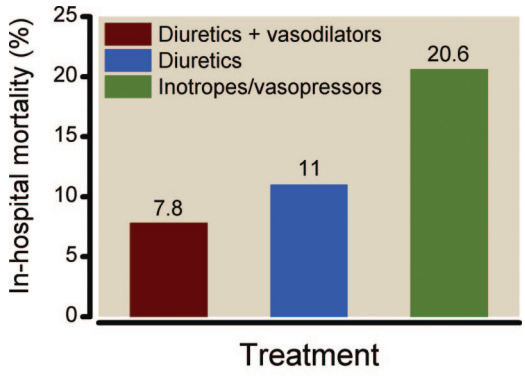
Airtraq intubation failed 53% of the time, regardless of body mass index, age, indication, or physician experience.

Interpretation

This well-designed study emphasizes the necessity for careful evaluation of new materials in the domain of airway management. Tracheal intubation remains a sophisticated procedure, even in experienced hands. The prehospital setting can be a particularly vulnerable situation. The Airtraq laryngoscope did not improve ease of intubation and therefore should not be recommended as an alternative to conventional intubation in difficult cases in the prehospital setting.

Short term survival by treatment among patients hospitalized with acute heart failure: The global ALARM-HF registry using propensity scorings methods. Intensive Care Med 2011; 37:290–301

Currently there are a large number of drugs available for decompensation of patients with acute heart failure (AHF). Previous studies have failed to show the benefit of any one treatment compared with another. In a *post hoc* analysis of a global, multicenter survey of standard in-hospital treatments for AHF, propensity matching was used to estimate the effect of specific treatments on in-hospital mortality. After propensity-based matching, patients who received the combination of vasodilators and diuretics had the lowest mortality rates ($P = 0.0016$ *vs.* diuretics alone; *see fig. below*). The use of intravenous catecholamines was associated with an increase in the risk of in-hospital mortality compared with patients who did not receive an inotrope or vasopressor (dopamine or dobutamine, 1.5-fold; norepinephrine or epinephrine more than 2.5-fold increase).



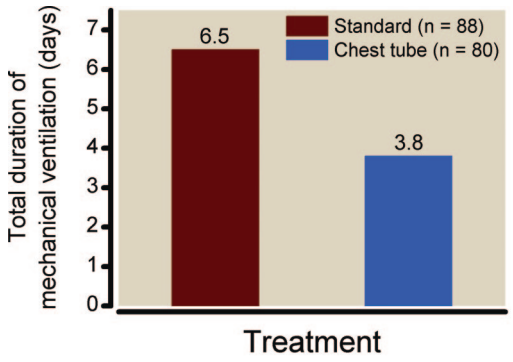
In-hospital mortality was lowest in patients who received vasodilators plus diuretics

Interpretation

This multicenter European study draws attention to the potential deleterious effects of pharmacologic treatments of AHF in patients hospitalized in intensive care units. For AHF, the best drug combination appears to be vasodilators plus diuretics, whereas vasopressors, particularly norepinephrine, should be used with caution.

Chest tube drainage of transudative pleural effusions hastens liberation from mechanical ventilation. Chest 2011; 139:519–23

Pleural effusion can prolong duration of mechanical ventilation, therefore increasing complications. Using a retrospective, single-center cohort design, this study examined the effects of chest tube drainage of pleural effusions on duration of mechanical ventilation in medical intensive care unit (ICU) patients. The total duration of mechanical ventilation was significantly shorter by almost 3 days in patients who had chest tube drainage compared with the standard treatment group ($P = 0.03$; *see fig. at top of next page*). In the chest tube group, 76% of patients were liberated from mechanical ventilation within 48 h compared with only 52% in the standard group. Significantly more pleural fluid was drained in patients with chest tubes (1,220 ml *vs.* 60 ml; $P < 0.001$) and near-complete effusion removal was achieved in 95% of chest tube patients, *versus* none in the standard group.



Duration of mechanical ventilation was significantly shorter in patients who had chest tube drainage.

Interpretation

Although limitations inherent to a retrospective cohort study should be taken into account, this study highlights the significant benefits of ultrasound-guided chest tube drainage of pleural effusions in medical ICU patients. This strategy represents a simple, efficient, and safe approach and should be encouraged to reduce exposure to mechanical ventilation.

