

Key Papers from the Most Recent Literature Relevant to Anesthesiologists



Effect of a strategy of a supraglottic airway device vs tracheal intubation during out-of-hospital cardiac arrest on functional outcome: The AIRWAYS-2 randomized clinical trial. JAMA 2018; 320:779–91.

The best approach to manage the airway during out-of-hospital cardiac arrest remains unknown. This multicenter randomized trial was designed to determine whether a supraglottic airway device is superior to tracheal intubation as the initial airway management strategy in adults with out-of-hospital cardiac arrest. Paramedics from four ambulance services were randomized 1:1 to use either tracheal intubation or supraglottic airway device for initial airway management. The primary outcome was modified Rankin Scale score at hospital discharge and 30 days later. In the supraglottic airway group, 311 of 4,882 patients (6.4%) had a good outcome (score range, 0 to 3) versus 300 of 4,407 patients (6.8%) in the intubation group. The adjusted risk difference was -0.6% (95% CI, -1.6 to 0.4%). Initial ventilation was successful in 4,255 of 4,868 patients (87.4%) in the supraglottic airway group compared with 3,473 of 4,397 patients (79.0%) in the tracheal intubation (adjusted risk difference, 8.3% [95% CI, 6.3 to 10.2%]). However, patients randomized to receive intubation were less likely to receive advanced airway management (3,419 of 4,404 patients [77.6%] vs. 4,161 of 4,883 patients [85.2%]). (Article Selection: Laszlo Vutskits. Image: P. L. Georgeadis, Brigham and Women's Hospital, Boston, Massachusetts.)

Take home message: Using a supraglottic airway device for advanced airway management for out-of-hospital cardiac arrest may not improve patient outcomes.



Effect of mobile device-supported single-patient multi-crossover trials on treatment of chronic musculoskeletal pain: A randomized clinical trial. JAMA Intern Med 2018; 178:1368–77.

Individually designed single-patient multicrossover (n-of-1) trials can facilitate tailored treatments but are potentially burdensome thus limiting uptake in research and practice. This clinical trial studied whether patients randomized to participate in an n-of-1 trial supported by a mobile health app would experience less chronic musculoskeletal pain compared with patients assigned to usual care. Intervention patients used a desktop interface to select treatments and trial parameters for an n-of-1 trial comparing two pain management regimens. The app provided reminders to take designated treatments on assigned days and to upload responses to daily questions on pain and treatment-associated adverse effects. The primary outcome was change in the PROMIS (Patient-Reported Outcomes Measurement Information System) pain-related interference 8-item short-form scale from baseline to 6 months. Among the

215 patients enrolled in the study, pain interference was reduced in both groups at 6-month follow-up although there were no differences between the intervention (n = 108) and the control group (n = 107) (-1.36 points; 95% CI, -2.91 to 0.19 points; $P = 0.09$). In the intervention group; 88% (n = 86) agreed that the app could help them manage their pain. (Article Selection: J. David Clark. Image: ©ThinkStock.)

Take home message: While n-of-1 trials are feasible for the management of pain and may enhance patient satisfaction, they are not always associated with improved pain inference 6 months later.

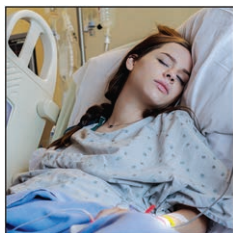


Opioid-prescribing guidelines for common surgical procedures: An expert panel consensus. J Am Coll Surg 2018; 227:411–8.

