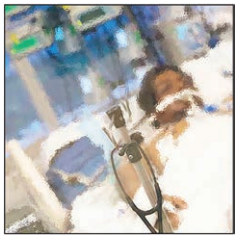
SCIENCE, MEDICINE, AND THE ANESTHESIOLOGIST

ANESTHESIOLOGY

Deborah J. Culley, M.D., Editor

Key Papers from the Most Recent Literature Relevant to Anesthesiologists



Effect of flexible family visitation on delirium among patients in the intensive care unit: The ICU Visits randomized clinical trial. JAMA 2019; 322:216–28.

Many hospitals have instituted flexible intensive care unit (ICU) visiting hours but the effect on clinical outcomes remains uncertain. This cluster-crossover randomized trial set out to determine whether a flexible ICU family visitation policy would reduce inpatient delirium. It also looked at whether it effected ICU-acquired infections, family anxiety or depression, and ICU staff burnout. Participants included 1,685 patients, 1,060 family members, and 737 clinicians at 36 adult ICUs. For the study, flexible visitation expanded hours to 12 per day and included in-person family education. Restricted hours meant following usual policy, which was a median of 1.5 h of family visitation daily. The authors found that ICU visitation policies did not affect the incidence of delirium (flexible: 19%, restricted: 20% adjusted difference, –1.7% [95% CI, –6.1% to 2.7%]; $P = 0.44$). Three of nine outcomes showed significant between-group variations based on visitation policy, including ICU-acquired infections (4% *vs.* 5%) and staff burnout (22% *vs.* 25%). With flexible visitation, family members experienced improvements in median anxiety (6 *vs.* 7) and depression scores (4 *vs.* 5). *(Article Selection: Martin J. London. Image: J. P. Rathmell.)*

Take home message: Flexible family visitation policies in an ICU may not reduce the risk of postoperative delirium but may have other positive effects on family and faculty.

Effect of drug disposal bag provision on proper disposal of unused opioids by families of pediatric surgical patients: A randomized clinical trial. JAMA Pediatr 2019 Jun 24 [Epub ahead of print].

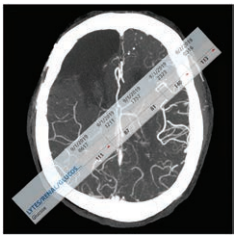
Providing patients with opioid disposal products before hospital discharge may help combat opioid abuse and diversion. This study examined whether providing a drug disposal bag increased proper opioid disposal among the families of pediatric patients. Parents of children who had outpatient otolaryngologic or urologic surgery at a major children's hospital and received an opioid prescription participated in this randomized trial. Intervention families received an activated charcoal drug disposal bag plus standard discharge instructions regarding proper opioid storage and disposal. Control families received only the discharge instructions. Participants completed two questionnaires: one at discharge and one 2 to 4 weeks later. Proper opioid disposal was the primary outcome. Among 202 parents, 181 completed follow-up; participation was evenly split between arms. Families who received a disposal bag were more likely to report proper disposal: 66 families (71.7%) *versus* 50 families without a bag (56.2%; 95% CI, 1.7% to 29.3%; $P = 0.03$). Among families who had leftover opioids, a higher percentage of those who received a disposal kit reported proper disposal: 85.7% *versus* 64.9% without a kit (95% CI, 7.6% to 34.0%). *(Article Selection: J. David Clark. Image: The Noun Project.)*

Take home message: This study suggests that providing drug disposal bags to families of children receiving postoperative opioids increased the likelihood of excess opioid disposal.

Association of duration and type of surgical prophylaxis with antimicrobial-associated adverse events. JAMA Surg 2019; 154:590–8.

