Key Papers from the Most Recent Literature Relevant to Anesthesiologists

ANESTHESIOLOGY

Deborah J. Culley, M.D., Editor

Patient-centered outcome spectrum: An evidence-based framework to aid in shared decision-making. Ann Surg 2017 Sep 15 [Epub ahead of print].

It is currently difficult for physicians and patients to preoperatively anticipate global health outcomes for older surgical patients. This study used multiple discrete outcome approximations to create a global outcome score that could be used to enhance shared decision-making discussions. They used the American College of Surgeons National Surgical Quality Improvement Program data files on all patients 65 yr of age and older who had an emergency general surgical procedure between 2012 and 2014. A total of 28,738 patients were included in the study. The authors developed a three-tiered, 30-day, patient-centered outcome spectrum (good, intermediate, and bad outcome). Overall, 46% of the patients had good outcomes, 40% had intermediate outcomes, and 13% had bad outcomes. However, these numbers varied between low- and high-risk patients, with high-risk patients having a 22% likelihood of a good outcome, 49% likelihood of an intermediate outcome, and a 29% likelihood of a bad outcome. This three-tiered, 30-day, patient-centered outcome spectrum may aid patients and physicians as they consider the risk of emergency surgical procedures. *(Summary: Deborah J. Culley. Image: ©ThinkStock.)*

Take home message: A global health outcome score may assist in shared decision-making discussions between practitioners and older surgical patients undergoing emergency surgery.

A randomized controlled trial of postoperative thoracic epidural analgesia versus intravenous patient-controlled analgesia after major hepatopancreatobiliary surgery. Ann Surg 2017; 266:545–54.

The optimal pain control regimen after major hepatobiliary surgery remains controversial and may include thoracic epidural or patient-controlled intravenous analgesia. In this study, 140 patients were randomized in a 2.5:1 strategy to either thoracic epidural (n = 106) or patient-controlled intravenous analgesia (n = 34). The primary outcome was the cumulative pain score (area under the curve) during the first 48 h after surgery. They found that patients receiving a thoracic epidural had significantly lower pain scores (79 [range, 0 to 229] *vs.* 105 [range, 34 to 267] pain-hours, $P = 0.03$) with a 35% reduction in patients experiencing severe pain (7 points or higher on the 10-point pain scale). However, 12% of patients in the thoracic epidural group experienced an analgesia-related complication *versus* 3% in the patient-controlled intravenous analgesia group, although this difference was not statistically significant. Thoracic epidural appears to provide superior postoperative pain control after major hepatobiliary surgery compared to patient-controlled intravenous analgesia, although the risk of analgesia-related complications may warrant further study. *(Summary: Peter Nagele. Image: ©ThinkStock.)*

Take home message: Thoracic epidural analgesia may be associated with better pain scores but a higher risk of analgesia-related complications.

Effect of a modified Hospital Elder Life Program on delirium and length of hospital stay in patients undergoing abdominal surgery: A cluster randomized clinical trial. JAMA Surg 2017; 152:827–34.

Delirium after surgery in elderly patients is common. In this cluster randomized trial, the effects of a modified Hospital Elder Life Program on the incidence of postoperative delirium were investigated among older patients undergoing major abdominal surgery. The modified Hospital Elder Life Program consisted of three protocols administered daily: orienting communication, oral and nutritional assistance, and early mobilization, in addition to usual care. Control patients received usual care. Among the 377 study patients, postoperative delirium occurred in 13 of 196 (6.6%) patients who received the modified Hospital Elder Life Program compared to 27 of 179 (15.1%) patients who received usual care ($P = 0.008$). The results of this study indicate that the implementation of a modified Hospital Elder Life Program may cut the risk of postoperative delirium among elderly patients undergoing major abdominal surgery in half. *(Summary: Peter Nagele. Image: ©ThinkStock.)*

Take home message: Implementation of a modified Hospital Elder Life Program may decrease the risk of postoperative delirium among elderly patients undergoing major abdominal surgery.

Impact of the hospital readmission reduction program on surgical readmissions among Medicare beneficiaries. Ann Surg 2017; 266:617–24.