The lack of multidisciplinary procedure-specific prescribing guidelines contributes to the wide variation in postoperative opioid prescribing practices. This study hypothesized that a single-institution, multidisciplinary expert panel can establish consensus on ideal opioid prescribing for select common surgical procedures. The authors used a multidisciplinary expert panel that included surgeons, pain specialists, outpatient surgical nurse practitioners, surgical residents, patients, and pharmacists to develop consensus ranges for outpatient opioid prescribing at the time of discharge after 20 common procedures. The guidelines focused on opioid-naïve adults without chronic pain undergoing uncomplicated procedures in eight surgical specialties. The number of opioid tablets was defined using oxycodone 5-mg oral equivalents. Ibuprofen was recommended for all patients unless medically contraindicated. The maximum number of opioid tablets varied by procedure (median, 12.5 tablets), with panel recommendations of 0 opioid tablets for 3 of 20 (15%) procedures, 1 to 15

opioid tablets for 11 of 20 (55%) procedures, and 16 to 20 tablets for 6 of 20 (30%) procedures. Interestingly, patients often voted for lower opioid prescriptions than surgeons. (Article Selection: Deborah J. Culley. Image: ©ThinkStock.)

Take home message: Institutional procedure-specific prescribing recommendations may help reduce the number of opioids prescribed after surgery.



Intravenous remifentanyl patient-controlled analgesia versus intramuscular pethidine for pain relief in labour (RESPITE): An open-label, multicentre, randomised controlled trial. Lancet 2018; 392:662–72.

Nearly a third of women receiving pethidine for labor pain will require an epidural, which may increase the risk of an instrumented vaginal delivery. Remifentanyl patient-controlled analgesia (PCA) in labor is a seldom-used alternative to pethidine. This study evaluated the incidence of progression to epidural analgesia among women using remifentanyl PCA compared with pethidine. The authors randomly assigned eligible participants to either the intravenous remifentanyl PCA group (40- μ g bolus on demand with a 2-min lockout) or the intramuscular pethidine group (100 mg every 4 h, up to 400 mg in 24 h). The primary outcome was the proportion of women who received epidural analgesia after enrollment for pain relief in labor. The proportions of epidural conversion were 19% (39 of 201) in the remifentanyl PCA group and 41% (81 of 199) in the pethidine group (risk ratio, 0.48; 95% CI, 0.34 to 0.66; $P < 0.0001$). There

were no serious adverse events or drug reactions directly attributable to either analgesic during the study. Remifentanyl PCA halved the proportion of epidural conversions, which challenges routine pethidine use as standard of care in labor. (Article Selection: Laszlo Vutskits. Image: ©ThinkStock.)

Take home message: The use of remifentanyl to treat labor pain may decrease the risk of epidural placement when compared to pethidine.

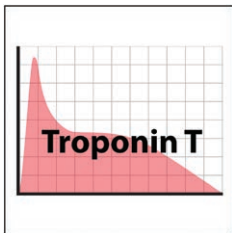


Quality of care in the United Kingdom after removal of financial incentives. *N Engl J Med* 2018; 379:948–57.

The role of pay-for-performance measures in improving the quality of care remains unknown. This study consisted of interrupted time-series analyses of electronic medical record data from 2010 to 2017 for 12 quality indicators in the United Kingdom's Quality and Outcomes Framework for which financial incentives were removed in 2014 and six indicators for which incentives were maintained. Data from 20 million registered patients demonstrated decreases in documented quality of care for all 12 indicators in the first year after the removal of pay-for-performance incentives. The greatest reductions were for indicators related to health advice, with a reduction of 62.3 percentage points (95% CI, –65.6 to –59.0) in electronic medical record documentation of lifestyle counseling for patients with hypertension. Interestingly, there was little change in performance on the six quality measures for which pay-for-performance incentives were maintained. This study suggests that incentive removal and electronic medical record changes can affect

quality of patient care. (Article Selection: J. David Clark. Image: ©ThinkStock.)

Take home message: Removal of pay-for-performance on quality measures may decrease documentation of quality-of-care indicators.

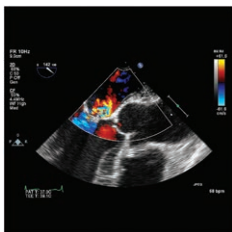


High-sensitivity troponin in the evaluation of patients with suspected acute coronary syndrome: A stepped-wedge, cluster-randomised controlled trial. *Lancet* 2018; 392:919–28.

