SCIENCE, MEDICINE, AND THE ANESTHESIOLOGIST

ANESTHESIOLOGY

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Key Papers from the Most Recent Literature Relevant to Anesthesiologists

Sentinel emotional events: The nature, triggers, and effects of shame experiences in medical residents. Acad Med 2019; 94:85–93.

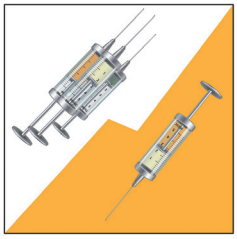
After a medical error or a patient care complication physicians often experience shame. For the medical learner this can be a powerful or debilitating experience. While guilt is commonly expressed as "I made a mistake," shame is more personal and expressed more as "I *am* the mistake." The shame experience is influenced by the innate personality and resilience of the individual and the psychological safety of his or her environment. This study investigated shame in a cohort of medical residents to clarify how shame is experienced in the medical education environment and the impact it has on the learner. Through hermeneutic analysis, the authors analyzed qualitative data collected through interviews with 12 medical residents. Shame reactions typically occurred after a negative encounter with patient care, education, or personal goals. The reaction was described as physically and emotionally painful and sometimes debilitating. Some of the negative effects of shame included social isolation, impaired sense of belonging, disengagement from learning, diminished psychological and physical wellness, reduced self-regulation, unprofessional behavior, and impaired empathy that may last for months. Importantly, a supervisor may play an important role in either exacerbating the reaction or modifying it into an emotionally constructive reaction. *(Article Selection: Franklyn Cladis. Image: Adobe Stock.)*

Take home message: Shame is a strong emotional and physical reaction that is common in physician trainees. If supervisors navigate shame constructively, it may be leveraged to enhance learning and personal growth.

The impact of complications and pain on patient satisfaction. Ann Surg 2019 Oct 28 [Epub ahead of print].

Patient satisfaction and patient-reported outcomes are considered to be important markers for the quality of medical care. This retrospective study aimed to identify the impact of specific clinical outcomes on satisfaction of care and regret among 9,950 patients who had 1 of 16 procedures in Michigan. Using multilevel hierarchical logistic regression, this study identified that patients with grade 1 or grade 2 to 3 complications were less likely to be highly satisfied with their care (odds ratio 0.50, 95% CI, 0.37 to 0.66, $P < 0.001$, and 0.44, 95% CI, 0.31 to 0.62, $P < 0.001$, respectively) and were also less likely to have no regret (odds ratio 0.48, 95% CI, 0.33 to 0.66, $P < 0.001$, and 0.39, 95% CI, 0.25 to 0.60, $P < 0.001$, respectively). Similarly, patients who experienced moderate or severe pain were less likely to be highly satisfied with their care (odds ratio 0.39, 95% CI, 0.32 to 0.49, $P < 0.001$, and 0.44, 95% CI, 0.31 to 0.62, $P < 0.001$, respectively) and were also less likely to have no regret (odds ratio 0.48, 95% CI, 0.33 to 0.66, $P < 0.001$, and 0.23, 95% CI, 0.18 to 0.29, $P < 0.001$, respectively). *(Article Selection: J. David Clark. Image: The Noun Project.)*

Take home message: Complications and pain after procedures may be associated with lower patient satisfaction with care and more regret.



Effect of vitamin C, hydrocortisone, and thiamine vs hydrocortisone alone on time alive and free of vasopressor support among patients with septic shock: The VITAMINS randomized clinical trial. JAMA 2020 Jan 17 [Epub ahead of print].

Septic shock is associated with high mortality. It has been suggested that the antiinflammatory effects of vitamin C and thiamine supplementation for thiamine deficiency may improve outcomes in the setting of septic shock. This multicentered study randomized 216 patients to either an intervention group that received intravenous vitamin C, hydrocortisone, and thiamine every 6 h (n = 109) or a control group that received intravenous hydrocortisone alone (n = 107). The primary outcome was time alive, free of vasopressor use for up to 7 days. There were no differences in the primary outcome between the groups. Patients randomized to the intervention group had an average of 122 h alive and free of vasopressors (interquartile range 76 to 145 h) whereas those randomized to the control group had 125 h alive and free of vasopressors (interquartile range 82 to 147 h, $P = 0.83$). *(Article Selection: Martin J. London. Image: Adobe Stock.)*

Take home message: This study suggests that vitamin C and thiamine when combined with hydrocortisone may not decrease the number of hours alive and free of vasopressors when compared to the use of hydrocortisone alone among patients with sepsis.