A multifaceted intervention for quality improvement in a network of intensive care units: Is early venous thromboembolism prophylaxis safe in trauma patients with intracranial hemorrhage? J Trauma 2011; 70: 324–9

Venous thromboembolism prophylaxis is often delayed in patients with traumatic brain injury because of the potential risk of intracranial hemorrhage. The rates of intracranial hemorrhagic injury (IHI) were compared in a retrospective study of patients with traumatic brain injury treated with venous thromboembolism prophylaxis either early or late. Patients received enoxaparin 30 mg subcutaneously every 12 h starting up to 72 h (early) or 72 h after (late) hospital admission. The rate of IHI progression before treatment was significantly decreased in the early group compared with the late group (9.38% *vs.* 17.41%; $P < 0.001$). However, no difference was observed in the progression of acute IHI after treatment (1.46% *vs.* 1.54%; $P = 0.912$). There were no deaths attributable to IHI progression in either group. The incidence of deep venous thrombosis and pulmonary embolism were higher in the late group, but not statistically different.

Interpretation

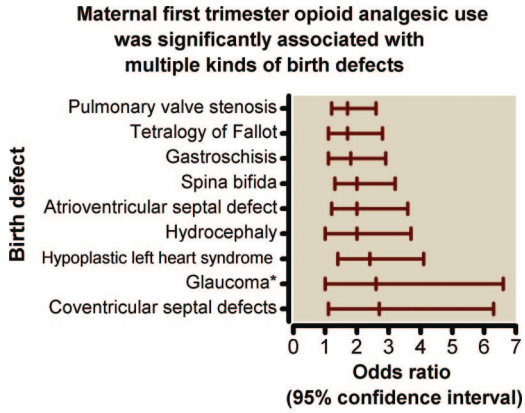
Because this is a retrospective cohort design, there are some methodologic limitations. However, the results confirm and extend recent data (Salottolo K *et al.*, J Trauma 2011; 70: 19–26) supporting the efficacy and safety of thromboprophylaxis in traumatic brain- injured patients.

Pain Medicine

Timothy J. Brennan, Ph.D., M.D., Editor

Maternal treatment with opioid analgesics and risk for birth defects. Am J Obstet Gynecol 2011; 204:314.e1–314.e11

Based on previous studies, the effects of opioid use in the first trimester of pregnancy on fetal development are unclear. To further understand the association between maternal opioid analgesic use and birth defects, data from the National Birth Defects Prevention Study, a multisite population-based, case-control study, were analyzed. Overall, 2.6% of mothers of infants with birth defects reported taking opioid analgesics during the first trimester compared with 2.0% in mothers comprising a control group. Opioid treatment was significantly associated with congenital heart disease overall (odds ratio = 1.4), for specific heart defects, and for defects in other organs (*see fig. below*). Most significant associations were in mothers who had received codeine and/or hydrocodone. Oxycodone was only significantly associated with pulmonary valve stenosis.



*Glaucoma or anterior chamber eye defects.

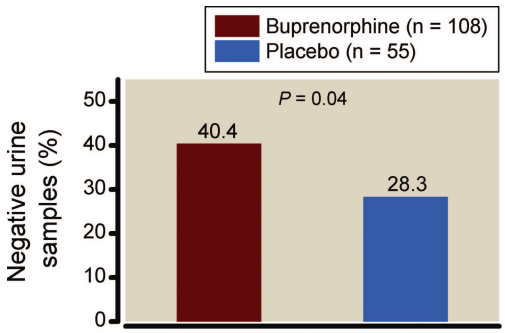
Interpretation

Options for treating pain in pregnant patients are limited. For medications, acetaminophen is usually prescribed although opioids are also used to some extent. This study indicates that opioid use early in pregnancy was associated with congenital heart disease and spinal and gastrointestinal abnormalities in infants. This information should be considered when evaluating treatment options in the pregnant patient and for those who could become pregnant.

Buprenorphine implants for treatment of opioid dependence: A randomized controlled trial. JAMA 2010; 304:1576–83

Advances in the treatment of opioid dependence: Continued progress and ongoing challenges. JAMA 2010; 304:1612–4

Buprenorphine maintenance therapy for opioid dependence has shown promise. Because sublingual buprenorphine is associated with problems such as adherence, diversion, and nonmedical use, an implantable formulation has been developed. This phase III multicenter, randomized, placebo-controlled study found that buprenorphine implants reduced illicit opioid use during a 16-week period (*see fig. on this page*). Significantly more patients in the buprenorphine group completed the 6-month study compared with the placebo group (65.7% *vs.* 30.9%; $P < 0.001$) with significantly fewer cravings, illicit drug use, and withdrawal symptoms.



Patients in the buprenorphine group had significantly more negative urine samples in the first 16 weeks compared with the placebo group.

Interpretation

Treatment options for opioid dependence are limited and diversion of the treatment drug remains a significant issue. This study demonstrated that buprenorphine implants improved compliance and reduced illicit drug use compared with placebo. The advantage of a buprenorphine implant is reduced drug diversion. The accompanying editorial highlights limitations of the study and notes some advances for the field of opioid dependence.