As a part of the Affordable Care Act financial penalties are placed on hospitals with higher than expected readmission rates in some targeted surgical procedures. This retrospective study used data from the Medicare Provider Analysis in 5,122,240 Medicare beneficiaries undergoing both targeted and nontargeted surgical procedures between 2008 and 2014 to determine whether the Affordable Care Act altered readmission rates in targeted and nontargeted surgical procedures. Between 2008 and 2014 readmission rates declined for both targeted (7% to 5%) and untargeted (17% to 13%) surgical procedures ($P < 0.001$). In addition, there were decreases in the hospital length of stay for both groups but no differences in discharge to a skilled nursing facility. This study suggests that hospitals are responding to financial incentives associated with the Affordable Care Act. *(Summary: Deborah J. Culley. Image: ©ThinkStock.)*

Take home message: The Affordable Care Act financial incentives in the Hospital Readmission Reduction Program have led to a decrease in readmissions without increasing discharge to a skilled nursing facility.

Individualized Metabolic Surgery score: Procedure selection based on diabetes severity. Ann Surg 2017; 266:650–7.

Bariatric surgery has been shown to produce superior glucose control in obese patients when compared to medical therapy. This study retrospectively studied 659 patients with type 2 diabetes that had either a Roux-enY gastric bypass or sleeve gastrectomy and developed a metabolic score based on the duration of the diagnosis of diabetes, the number of preoperative diabetes medications the patient was taking, whether the patient was on insulin, and the degree of glycemic control identified by an HbA_{1c} of less than 7%. In patients with mild type 2 diabetes mellitus (Individualized Metabolic Surgery score of 25 or less), both procedures were associated with significant improvements in remission of diabetes mellitus, but Roux-enY gastric bypass was the suggested procedure. Among patients with intermediate diabetes mellitus (Individualized Metabolic Surgery score of 26 to 95), Roux-enY gastric bypass was superior to sleeve gastrectomy, whereas in patients with severe diabetes mellitus (Individualized Metabolic Surgery score greater than 95), the efficacy of both procedures for remission of diabetes mellitus was low but sleeve gastrectomy was the suggested procedure. The model was validated in a second set of 241 patients in Spain. *(Summary: Deborah J. Culley. Image: ©ThinkStock.)*

Take home message: An Individualized Metabolic Surgery score may be used to identify those patients most likely to have diabetes remission following Roux-enY gastric bypass or sleeve gastrectomy.

Improving adherence to long-term opioid therapy guidelines to reduce opioid misuse in primary care: A cluster-randomized clinical trial. JAMA Intern Med 2017; 177:1265–72.

Reducing the overprescribing of opioids and more carefully managing chronic pain patients receiving these medications are key goals in our approach to America's opioid epidemic. This manuscript describes an intervention designed to enhance guideline-concordant care in a primary care environment. Cluster randomization was used on 53 primary care clinicians and their 985 opioid-receiving patients to randomly assign them into two study arms. The intervention primary care clinicians were aided by an opioid nurse care manager, a web-based electronic registry of their opioid-receiving patients, one-on-one training of the primary care clinicians by an opioid-prescribing expert, and access to electronic decision tools. Control primary care clinicians only had access to the decision-making tools. After 1 yr, patients of intervention primary care clinicians were more likely to have guideline-concordant care, but were no less likely to receive an early refill of opioids (primary endpoints). Additional analyses showed that the intervention was associated with higher rates of dose reduction and opioid discontinuation along with a modest decrease in daily opioid doses. *(Summary: David J. Clark. Image: ©ThinkStock.)*

Take home message: Multicomponent interventions with primary care clinicians may achieve moderate improvements in opioid-prescribing practices.

Effect of systematic intensive care unit triage on long-term mortality among critically ill elderly patients in France: A randomized clinical trial. JAMA 2017; 318:1450–9.