Antimicrobial prophylaxis offers benefits in the perioperative setting, but the harmful effects associated with continuing prophylaxis after skin closure are not well understood. This study used rates of surgical site infection, acute kidney injury, and Clostridium difficile infection to explore an association between the type of antibiotic prophylaxis and duration on adverse outcomes. This retrospective cohort study included patients from Veterans Affairs who underwent cardiac, joint replacement, colorectal, and vascular procedures during a 5-yr period. The authors analyzed the duration of postoperative antimicrobial prophylaxis in daily increments for up to 3 days in 79,058 patients. After stratifying and adjusting for multiple factors, the authors found that surgical site infection did not correlate with treatment length. However, the odds of acute kidney injury and Clostridium difficile progressively increased with each additional day of antibiotic prophylaxis following both cardiac and noncardiac surgeries such that administration of antibiotics for 72 h after surgery was associated with an increased odds ratio of 1.79 (95% CI, 1.27 to 2.53) for the development of acute kidney injury in noncardiac surgical procedures which is similar to that in cardiac surgery (odds ratio 1.82; 95% CI, 1.54 to 2.16). *(Article Selection: Beatrice Beck-Schimmer. Image: J. P. Rathmell.)*

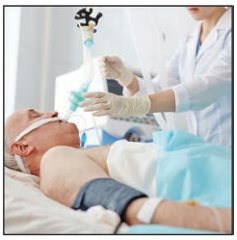
Take home message: Prolonged antimicrobial prophylaxis was associated with higher odds of postoperative acute kidney injury and Clostridium difficile infection after surgery.



Intensive vs standard treatment of hyperglycemia and functional outcome in patients with acute ischemic stroke: The SHINE randomized clinical trial. JAMA 2019; 322:326–35.

Hyperglycemia in the setting of acute ischemic stroke is common and is associated with adverse outcomes. The SHINE trial examined whether intensive hyperglycemia treatment is effective in this setting. Participants included adults with acute ischemic stroke and glucose concentrations of greater than 110 mg/dl (if diabetic) or 150 mg/dl (if not diabetic) at 63 U.S. hospitals (n = 1,151). Patients were randomized to receive continuous IV insulin with a target blood glucose concentration of 80 to 130 mg/dl (4.4 to 7.2 mmol/l) or subcutaneous insulin on a sliding scale with a target blood glucose concentration of 80 to 179 mg/dl (4.4 to 9.9 mmol/l). In the intensive treatment group, the mean blood glucose level was 118 mg/dl (6.6 mmol/l) and 179 mg/dl (9.9 mmol/l) in the standard treatment group. However, only patients in the experimental group experienced severe hypoglycemia (15/581 [2.6%]; risk difference, 2.58% [95% CI, 1.29% to 3.87%]). There was no statistically significant difference in the percentage of patients who achieved a favorable outcome based on the 90-day modified Rankin Scale score (intensive treatment: 21%; standard treatment: 22%). The adjusted relative risk was 0.97 (95% CI, 0.87 to 1.08, $P = 0.55$; unadjusted risk difference, −0.83% [95% CI, −5.72% to 4.06%]). Accordingly, the trial was stopped for futility. *(Article Selection: Laszlo Vutskits. Image: J. P. Rathmell.)*

Take home message: For patients with acute ischemic stroke, treatment with intensive *versus* standard glucose control for up to 72 h had no effect on functional outcome at 90 days.



Standards for studies of neurological prognostication in comatose survivors of cardiac arrest: A scientific statement from the American Heart Association. Circulation 2019; 140:e517–42.

Patient mortality remains high after cardiac arrest. Massive brain injuries are believed to account for most patient deaths after cardiac arrest. If physicians were better able to predict outcomes for these patients, futile treatments could be avoided and proper care continued for patients who are more likely to recover neurologic function. The American Heart Association Emergency Cardiovascular Care Science Subcommittee convened a writing group composed of adult and pediatric experts in adult and pediatric neurology, cardiology, emergency medicine, intensive care medicine, and nursing to assess the current state of knowledge about prognostication for these patients and when life-sustaining treatment should be withdrawn. The writing group concluded that the existing body of research into neurologic prognostication is of overall low quality, leading to a lack of clinical confidence in predictors and outcomes. Their suggested approach is to develop neurologic function index tests that directly correlate with patient outcomes and quality of life measures. *(Article Selection: Martin J. London. Image: ©gettyimages.)*

Take home message: The ability to identify patients who are likely to have either a good or poor neurologic outcome after cardiac arrest remains low.