High-sensitivity cardiac troponin assays allow for use of lower troponin thresholds for the diagnosis of myocardial infarction, but it is less clear whether this will improve patient outcomes. This study examined whether the introduction of a high-sensitivity cardiac troponin I assay with a sex-specific 99th centile diagnostic threshold would reduce myocardial infarction or cardiovascular death in patients with suspected acute coronary syndrome. Five hospitals each were randomly allocated to early or late implementation, in which the high-sensitivity assay was introduced immediately after the 6-month validation phase or deferred for a further 6 months. The primary outcome was subsequent myocardial infarction or death from cardiovascular causes at 1 yr after initial presentation. Seventeen percent of the 10,360 patients with myocardial injury or infarction were identified by the high-sensitivity cardiac

troponin I assay but not the contemporary assay. In those patients, subsequent myocardial infarction or cardiovascular death within 1 yr occurred in 105 (15%) of 720 patients in the validation phase and 131 (12%) of 1,051 patients in the implementation phase (adjusted odds ratio for implementation vs. validation phase, 1.10; 95% CI, 0.75 to 1.61; $P = 0.620$). (Article Selection: Laszlo Vutskits. Image: J. P. Rathmell.)

Take home message: The use of high-sensitivity cardiac troponin I assays may identify more patients with myocardial injury or infarction, but this was not associated with a lower incidence of myocardial infarction or death 1 yr later.

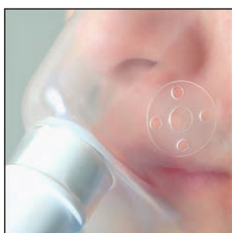


Transcatheter mitral-valve repair in patients with heart failure. *N Engl J Med* 2018 Sep 23 [Epub ahead of print].

Patients with heart failure who have mitral regurgitation due to left ventricular dysfunction face a poor prognosis, but it is unclear whether transcatheter mitral-valve repair improves outcomes. This study enrolled 614 patients with heart failure and moderate-to-severe or severe secondary mitral regurgitation who remained symptomatic despite guideline-directed medical therapy. Patients were randomized 1:1 to transcatheter mitral-valve repair plus medical therapy or medical therapy alone. The primary outcome was all hospitalizations for heart failure within 24 months. The primary safety endpoint was freedom from device-related complications at 12 months compared with a prespecified objective performance goal of 88.0%. The annualized rate of all hospitalizations for heart failure within 24 months was 35.8% per patient-year in the device group versus 67.9% per patient-year in the control group (hazard ratio, 0.53; 95% CI, 0.40 to 0.70; $P < 0.001$) and the freedom from device-related complications at 12 months was 96.6% ($P < 0.001$).

The authors concluded that transcatheter mitral-valve repair resulted in a lower heart failure hospitalization rate and lower all-cause mortality within 24 months than medical therapy alone. (Article selection: Martin J. London. Image: J. P. Rathmell.)

Take home message: Transcatheter mitral-valve repair may be associated with fewer hospitalizations for heart failure when compared to medical therapy alone in high risk patients with a low risk of device related complications.



Effect of oxygen vs room air on intrauterine fetal resuscitation: A randomized noninferiority clinical trial. *JAMA Pediatr* 2018; 172:818–23.