Elderly patients admitted to an intensive care unit have a higher mortality rate when compared to younger patients. This study randomized 3,037 patients, 75 yr of age and older, to a standardized systematic intensive care unit admission group or conventional practice. The authors used a multicenter, cluster-randomized study design involving 24 academic and nonacademic hospitals in France that had at least one intensive care unit and one emergency department between 2012 and 2015. In hospitals randomized to the systematic intensive care unit admission group, the emergency room physician and the intensive care unit physician were required to evaluate the patient and jointly decided whether the patient should be admitted to the intensive care unit. Their primary outcome measure was 6-month mortality. There was a total of 1,273 deaths among these elderly patients and those in the conventional treatment group had a lower death rate (39%) when compared to those in the systematic intensive care unit admission group (45%; relative risk [RR] = 1.16 [95% CI, 1.07 to 1.26], $P < 0.001$) on univariate analysis but there was no differences between the groups when baseline characteristics were included in the analysis (RR = 1.05 [95% CI, 0.96 to 1.14], $P = 0.28$). On secondary analysis, the risk of in-hospital mortality was greater in those patients in the systematic intensive care unit admission group (RR = 1.18 [95% CI, 1.03 to 1.33]), perhaps because those patients were also more ill. *(Summary: Deborah J. Culley. Image: ©ThinkStock.)*

Take home message: A standardized systematic intensive care unit admission process that involves collaborative decisions between the intensive care unit physician and the emergency room physician has been associated with a higher intensive care unit admission rate and a higher in-hospital mortality.

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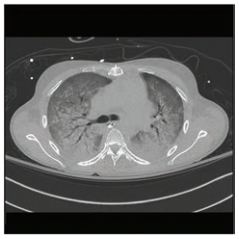
Factors associated with success of clinician-researchers receiving career development awards from the National Institutes of Health: A longitudinal cohort study. Acad Med 2017; 92:1429–39.

Prior studies have demonstrated that less than half of the recipients of K series career development awards go on to achieve independent R01 grants and that women are less likely to do so than men. This study used National Institutes of Health (NIH) RePORTER to identify 1,719 clinician investigators who received a new K08 or K23 award between 2006 and 2009. The authors surveyed 1,708 of these clinician investigators between 2010 and 2011, and 1,275 of them responded to the survey. In 2014 a second survey was administered to the 1,275 prior survey responders of whom 1,066 completed the second survey. The authors identified sex, weekly work hours, K award year, funding institute tier, specialty, mentoring relationships, adequacy of research equipment, feeling responsible to contribute to clinical care, a supportive department, and perceived value in prolifically publishing high-quality research to be predictors of clinician investigator success. The authors note that time for research is important for women to succeed in research and suggest that institutions learn from one another to adopt practices that increase their time to do so. *(Summary: Deborah J. Culley. Image: ©ThinkStock.)*

Take home message: A number of variables predict successful transition from K series awards to independent funding.



Effect of lung recruitment and titrated positive end-expiratory pressure (PEEP) vs low PEEP on mortality in patients with acute respiratory distress syndrome: A randomized clinical trial. JAMA 2017; 318:1335–45.

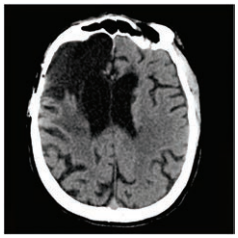
Lung recruitment maneuvers aim to open collapsed lung units in acute respiratory distress syndrome (ARDS) by applying stepwise increases in positive end-expiratory pressure (PEEP), up to 60 cm H_2O. Prior evidence has suggested that lung recruitment in ARDS may exert beneficial effects without increasing the risk for barotrauma. The Alveolar Recruitment for ARDS Trial (ARTS) randomized 1,010 ARDS patients to either lung recruitment and PEEP titration or a control strategy of low PEEP and found that patients in the lung recruitment group had a 6% increase in 28-day all-cause mortality (hazard ratio = 1.20; 95% CI, 1.01 to 1.42). The authors conclude that lung recruitment and titrated PEEP may be associated with increased mortality in patients with moderate to severe ARDS. *(Summary: Peter Nagele. Image: J. P. Rathmell.)*

Take home message: Lung recruitment maneuvers in the setting of moderate to severe ARDS may be associated with an increase in mortality.

