**Key Papers from the Most Recent Literature Relevant to Anesthesiologists**

### Anesthesiology

**Deborah J. Culley, M.D., Editor**


Prescription opioid misuse rates have increased in adults more than 50 yr of age, but few studies have focused on this older age group. This study used data from the 2009 to 2014 National Survey on Drug Use and Health surveys to estimate prevalence rates of prescription opioid sources, misuse, and opioid use disorder symptoms. Nearly half (47.7%) of adults 65 yr and older had physician prescriptions as their source of opioid misuse. Patients in the 50 to 64 age range had the second highest rates of misuse (39.2%). Methods of obtaining opioids by younger people including theft, purchases, and gifts from family or friends were least common in adults 65 yr and older. The authors concluded that older adults, particularly those 65 yr and older, use a different pattern of prescription opioid sources than adolescents or younger adults, and that older adults who obtain them from physician sources have a high prevalence of opioid use disorder symptoms. *(Article Selection: J. David Clark. Image: ©ThinkStock.)*

**Take home message:** Physicians are a key source of misused opioids in older adults. This study highlights the potential role clinicians can play in preventing opioid misuse in older patients.


Sex disparities in medicine from training and throughout one’s medical career advancement have improved significantly during the past 50 yr. Unfortunately, disparities remain, perhaps most prominently in academic medicine. This study evaluated sex differences in full professorship among U.S. academic surgeons. Researchers obtained a comprehensive list of surgeons with faculty appointments at U.S. medical schools in 2014, then linked that list to a comprehensive physician database from Doximity, the online networking website for physicians. Data gathered included demographics such as age, sex, years since residency, numbers of publications, clinical trial participation, and surgical subspecialty. Among 11,549 surgeons identified as being on the faculty at U.S. medical schools, about 15% were women (1,692). The percentage of women faculty by rank decreased with seniority: 19.4% of assistant professors (1,072 of 5,538), 13.8% of associate professors (404 of 2,931), and 7.0% of full professors (216 of 3,080). After multivariable analysis, women were less likely to attain the rank of full professor when compared with men (adjusted odds ratio, 0.76; 95% CI, 0.6 to 0.9). *(Article Selection: Beatrice Beck-Schimmer. Image: J. P. Rathmell.)*

**Take home message:** Approximately 15% of U.S. surgical faculty members in academic departments are women. On multivariate analysis, women were less likely to become full professors when compared with male colleagues.


Closure of a patent foramen ovale after unexplained stroke has been controversial. This meta-analysis of randomized controlled trials compared device closure with medical therapy to prevent recurrent stroke for patients with a patent foramen ovale. The primary efficacy endpoint was recurrent stroke, analyzed on an intention-to-treat basis. The primary safety endpoint was new-onset atrial fibrillation. Investigators examined five studies with a total of 3,440 patients. In all, 1,829 patients were randomized to device closure and 1,611 to medical therapy. Across all patients, patent foramen ovale closure was superior to medical therapy for prevention of stroke (hazard ratio, 0.32; 95% CI, 0.13 to 0.82; \( P = 0.02 \)). However, device closure was also associated with an increased risk for the development of atrial fibrillation (risk ratio, 4.68; 95% CI, 2.19 to 10.00; \( P < 0.001 \)). *(Article Selection: Martin J. London. Illustrator: J. P. Rathmell.)*

**Take home message:** In selected patients with unexplained stroke, patent foramen ovale closure may be superior to medical therapy for the prevention a subsequent stroke but is associated with an increased risk of developing atrial fibrillation.

The use of epinephrine for out-of-hospital cardiac arrest is controversial. These concerns led the International Liaison Committee on Resuscitation to call for a placebo-controlled trial to determine whether epinephrine is safe and effective in such patients. PARAMEDIC2 was a randomized, double-blind trial involving 8,014 patients in the United Kingdom with out-of-hospital cardiac arrest. Paramedics at five National Health Service ambulance services gave standard care plus either parenteral epinephrine (4,015 patients) or saline placebo (3,999 patients). The primary outcome was the 30-day survival rate. At 30 days, 130 patients (3.2%) in the epinephrine group were alive compared with 94 (2.4%) in the placebo group (unadjusted odds ratio, 1.39; 95% CI, 1.06 to 1.82; P = 0.02). There was no evidence of a significant difference in the proportion of patients who survived until hospital discharge with a favorable neurologic outcome (2.2% vs. 1.9%); unadjusted odds ratio, 1.18; 95% CI, 0.86 to 1.61). (Article Selection: Laszlo Vutskits. Image: J. P. Rathmell.)

Take home message: In adults with out-of-hospital cardiac arrest, the use of epinephrine increases the 30-day survival rate but not the incidence of severe neurologic impairment.