Impact of dexmedetomidine on long-term outcomes after noncardiac surgery in elderly: 3-year follow-up of a randomized controlled trial. Ann Surg 2019; 270:356–63.

Postoperative delirium, while common in the elderly, is associated with a variety of both short- and long-term negative outcomes. This randomized clinical trial compared the long-term outcomes of low-dose dexmedetomidine *versus* placebo in 700 patients. The authors previously reported that patients who had stayed in the intensive care unit after noncardiac surgery and were treated with dexmedetomidine were less likely to develop delirium, but the effect on long-term outcomes were unknown. The authors interviewed patients or family members at a 3-yr follow-up to assess survival and cognitive function. Overall, the 3-yr survival rate was comparable between the two groups, with 114 deaths in the intervention group and 122 deaths in the placebo group (hazard ratio 0.87; 95% CI, 0.68 to 1.13; $P = 0.303$). However, patients in the dexmedetomidine group had significantly higher survival rates at 6 months, 1 yr, and 2 yr (rate difference of 5.2%, 5.3%, and 6.7%, respectively; $P < 0.05$). Among 3-yr survivors, patients in the intervention group had significantly better cognitive function and quality of life scores in the physical, psychologic, social relationships, and environment domains when compared to those that received placebo ($P < 0.001$). *(Article Selection: Deborah J. Culley. Image: J. P. Rathmell.)*

Take home message: Among elderly patients admitted to intensive care unit after noncardiac surgery, low-dose dexmedetomidine infusion may not modify 3-yr survival, although it may increase survival for up to 2 yr. Importantly, this study suggests that dexmedetomidine administration in the intensive care unit may be associated with improved cognitive function and quality of life in 3-yr survivors.

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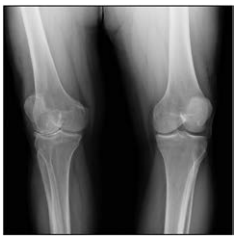
Effect of albuterol premedication vs placebo on the occurrence of respiratory adverse events in children undergoing tonsillectomies: The REACT randomized clinical trial. JAMA Pediatr 2019; 173:527–33.

As many as half of the children who undergo tonsillectomy have a surgery-related respiratory adverse event. This study investigated whether pediatric tonsillectomy patients who were treated with inhaled albuterol sulfate (salbutamol sulfate) preoperatively were less likely to experience adverse perioperative respiratory events. The REACT trial was a randomized, triple-blind, placebo-controlled trial conducted in Perth, Australia, among 484 children up to 8 yr of age who underwent tonsillectomy. Patients received either albuterol (two actuations, 200 μg) or placebo preoperatively, and the primary outcome was the development of bronchospasm, laryngospasm, airway obstruction, desaturation, coughing, or stridor before leaving the postanesthesia care unit. The authors found that nearly half of the children in the placebo group (47.9%, n = 114) had an adverse event, while only about one quarter of the intervention group (27.8%, n = 67) did. Even after adjusting for age, airway management, and severity of obstructive sleep apnea, patients in the placebo arm were more likely to experience adverse respiratory events (odds ratio, 2.8; 95% CI, 1.9 to 4.2; $P < 0.001$). *(Article Selection: Laszlo Vutskits. Image: ©gettyimages.)*

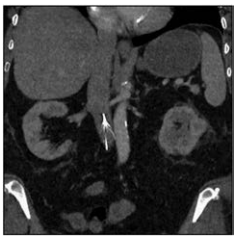
Take home message: Albuterol premedication administered before tonsillectomy in young children may result in fewer adverse perioperative respiratory events when compared to children who did not receive albuterol premedication. Premedication with albuterol should be considered for children undergoing tonsillectomy.