The majority of laboring women receive supplemental oxygen to reverse perceived fetal hypoxemia and prevent fetal acidemia. The safety of this practice is not clear as data suggest that neonatal hyperoxygenation may be harmful. This randomized, unblinded study tested the hypothesis that room air is noninferior to oxygen in improving fetal metabolic status among patients with category II fetal heart tracings. Laboring women with at-term singleton pregnancies who developed category II tracings in labor were randomized 1:1 to room air or oxygen. The intervention cohort received 10 l of oxygen/min by nonbreather facemask until delivery. The primary outcome was umbilical artery lactate and noninferiority was defined as a mean difference between groups of less than 9.0 mg/dl (1.0 mmol/l). A total of 99 patients with paired cord gases were included in the modified intention-to-treat analysis. There was no difference in umbilical artery lactate between the group treated with oxygen when compared to those treated with room air (mean, 30.6 mg/dl

[95% CI, 27.0 to 34.2 mg/dl] vs. 31.5 mg/dl [95% CI, 27.9 to 36.0 mg/dl]; $P = 0.69$). The mean difference in lactate was 0.9 mg/dl (95% CI, –4.5 to 6.3 mg/dl) suggesting that room air was not inferior to oxygen. (Article selection: Laszlo Vutskits. Image: ©ThinkStock.)

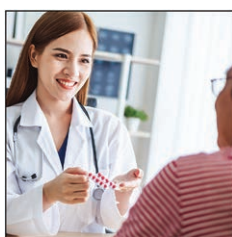
Take home message: Room air may be an acceptable alternative to supplemental oxygen in laboring patients with category II fetal heart tracings.



Use of aspirin to reduce risk of initial vascular events in patients at moderate risk of cardiovascular disease (ARRIVE): A randomised, double-blind, placebo-controlled trial. *Lancet* 2018; 392:1036–46.

The use of aspirin in the primary prevention of cardiovascular events remains controversial among moderate risk patients. This study assessed the efficacy and safety of aspirin *versus* placebo in patients with a moderate estimated risk of a first cardiovascular event. Patients were randomized 1:1 to receive enteric-coated aspirin tablets (100 mg) or placebo tablets, once daily. The primary efficacy endpoint was a composite outcome of time to first occurrence of cardiovascular death, myocardial infarction, unstable angina, stroke, or transient ischemic attack. In the intention-to-treat analysis, the primary endpoint occurred in 269 of 6270 (4.29%) patients in the aspirin group *versus* 281 of 6,276 (4.48%) patients in the placebo group (hazard ratio, 0.96; 95% CI, 0.81 to 1.13; $P = 0.6038$). The authors theorized that the much-lower-than-expected event rate probably reflects contemporary risk-management strategies, making the study more representative of a low-risk population. Thus, the role of aspirin in primary prevention among moderate-risk patients may not have been addressed in this study. (Article selection: Laszlo Vutskits. Image: J. P. Rathmell.)

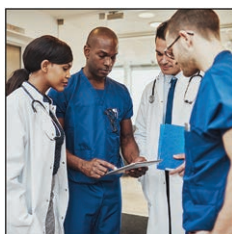
Take home message: The role of aspirin for the primary prevention of cardiovascular events in moderate risk patients remains unclear.



Effect of aspirin on cardiovascular events and bleeding in the healthy elderly. *N Engl J Med* 2018; 379:1509–18.

Aspirin is commonly used as a secondary prevention of cardiovascular events. However, its role in the primary prevention of cardiovascular disease is unclear. The authors enrolled community-dwelling adults in Australia and the United States who were 70 yr of age or older without cardiovascular disease, dementia, or disability. Participants received either 100 mg of enteric-coated aspirin or placebo. The secondary endpoints described in this study include major hemorrhage and cardiovascular disease (fatal coronary heart disease, nonfatal myocardial infarction, stroke, or hospitalization for heart failure). After a median follow-up of 4.7 yr, the cardiovascular disease rate was 10.7 events per 1,000 person-years with aspirin ($n = 9,525$) and 11.3 events per 1,000 person-years with placebo ($n = 9,589$); (hazard ratio, 0.95; 95% CI, 0.83 to 1.08). The rate of major hemorrhage was 8.6 events and 6.2 events per 1000 person-years, respectively (hazard ratio, 1.38; 95% CI, 1.18 to 1.62; $P < 0.001$). Low-dose aspirin for the primary prevention of cardiac events in older was associated with a significantly higher risk of major hemorrhage without the benefit a lower risk of cardiovascular disease. (Article selection: Deborah J. Culley. Image: ©ThinkStock.)