Conventional pain management after open liver resection involves intravenous patient-controlled analgesia (IV PCA) or epidural analgesia. This blinded, randomized trial assessed the effectiveness of medial open transversus abdominis plane (MOTAP) catheter analgesia compared with IV PCA. Investigators enrolled patients undergoing liver resection through a subcostal incision. They placed two catheters after resection: one in the plane between internal oblique and transversus abdominis and the other in the posterior rectus sheath. Patients were randomized to receive ropivacaine 0.2% (n = 71) or saline (n = 82) through both catheters for 72h. All patients also received IV PCA with hydromorphone. Opioid use during the first 48h was the primary outcome. Patients who received ropivacaine required significantly less opioid than patients who received saline (median 39.6 mg vs. 49.2 mg, P = 0.03). Pain scores at rest and with coughing were significantly lower among patients randomized to the ropivacaine group (P = 0.002) and the median hospital stay was reduced from 6 days to 5 days in these patients. (Article Selection: Deborah J. Culley. Image: J. P. Rathmell.)

Take home message: Medial open transversus abdominis plane (MOTAP) catheter analgesia for the treatment of pain after liver resection may reduce opioid requirements and decrease pain scores.


The state of New York mandated statewide sepsis treatment in 2013 that consists of a 1-h bundle of blood cultures, broad-spectrum antibiotics, and a 20-ml/kg intravenous fluid bolus. However, it is unclear whether accomplishing this goal improves outcomes. To determine the risk-adjusted association between completing the bundle and individual bundle elements with in-hospital mortality, investigators conducted a statewide cohort study from 2014 to 2016. Of 1,179 pediatric patients with sepsis reported from 54 hospitals, 139 patients (11.8%) died. The mean age of study patients was 7.2 yr. Just more than half were male (54.2%) and 44.5% were previously healthy. The entire sepsis bundle was completed within 1 h in 294 patients (24.9%). Antibiotics were administered to 798 patients (67.7%), blood cultures were obtained in 740 patients (62.8%), and the fluid bolus was completed in 548 patients (46.5%) within 1 h. The authors found that completing the entire bundle within 1 h was associated with lower risk-adjusted odds of in-hospital mortality (odds ratio, 0.59; 95% CI, 0.38 to 0.93; P = 0.02). The predicted risk difference was 4.0% (95% CI, 0.9% to 7.0%). However, completion of each individual bundle element within 1 h was not significantly associated with lower risk-adjusted mortality. (Article Selection: Laszlo Vutskits. Image: ©ThinkStock.)

Take home message: Completion of a sepsis bundle within 1 h of admission to the hospital was associated with lower risk-adjusted in-hospital mortality in pediatric patients.


Given that medical practice is uncertain and complex, even outstanding performers will inevitably experience moments of underperformance and failure. The authors interviewed 28 academic physicians about their experiences with underperformance or failure, using constructivist-grounded theory to inform data collection and analysis. Participants’ experiences with struggle ranged from patient errors and academic failures to smaller moments of interpersonal conflict and work-life imbalance. To buffer impact, participants sometimes shifted their focus to an aspect of their identity where they felt successful and sometimes deflected blame for performance gaps. Participants seemed to accept personal responsibility while simultaneously sharing accountability with external forces for underperformance or failure. Paradoxically, participants perceived learners who used these strategies as lacking in insight. The authors concluded that “shifting and sharing” may be an element of reflection and resilience and that recognizing external factors may provide a way to gain perspective and to preserve the self. However, this strategy challenges educators’ assumptions that learners who deflect are avoiding personal responsibility. (Article Selection: Cathleen Peterson-Layne. Image: ©ThinkStock.)

Take home message: Resilience is widely understood to be critical to a successful career in medicine, and when physicians share blame for errors, they may unfairly be perceived as lacking resilience.

Low-dose aspirin appears to have modest benefits in long-term prevention of cardiovascular events, possibly due to standardized dosing that does not take body habitus into consideration. This study analyzed how body weight and height affected outcomes in studies looking at low dose (less than or equal to 100mg) and higher dose (300–325mg or greater than or equal to 500mg) of aspirin in randomized trials for the prevention of cardiovascular events and validated them in trials of aspirin as a secondary prevention of stroke. In 10 trials including 117,279 patients, vascular death benefits were seen in people weighing 50 to 69kg (hazard ratio, 0.75; 95% CI, 0.65 to 0.85) but not in those weighing 70kg or more (hazard ratio, 0.95 [0.86 to 1.04]; 1.09 [0.93 to 1.29]) with the use of low-dose aspirin. Higher doses of aspirin had the opposite interaction with body weight and reduced cardiovascular events only among patients with higher weight (P = 0.02). These data led the authors to conclude that a more tailored dosing strategy for aspirin prophylaxis may be required to decrease the risk of cardiovascular events. (Article Selection: Laszlo Vutskits. Image: ©ThinkStock.)