Effect of tanezumab on joint pain, physical function, and patient global assessment of osteoarthritis among patients with osteoarthritis of the hip or knee: A randomized clinical trial. JAMA 2019; 322:37–48.

Many patients with moderate to severe osteoarthritis of the knee or hip do not have adequate pain relief with traditional treatments. This study compared two subcutaneous dosing regimens of the monoclonal antibody tanezumab in patients with osteoarthritis in a randomized, double-blind, multicenter trial. Patients were randomized to receive injections of tanezumab (2.5 mg at day 1 and week 8 or 2.5 mg at day 1 and 5 mg at week 8) or placebo. The primary endpoints were changes at 16 weeks using the Western Ontario and McMasters Universities Osteoarthritis Index Pain and Physical Function and patient global assessment of osteoarthritis indexes. Of the 582 patients who completed the trial, patients in the tanezumab groups experienced statistically significant improvements in joint pain, physical function, and patient global assessment of osteoarthritis over 16 weeks. However, the improvements were limited. Patients in the experimental groups had more total joint replacements, with nearly 7% in the higher-dose group undergoing joint replacement, while less than 2% of the placebo group did. *(Article Selection: J. David Clark. Image: J. P. Rathmell.)*

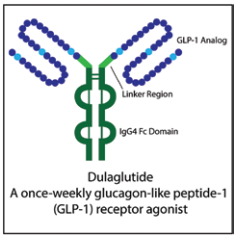
Take home message: In patients with moderate to severe osteoarthritis of the knee or hip, tanezumab, compared with placebo, resulted in improvements in scores assessing pain and physical function, but may be associated with an increase in total joint replacements.



A multicenter trial of vena cava filters in severely injured patients. N Engl J Med 2019; 381:328–37.

Venous thromboembolism is a frequent sequela of major trauma and many severely injured patients cannot receive preventive anticoagulation. This multicenter, randomized, controlled trial investigated whether early placement of an inferior vena cava filter reduced the risk of pulmonary embolism or death in severely injured patients. Investigators randomized 240 severely injured patients who were ineligible for anticoagulation to receive an inferior vena cava filter within 72 h or not. The primary endpoint was a composite of symptomatic pulmonary embolism or any-cause death at 90 days. There were no differences in the primary outcome between the group that received inferior vena cava filters and those that did not (filter group: 14%, control group: 14%; hazard ratio 0.99; 95% CI, 0.51 to 1.94; $P = 0.98$). No patients in the filter group (n = 46) who did not receive preventive anticoagulation developed a pulmonary embolism, but five patients in the control group did (n = 34, 15%), including one who died. Trapped thrombi were found in the inferior venal cava filters of six patients. *(Article Selection: Laszlo Vutskits. Image: J. P. Rathmell.)*

Take home message: Prophylactic placement of a vena cava filter after major trauma may not result in a lower incidence of symptomatic pulmonary embolism or death at 90 days when compared to patients who did not receive a filter.



Dulaglutide and cardiovascular outcomes in type 2 diabetes (REWIND): A double-blind, randomised placebo-controlled trial. Lancet 2019; 394:121–30.