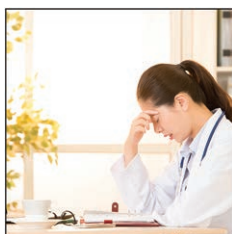
Take home message: Treatment with low dose aspirin for the prevention of primary cardiac events in older patients may be associated with an increased risk of hemorrhage without reducing the risk of subsequent cardiac disease.



Association of clinical specialty with symptoms of burnout and career choice regret among US resident physicians. *JAMA* 2018; 320:1114–30.

It is unknown whether rates for symptoms of burnout among resident physicians vary by clinical specialty and if individual factors measured during medical school relate to burnout risk and career choice regret during residency. First-year medical students completed a baseline questionnaire. Participants were invited to respond to two questionnaires; one during medical school year 4 and one during residency year 2. Among 4,696 resident physicians, 3,588 (76.4%) completed the questionnaire during the second year of residency (median age, 29 [interquartile range, 28.0 to 31.0] yr; 1,822 [50.9%] were women). Symptoms of burnout were reported by 1,615 of 3,574 resident physicians (45.2%; 95% CI, 43.6 to 46.8%). Career choice regret was reported by 502 of 3,571 resident physicians (14.1%; 95% CI, 12.9 to 15.2%). In a multivariable analysis, training in urology, neurology, emergency medicine, and general surgery were associated with higher relative risks of reported symptoms of burnout (range of relative risks, 1.24 to 1.48) compared to training in internal medicine. The authors concluded that symptoms of burnout and career choice regret were prevalent but varied substantially by clinical specialty. (Article selection: Laszlo Vutskits. Image: ©ThinkStock.)

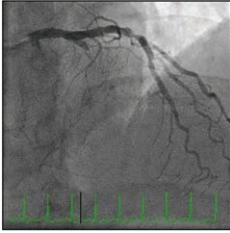
Take home message: Symptoms of burnout and career choice regret in second-year residents vary considerably by clinical specialty.



Prevalence of burnout among physicians: A systematic review. *JAMA* 2018; 320:1131–50.

The overall prevalence of burnout among physicians is unknown but an accurate estimate would have important health policy implications. The authors searched EMBASE, ERIC, MEDLINE/PubMed, psycARTICLES, and psycINFO for studies on the prevalence of physician burnout to extract burnout prevalence and study characteristics. Methodological variations and statistical heterogeneity made quantitative pooling inappropriate. The authors identified 182 studies involving 109,628 individuals in 45 countries. Studies used at least 142 unique definitions for meeting overall burnout or burnout subscale criteria. Among studies using instruments based on the Maslach Burnout Inventory, there were at least 47 distinct definitions of overall burnout prevalence and at least 26 definitions of emotional exhaustion, depersonalization, and low personal accomplishment prevalence. Overall burnout prevalence ranged from 0 to 80.5%. Emotional exhaustion, depersonalization, and low personal accomplishment prevalence ranged from 0 to 86.2%, 0 to 89.9%, and 0 to 87.1%, respectively. These findings preclude definitive conclusions about the prevalence of burnout and highlight the importance of developing a consensus definition and of standardizing measurement tools to assess chronic occupational stress in physicians. (Article selection: Laszlo Vutskits. Image: ©ThinkStock.)

Take home message: Consensus definitions and standardized measurement tools are needed to accurately assess burnout among physicians.