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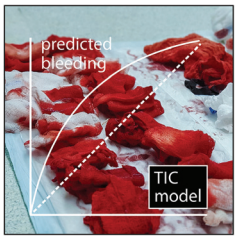
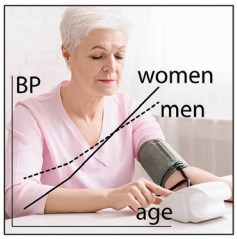


Early identification of trauma-induced coagulopathy: Development and validation of a multivariable risk prediction model. Ann Surg 2020 Jan 14 [Epub ahead of print].

Trauma-induced coagulopathy is associated with morbidity and mortality. The purpose of this study was to develop and validate a risk prediction model for the development of trauma-induced coagulopathy. The authors used data from patients recruited for the Activation of Coagulation and Inflammation in Trauma study (n = 600 for the development cohort and 491 in the validation cohort) to develop a Bayesian Network prediction model to identify predictors of trauma-induced coagulopathy. This method identified base deficits, lactate, systolic blood pressure, pH, heart rate, temperature, pelvic fracture, hemothorax, focused assessment with sonography in trauma, long bone fracture, energy, Glasgow Coma Scale, fluid volume, and blood gas values as variables in the predictive model. The development model had an area under the curve of 0.93 and 0.95 in the validation model. The Bayesian Network model can be found at http://www.traumamodels.com. *(Article Selection: Deborah J. Culley. Image: Adobe Stock.)*

Take home message: We may be able to predict trauma-induced coagulopathy using this Bayesian Network model.



Sex differences in blood pressure trajectories over the life course. JAMA Cardiol 2020 Jan 15 [Epub ahead of print].

It remains unclear whether longitudinal patterns of increased blood pressure are similar between men and women. This study collected longitudinal blood pressure measurements between 1971 and 2014 in 32,833 patients (54% women) enrolled in four community-based cohort studies to evaluate whether there are differences in longitudinal patterns of blood pressure between men and women. In contrast to the belief that vascular disease among women is delayed by 10 to 20 yr when compared to men, this study using mixed-effects regression models identified that women have a steeper increase in blood pressure that begins in the third decade of life and continued throughout life (chi-square test = 314 for systolic blood pressure; 31 for diastolic blood pressure and 129 for mean arterial pressure, $P < 0.001$). Despite these differences in blood pressure trajectories, the incidence of cardiovascular diseases was higher in men when compared to women (hazard ratio 1.61; 95% CI, 1.54 to 1.68; $P < 0.001$). *(Article Selection: Martin J. London. Image: Adobe Stock.)*

Take home message: Longitudinal blood pressure may be higher in women when compared to men. Despite having higher longitudinal blood pressures, women may be less likely to develop cardiovascular diseases.

Worse than death: Survey of public perceptions of disability outcomes after hypothetical traumatic brain injury. Ann Surg 2020 Jan 14 [Epub ahead of print].

There is uncertainty about how individuals value disability after a traumatic brain injury. This study used a cross-sectional web-based online survey wherein participants evaluated their perspectives on Extended Glasgow Outcome Scale health states 1 yr after a theoretical traumatic brain injury with ratings between 1 (death) and 8 (upper good recovery) and correlated them with health utility values that ranged between –1 (worse than death), 0 (death, reference value), and +1 (full health) in the 3,235 individuals who completed the study. The study participants rated some lower Extended Glascow Outcome Scale health states 1 yr after a traumatic brain injury as worse than death. In particular, more than 75% of participants identified a vegetative state 1 yr after a traumatic brain injury and 50% rated being housebound and needing all-day assistance 1 yr after a traumatic brain injury as conditions that were worse than death, although the authors suggest that selection bias may be one of the limitations of the study. *(Article Selection: Deborah J. Culley. Image: Adobe Stock.)*

Take home message: Poor outcomes after a theoretical traumatic brain injury may be worse than death to some individuals.

Altruistic behaviors relieve physical pain. Proc Natl Acad Sci USA 2020; 117:950–8.