Patients with type 2 diabetes and high glycated hemoglobin A1c concentrations are at high risk for cardiovascular events. This randomized, double-blind, placebo-controlled trial performed at 371 sites in 24 countries and included 9,901 patients studied how the glucagon-like peptide-1 receptor agonist dulaglutide affected the risk of major adverse cardiovascular events when added to existing antihyperglycemic regimens. Participants, who had type 2 diabetes with varying degrees of glycemic control, with and without previous cardiovascular disease, were randomized to either weekly injections of dulaglutide 1.5 mg or placebo. The authors used a composite endpoint of nonfatal myocardial infarction, nonfatal stroke, and cardiovascular-related death. During a median follow-up of 5 yr, 12% of patients in the dulaglutide group (n = 594) experienced the primary outcome for an incidence rate of 2 per 100 person-years. This compares with 13% in control patients (n = 663) for an incidence rate of 3 per 100 person-years (hazard ratio 0.88; 95% CI, 0.79 to 0.99; $P = 0.026$). All-cause mortality was comparable between groups: dulaglutide group: 11%, n = 536; placebo group: 12%, n = 592 (hazard ratio 0.90; 95% CI, 0.80 to 1.01; $P = 0.067$). Interestingly, those individuals randomized to the dulaglutide group had a higher risk of gastrointestinal events when compared to the placebo during follow-up. *(Article Selection: Martin J. London. Image: J. P. Rathmell.)*

Take home message: Dulaglutide should be considered for the management of hyperglycemia in middle-aged and older people with type 2 diabetes with a history of cardiovascular disease or cardiovascular risk factors but may increase the risk of gastrointestinal events.

Demographics, care patterns, and outcomes of patients admitted to cardiac intensive care units: The Critical Care Cardiology Trials Network Prospective North American Multicenter Registry of Cardiac Critical Illness. JAMA Cardiol 2019 Jul 24 [Epub ahead of print].

Evolving demographics, care patterns, and patient outcomes in the modern cardiac intensive care unit are not well understood. This study established the Critical Care Cardiology Trials Network, an investigator-initiated multicenter network of 16 advanced cardiac intensive care units in the United States and Canada. Each cardiac intensive care unit sent data for its consecutive admissions over a 2-month period to the central data coordinating center. This study tracked the demographics, diagnoses, management, and clinical outcomes of 3,049 participants. Of 3,310 admissions during a 1-yr period, three quarters (2,557, 77.3%) were for primary cardiac problems. Of the remaining admissions, 337 (10%) were for postprocedural care, 253 (8%) for mixed general and cardiac problems, and 163 (5%) for general intensive care unit overflow. The most common admission diagnoses were acute coronary syndrome 969 (32%) and heart failure 567 (19%). The incidence of coronary syndrome ranged from 15% to 57% depending on the center. Respiratory insufficiency, shock, unstable arrhythmia, and cardiac arrest were the most common entrance diagnoses. The highest mortality rates occurred in patients with cardiac arrest, cardiogenic shock, and/or needed renal replacement therapy. *(Article Selection: Martin J. London. Image: ©gettyimages.)*

Take home message: Cardiac intensive care units are now seeing diverse patient populations ranging from those admitted for monitoring to those with acute life-threatening illnesses, including acute coronary syndrome and congestive heart failure.

To sleep, perchance to dream: Acute and chronic sleep deprivation in acute care surgeons. J Am Coll Surg 2019; 229:166–74.

In-house call has been associated with disrupted sleep. The purpose of this prospective study was to evaluate sleep deprivation in acute care surgeons taking in-house call. Data on age, sex, in-house call schedule, hours and pattern of each sleep stage, and total hours of sleep over a 3-month period of time were gathered. Nights with in-house call were excluded from the study. Sleep was categorized as normal, acute sleep deprivation, or chronic sleep deprivation in 17 acute care surgeons from two level 1 trauma centers. Sixty-five percent of sleep patterns were categorized as either acute or chronic sleep deprivation. Sleep patterns consistent with acute and chronic sleep deprivation were noted on postcall day 1 but peaked on postcall day 2 and were not back to baseline until postcall day 3 ($P < 0.05$), suggesting that a large percentage of surgeons taking call at level 1 trauma centers experience acute and chronic sleep deprivation. *(Article Selection: Deborah J. Culley. Image: ©gettyimages.)*

Take home message: In-house call among surgeons at level 1 trauma centers may be associated with acute and chronic sleep disturbances.

 DOI: 10.1097/ALN.0000000000003013