2018 ESC/EACTS guidelines on myocardial revascularization. *Eur Heart J* 2018 Aug 25 [Epub ahead of print].

The European Society of Cardiology and European Association for Cardio-Thoracic Surgery recently issued revised guidelines on myocardial revascularization. There are a number of key messages from these guidelines that are relevant to anesthesiologists. Not surprisingly, the prognostic and symptomatic benefits of myocardial revascularization depend on the completeness of revascularization. Diabetes mellitus and anatomical complexity of coronary artery disease determine the relative benefits of percutaneous interventions and coronary artery bypass graft. Both percutaneous cardiac interventions and coronary artery bypass graft are equally reasonable and sometimes equally problematic options. Timely percutaneous cardiac interventions remain the mainstay of treatment of acute cardiac syndromes. After percutaneous cardiac interventions in the setting of acute cardiac syndrome, the choice of further revascularization modality should follow specific criteria. Radial access is preferred for any percutaneous cardiac interventions. Drug-eluting stents are recommended for any percutaneous cardiac intervention. Even though 6 months of dual antiplatelet therapy is generally recommended after percutaneous cardiac interventions and 12 months after acute coronary syndrome this should be individualized for each patient. (Article selection: Martin J. London. Image: J. P. Rathmell.)

Take home message: The European Society of Cardiology and European Association for Cardio-Thoracic Surgery have issued revised guidelines on myocardial revascularization.



Association of gestational diabetes with maternal disorders of glucose metabolism and childhood adiposity. *JAMA* 2018; 320:1005–16.

This study, a long-term follow-up to the Hyperglycemia and Adverse Pregnancy Outcome Study, examined associations of gestational diabetes with maternal glucose metabolism and childhood adiposity at 10 to 14 yr postpartum. The primary maternal outcome was a disorder of glucose metabolism (composite of type 2 diabetes or prediabetes). The primary outcome for children was being overweight or obese. The criteria for gestational diabetes were met by 14.3% (672/4697) of mothers overall and by 14.1% (683/4832) of mothers of participating children. Among mothers with gestational diabetes, 52.2% (346/663) developed a disorder of glucose metabolism *versus* 20.1% (791/3946) of mothers without gestational diabetes (odds ratio, 3.44 [95% CI, 2.85 to 4.14]; risk difference, 25.7% [95% CI, 21.7 to 29.7%]). Among women with gestational diabetes there was a higher maternal risk for a disorder of glucose metabolism during long-term follow-up after pregnancy. Among children of mothers with gestational

diabetes *versus* those without it, the difference in childhood overweight or obesity defined by body mass index cutoffs was not statistically significant. (Article selection: Laszlo Vutsits. Image: ©ThinkStock.)

Take home message: Gestational diabetes may be a predictor for the subsequent development of disorders of glucose metabolism in the mother but may have no effect on childhood obesity.



Impact of a novel preoperative patient-centered surgical wellness program. *Ann Surg* 2018; 268:650–6.

Hospital-acquired infections are often preventable and may harm patient outcomes and burden a healthcare system. The question is whether preoperative wellness efforts may significantly decrease the risk of infections. This study evaluated whether a preoperative wellness bundle significantly decreased the risk of hospital-acquired infections. A group of 12,396 surgical patients received a wellness bundle during preoperative screening at an urban academic medical center. The wellness bundle consisted of a chlorhexidine bath solution, immunonutrition supplements, incentive spirometer, topical mupirocin for the nostrils, and smoking cessation information. Study staff performed structured patient interviews, observations, and standardized surveys throughout the perioperative period. The authors compared hospital-acquired infections among patients in the wellness program and compared them to patients in a nonintervention group using Fisher exact test, logistic regression, and Poisson regression. Compliance with each element was

high in the intervention group (80% mupirocin, 72% immunonutrition, 71% chlorhexidine bath, 67% spirometer). The intervention group had statistically significant reductions in surgical site infections ($P = 0.04$), *Clostridium difficile* ($P = 0.02$), catheter associated urinary tract infections ($P = 0.007$), and patient safety indicators ($P < 0.001$). (Article selection: Deborah J. Culley. Image: ©ThinkStock.)

Take home message: A preoperative patient-centered surgical wellness program may be associated with a decrease in hospital-acquired infections.