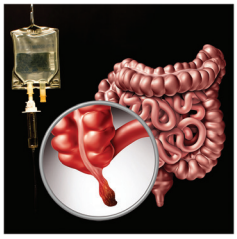
Previous studies have demonstrated that performance of altruistic behaviors may be associated with benefits to the individual performing altruistic actions. This study is novel in that it examined whether performance of altruistic behaviors alters the performers' response to physical pain. In a pilot study the authors compared Wong-Baker Faces Pain Rating Scale on blood donors who were donating their blood after a catastrophe (earthquake) to benefit others and compared their pain scores to those of patients who were having routine blood draws and found that blood donors felt less pain (mean ± SD, 1.5 ± 1.3) when compared to those who were having blood drawn for testing (mean ± SD, 2.4 ± 1.1; $P = 0.006$), despite the use of a larger needle and larger blood draws. Similar findings were noted by the authors in other pilot studies, but both were potentially biased by failure to randomize the participants. These findings were consistent in another pilot study and in three additional experiments, including one where acting altruistically reduced chronic pain among cancer patients. The authors also used functional magnetic resonance imaging to identify that altruistic behaviors not only decrease pain sensation but also lead to changes in brain activity in the dorsal anterior cingulate cortex and bilateral insula. *(Article Selection: J. David Clark. Image: Adobe Stock.)*

Take home message: Performing altruistic behaviors may reduce one's perception of pain.

Effect of hydroxyethyl starch vs saline for volume replacement therapy on death or postoperative complications among high-risk patients undergoing major abdominal surgery: The FLASH randomized clinical trial. JAMA 2020; 323:225–36.

There has been a longstanding debate about the use of hydroxyethyl starch in patients at high risk of developing postoperative kidney injury associated with intravascular volume depletion. This multicenter, double-blind, parallel-group study compared hydroxyethyl starch (n = 389) to 0.9% saline (n = 386) for intravascular volume expansion to determine their effects on death or major postoperative complications by 14 days after surgery. The percentage of patients who experienced death or a major postoperative complication within 14 days of surgery was 36% in the hydroxyethyl starch group and 32% in the 0.9% saline group for a relative risk of 1.10 (95% CI, 0.91 to 1.34; $P = 0.33$), suggesting no difference in using saline when compared to hydroxyethyl starch for volume expansion in patients at high risk for postoperative kidney injury. *(Article Selection: Martin J. London. Image: Adobe Stock.)*

Take home message: The use of hydroxyethyl starch for volume expansion resulted in no difference in the primary outcome of death or major postoperative complications within 14 days after surgery when compared to 0.9% saline.



Are postoperative intravenous antibiotics indicated after laparoscopic appendicectomy for simple appendicitis? A prospective double-blinded randomized controlled trial. Ann Surg 2019 Dec 9 [Epub ahead of print].

There is little evidence to justify administration of postoperative intravenous antibiotics after a laparoscopic appendectomy in children. This study randomized 304 patients 16 yr of age and younger having a laparoscopic appendectomy into a study. All patients received antibiotics at induction of anesthesia and were then randomized to either a placebo group or a treatment group that received two additional doses of intravenous antibiotics postoperatively. The primary outcome was postoperative wound infection. Due to protocol violations 243 patients were included in the final analysis (n = 122 placebo, n = 121 treatment). The incidence of postoperative wound infection was 7% in the placebo group and 1% in the treatment group (relative risk 1.8; 95% CI, 1.1 to 2.2; $P = 0.01$), suggesting that administration of antibiotics postoperatively to pediatric patients may decrease the risk of developing a postoperative wound infection. *(Article Selection: Deborah J. Culley. Image: Adobe Stock.)*

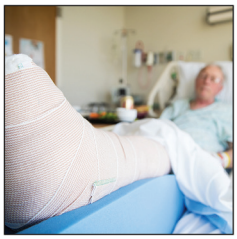
Take home message: Administration of postoperative antibiotics to pediatric patients having a laparoscopic appendectomy may reduce the risk of surgical site infections.

 DOI: 10.1097/ALN.0000000000003323

Palliative care and end-of-life outcomes following high-risk surgery. JAMA Surg 2020 Jan 2 [Epub ahead of print].