Take home message: Low-dose aspirin may be efficacious for the prevention of vascular events in patients weighing less than 70kg. In contrast, higher doses of aspirin may be more effective in patients weighing more than 70kg.


Peripheral intravenous catheters are the most common invasive medical devices used in hospitals, but optimal dressing and securement methods are not well established. The SAVE trial compared the effectiveness and costs of three alternative approaches to standard nonbordered polyurethane dressings. Eligible adult patients were randomized 1:1:1:1 to receive tissue adhesive with polyurethane dressing, bordered polyurethane dressing, a securement device with polyurethane dressing, or polyurethane dressing (control) (total n = 1697). The primary outcome was all-cause catheter failure as a composite of complete dislodgement, occlusion, phlebitis, and infection. The authors found that approximately 40% of the patients in each group had peripheral intravenous catheter failure, ranging from 38% in the tissue adhesive with polyurethane group to 43% of those in the control group; none of the three interventions were superior to the control. Skin-related adverse events were by far the most common in the tissue adhesive with polyurethane group (n = 17), while those in the other groups ranged from 2 patients to 8 patients. Total costs of the trial interventions did not differ significantly between groups. (Article Selection: Martin J. London. Image: ©ThinkStock.)

Take home message: Current intravenous dressing and securement methods are commonly associated with catheter failure and poor durability suggesting a need for innovations in effective, durable dressings.


Surgical site infections after colorectal surgery are common, lead to patient harm, and are costly to the healthcare system. This pre-post cohort study evaluated the effectiveness of the Agency for Healthcare Research and Quality Safety Program for Surgery in Hawaii, which had been implemented at all 15 hospitals in the state. The intervention was a statewide implementation of the Comprehensive Unit-Based Safety Program and individualized bundles of interventions to reduce surgical site infections, with a primary endpoint of colorectal surgical site infections. Between January 2013 and June 2015, the collaborative colorectal surgical site infection rate decreased from 12.1% to 4.6% (P < 0.01). The surgical site infection rate exhibited a linear decrease during the 10-quarter period (P = 0.005) and a culture of safety increased in 10 of 12 domains. (Article Selection: Deborah J. Culley. Image: Agency for Healthcare Research and Quality.)

Take home message: Implementation of an Agency for Healthcare Research and Quality Safety Program for Surgery in the state of Hawaii may be associated with a 61.7% decrease in the colorectal surgical site infection rate and an increase in a culture of patient safety.


Functional capacity is an important component of risk assessment for major surgery. This international, prospective cohort study compared preoperative subjective assessment with objective tests of functional capacity for predicting death or complications after major elective noncardiac surgery. The authors recruited 1,401 adult patients who had at least one risk factor for cardiac complications. Anesthesiologists preoperatively assessed participants’ functional capacity in units of metabolic equivalents of tasks graded as poor (less than 4), moderate (4 to 10), or good (greater than 10) and compared them with objective evaluations of functional capacity. The primary outcome was death or myocardial infarction within 30 days after surgery. The investigators found that 28% (2%) of patients died or had a myocardial infarction within 30 days of surgery. Subjective assessment had 19.2% sensitivity (95% CI, 14.2 to 25) and 94.7% specificity (93.2 to 95.9) for identifying patients’ inability to attain four metabolic equivalents during objective functional testing. (Article Selection: Laszlo Vutskits. Image: ©ThinkStock.)

Take home message: Subjective preoperative assessments of a patients’ functional capacity may not correlate with objective measures of functional capacity or be a good predictor of adverse cardiac events.

Little is known about clinical trial participants’ perceptions of the risks of data sharing, but some trial sponsors and investigators urge caution despite the potential benefits. This survey queried 771 current and recent participants from clinical trials at three U.S. academic medical centers. Surveys were distributed by mail (350 completed surveys) and in clinic waiting rooms (421 completed surveys), for an overall response rate of 79%. A total of 93% of participants were very or somewhat likely to allow their data to be shared with university scientists, and 82% were very or somewhat likely to share with scientists in for-profit companies. Less than 8% of respondents felt that the potential negative consequences of data sharing outweighed the benefits. Willingness to share data did not vary significantly by intended purpose although fewer participants were willing to share their data for use in litigation. The respondents’ greatest concerns were that data sharing might make others less willing to enroll in clinical trials, that data would be used for marketing purposes, or that data could be stolen. (Article Selection: Beatrice Beck-Schimmer. Image: ©ThinkStock.)

Take home message: Nearly all clinical trial participants were willing to allow university scientists access to their data, and less than 8% felt that potential consequences of data sharing outweighed the benefits.