Oxygen therapy in suspected acute myocardial infarction. N Engl J Med 2017; 377:1240–9.

Supplemental oxygen is routinely administered in the setting of an acute myocardial infarction, although it is unclear whether this leads to better outcomes in patients that do not have hypoxia at baseline. This study enrolled 6,629 patients with an acute myocardial infarction to receive either supplemental oxygen or ambient air and found that while there were more episodes of hypoxia requiring oxygen therapy in the ambient air group (8%) when compared to the supplemental oxygen group (2%, $P < 0.001$), there were no differences in the primary outcome (1-yr all-cause mortality; hazard ratio [HR] = 0.97; 95% CI, 0.79 to 1.21; $P = 0.80$) or secondary outcomes (reinfarction, new onset atrial fibrillation, atrioventricular block, cardiogenic shock, or cardiac arrest). Intriguingly, the 17,862 patients with confirmed myocardial infarction that were not enrolled in the study during the trial period were at higher risk for all-cause 1-yr mortality and rehospitalization for a myocardial infarction (20.1% *vs.* 8.2% in the study population; HR = 0.38; 95% CI, 0.34 to 0.42; $P < 0.001$). *(Summary: Deborah J. Culley. Image: J. P. Rathmell.)*

Take home message: Administration of oxygen in the setting of an acute myocardial infarction without evidence of hypoxia at baseline may not improve patient outcomes.



Effect of routine low-dose oxygen supplementation on death and disability in adults with acute stroke: The Stroke Oxygen Study randomized clinical trial. JAMA 2017; 318:1125–35.

Undetected hypoxia after a stroke is common and frequently undetected. This study enrolled 8,003 patients with an acute stroke and randomized them to continuous oxygen at 3 l/min *via* nasal cannula if the oxygen saturation was less than or equal to 93% or 2 l/min if it was greater than 93% for 72 h; nocturnal oxygen for 3 nights; or a control group who received oxygen only when clinically indicated. There were no differences in the primary outcome, modified Rankin Scale score, assessed at 90 days between the oxygen group when compared to the control group (odds ratio = 0.97; 95% CI, 0.89 to 1.05; $P = 0.47$) or between continuous and nocturnal oxygen administration (odds ratio = 1.03; 95% CI, 0.93 to 1.13; $P = 0.61$). Similarly, there were no differences in the number of patients that had died, lived independently, or were living at home 90 days after their stroke. *(Summary: Deborah J. Culley. Image: T. M. Leslie-Mazwi, Massachusetts General Hospital.)*

Take home message: Routine low-dose oxygen supplementation after acute stroke may not improve outcomes.

Effect of intravenous ferric carboxymaltose on hemoglobin response among patients with acute isovolemic anemia following gastrectomy: The FAIRY randomized clinical trial. JAMA 2017; 317:2097–2104.

Acute anemia after major cancer surgery is common and negatively influences postoperative outcomes. Correction of acute postoperative anemia by oral iron supplementation aggravates gastrointestinal dysfunction whereas blood transfusions are controversial and do not replenish iron stores. The multicenter Ferric Carboxymaltose for Acute Isovolemic Anemia following Gastrectomy trial randomized 454 patients with gastric cancer undergoing gastrectomy to either ferric carboxymaltose (500 to 1,000 mg as intravenous infusion) or placebo (normal saline) if they developed moderate postoperative anemia (hemoglobin 7 to 10 g/dl) not requiring blood transfusions (less than 7 g/dl) at 5 to 7 days after surgery. Patients receiving ferric carboxymaltose had a 92% response rate (hemoglobin increase of 2 g/dl or more) compared to placebo (54%; absolute difference = 38.2; 95% CI, 33.6 to 42.8; $P = 0.001$), although the incidence rate of adverse events was also higher in the ferric carboxymaltose group. The authors concluded that in patients undergoing radical gastrectomy the use of ferric carboxymaltose might improve recovery from acute postoperative anemia. *(Summary: Peter Nagele. Image: ©ThinkStock.)*

Take home message: Administration of ferric carboxymaltose increases hemoglobin levels after gastric surgery but is associated with an increased risk of adverse events.