Palliative care consultation is infrequently utilized in the setting of high-risk surgical procedures, although it is thought to improve patient care. This secondary analysis of a retrospective cross-sectional cohort study proposed to determine the incidence of palliative care consultations in older surgical patients having high-risk surgery and to determine whether a palliative care consultation was associated with differences in family-reported ratings on overall care, communication, and support for patients who died within 90 days of a high-risk surgical procedure in 129 Veterans Administration hospitals. Among the 9,204 patients who had high-risk surgical procedures, 30% received a palliative care consultation during their hospital stay. The 90-day mortality rate for these high-risk surgeries was 6%. On multivariate analysis, families of patients who had received a palliative care consultation were more likely to rate the patient's overall care (odds ratio 1.5; 95% CI, 1.1 to 1.9; $P = 0.007$), end-of-life communication (odds ratio 1.4; 95% CI, 1.1 to 1.9; $P = 0.004$), and support (odds ratio 1.3; 95% CI, 1.0 to 1.7; $P = 0.05$) as excellent when compared to those who did not receive a palliative care consultation. *(Article Selection: J. David Clark. Image: Adobe Stock.)*

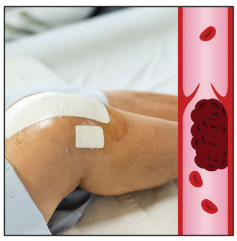
Take home message: This study suggests that palliative care consultations may lead to increased ratings for overall care, end-of-life communication, and support by family members of patients undergoing high-risk surgical procedures.



Hospital variation in geriatric surgical safety for emergency operation. J Am Coll Surg 2020 Feb 4 [Epub ahead of print].

It has been suggested that the management of older surgical patients having emergency surgical procedures is not optimized. The purpose of this study was to identify the degree to which postoperative mortality varies for emergency surgical procedures in older patients and whether these differences are explained by patient, surgery, or hospital features. The authors used the California State Inpatient Database to evaluate 24,207 patients having one of eight emergency general surgery procedures and used Bayesian mixed-effect logistic regression models to determine expected mortality and a risk-adjusted hospital level standardized mortality ratio to identify outliers. Of 107 hospitals included in the analysis, there were 11 (10%) hospitals that were poor-performing outliers and 10 (9%) were high-performing outliers. There were no differences in patient, surgery, or hospital features among outliers except for the performance of fewer appendectomies in poor-performing hospitals ($P = 0.01$). *(Article Selection: Deborah J. Culley. Image: Adobe Stock.)*

Take home message: More than 10% of hospitals have excessive mortality after emergency surgical procedures in older surgical patients.



Effect of osocimab in preventing venous thromboembolism among patients undergoing knee arthroplasty: The FOXTROT randomized clinical trial. JAMA 2020; 323:130–9.

Osocimab, a long-acting monoclonal antibody that inhibits factor Xla, has not been compared to apixaban or enoxaparin for the prevention of thromboembolism. This prospective, randomized, open-label, phase 2 trial involving 54 hospitals from 13 countries randomized patients to one postoperative intravenous dose of osocimab (0.3 mg/kg, 0.6 mg/kg, 1.2 mg/kg, or 1.8 mg/kg) or one preoperative dose of osocimab (0.3 mg/kg or 1.8 mg/kg) and compared them to patients randomized to 40 mg of subcutaneous enoxaparin once daily (n = 105) or 2.5 mg of oral apixaban twice daily (n = 105) for 10 to 13 days. The primary outcome was the incidence of venous thromboembolism between 10 and 13 days postoperatively. Of the 600 patients included in the analysis, the incidence of venous thromboembolism was 16%, 17%, 18%, and 30% among patients receiving 0.3mg/kg, 0.6 mg/kg, 1.2 mg/kg, or 1.8 mg/kg of osocimab postoperatively. Among patients who received 0.3 mg/kg of osocimab preoperatively the risk of thromboembolism was 30% but this was reduced to 9% among those who received the 1.8 mg/kg dose preoperatively. The incidence of thromboembolism was 26% among patients receiving enoxaparin and 15% among those receiving apixaban. Postoperative administration of osocimab met criteria for noninferiority compared with enoxaparin when administered at 0.6 mg/kg, 1.2 mg/kg, and 1.8 mg/kg. Interestingly, administration of 1.8 mg/kg of osocimab met criteria for superiority over enoxaparin. *(Article Selection: Martin J. London. Image: Adobe Stock.)*

Take home message: Postoperative osocimab at 0.6 mg/kg, 1.2 mg/kg, and 1.8 mg/kg may be noninferior to enoxaparin, and preoperative administration of 1.8 mg/kg osocimab may be superior when compared with enoxaparin for the prevention of venous thromboembolism.