SCIENCE, MEDICINE, AND THE ANESTHESIOLOGIST

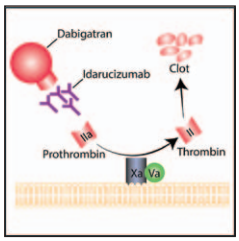
Key Papers from the Most Recent Literature Relevant to Anesthesiologists

ANESTHESIOLOGY

Jean Mantz, M.D., Ph.D., Editor

Harms associated with single unit perioperative transfusion: Retrospective population based analysis. BMJ 2015; 350:h3037. Editorial: Perioperative blood transfusions. BMJ 2015; 350:h3153.

There is ongoing debate regarding the impact of perioperative blood transfusion on patient outcomes. In this large, population-based study, data from more than 1.5 million patients admitted for surgery to 346 hospitals in the United States were analyzed retrospectively. The authors found that receipt of as little as one unit of blood was associated with a 2.33-fold increase in the risk of developing a stroke or myocardial infarction. Although the study is unable to prove a causal relation between transfusions and adverse outcomes, these findings raise the possibility of a link on a population level. The authors' conclusions are further supported by a plausible mechanism of injury connecting blood transfusions to the reported adverse events. The message from this and other studies is one of caution and restraint when it comes to the use of perioperative blood transfusions. *(Summary: J. Mantz. Image: J.P. Rathmell.)*



Idarucizumab for dabigatran reversal. N Engl J Med 2015; 373:511–20.

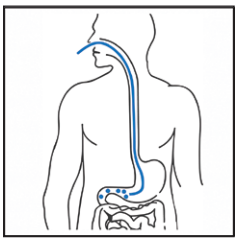
Specific reversal agents for non-vitamin K antagonist oral anticoagulants are lacking. This prospective cohort study determined the safety of intravenous idarucizumab and its capacity to reverse the anticoagulant effects of dabigatran in patients who had serious bleeding (group A) or required an urgent procedure (group B). The primary endpoint was the maximum percentage reversal of the anticoagulant effect of dabigatran within 4 h after the administration of idarucizumab, as measured by the dilute thrombin time or ecarin clotting time. It was found that idarucizumab completely reversed the anticoagulant effect of dabigatran within minutes in 88 to 98% of the 90 patients. One thrombotic event occurred within 72 h after idarucizumab administration in a patient in whom anticoagulants had not been reinitiated. These results represent a step forward for rapid preoperative restoration of coagulation in the setting of dabigatran-associated hemorrhage. *(Summary: J. Mantz. Illustration: J.P. Rathmell.)*

Traumatic spinal cord injury in the United States, 1993–2012. JAMA 2015; 313:2236–43.

This study assessed trends in acute traumatic spinal cord injury incidence, etiology, and mortality, and associated surgical procedures in the United States from 1993 to 2012. Analysis of survey data was obtained from the U.S. Nationwide Inpatient Sample databases for 1993–2012, including a total of 63,109 patients with acute traumatic spinal cord injury. It was found that the average incidence of traumatic spinal cord injury was 54 per million. The incidence of fall-induced injury significantly increased in men aged over 65 yr between 1997–2000 and 2010–2012, and overall mortality decreased significantly in persons aged 85 yr or more. Between 1993 and 2012, the incidence of acute traumatic spinal cord injury remained relatively stable but, reflective of an increasing population, the total number of cases increased. The largest increase in incidence was observed in older patients, largely associated with an increase in falls; in-hospital mortality remained high, especially in the elderly. *(Summary: J. Mantz. Image: J.P. Rathmell.)*

Efficacy and safety of very early mobilization within 24 h of stroke onset (AVERT): A randomized controlled trial. Lancet 2015; 386:46–55.

Early mobilization after stroke is thought to contribute to the beneficial effects of stroke-unit care; however, the intervention is poorly defined and not supported by strong evidence. The effectiveness of frequent, very early mobilization (within the first 24 h post-stroke) with usual care after stroke (either ischemic or hemorrhagic) was compared with usual care alone in this prospective, randomized, multicenter trial including 2,104 patients. The primary outcome was defined as a modified Rankin Scale score of 0–2 at 3 months. It was found that patients in the very early mobilization group had reduced favorable outcome at 3 months (adjusted odds ratio 0.73, 95% confidence interval 0.59–0.90; P=0.004). Early mobilization after stroke is recommended in many clinical practice guidelines worldwide, but the current findings challenge present recommendations. *(Summary: J. Mantz. Image: J.P. Rathmell.)*

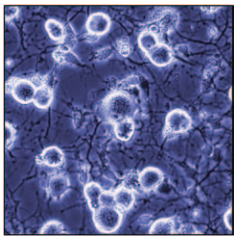


Permissive underfeeding or standard enteral feeding in critically ill adults. N Engl J Med 2015; 372:2398–408.

The appropriate caloric goal for critically ill adults is unclear. This randomized controlled trial evaluated the effect of restriction of nonprotein calories (permissive underfeeding), as compared with standard enteral feeding for up to 14 days on 90-day mortality among critically ill adults. Full recommended amount of protein was maintained in both groups. There was no difference between groups either in mortality or in any of the secondary outcomes. *(Summary: J. Mantz. Illustration: J.P. Rathmell.)*

Mobile-phone dispatch of laypersons for CPR in out-of-hospital cardiac arrest. N Engl J Med 2015; 372:2316–25. Early cardiopulmonary resuscitation in out-of-hospital cardiac arrest. N Engl J Med 2015; 372:2307–15.

These two papers confirm and extend the importance of initiating cardiopulmonary resuscitation (CPR) as early as possible when facing out-of-hospital cardiac arrest. In the first paper, it was shown that a mobile-phone alert system to dispatch lay volunteers who were trained in CPR was associated with significantly increased rates of bystander-initiated CPR among persons with out-of-hospital cardiac arrest. In the second paper, CPR was performed before the arrival of emergency medical services (EMS) in 15,512 cases (51.1%) and was not performed before the arrival of EMS in 14,869 cases (48.9%). The 30-day survival rate was 10.5% when CPR was performed before EMS arrival *versus* 4.0% when CPR was not performed before EMS arrival ($P<0.001$). Promoting prompt initiation of cardiac resuscitation has resulted in robust improvement in survival after out-of-hospital cardiac arrest. *(Summary: J. Mantz. Image: J.P. Rathmell.)*



Different immune cells mediate mechanical pain hypersensitivity in male and female mice. Nat Neurosci 2015; 18:1081–3.

Males and females develop painful conditions at different rates, experience pain at different average intensities, and respond differentially to analgesics. A consortium of investigators led by Sorge *et al.* has provided a possible molecular basis for these differences. These investigators focused on the roles of microglia in supporting pain-related responses in male and female mice. Microglia are widely believed to be key cells supporting pain sensitization, but laboratory experiments supporting a central role for microglia in pain have been done almost exclusively in male laboratory animals. The investigators found that female mice did not respond to agents limiting microglial activity whereas male mice showed robust analgesia. On the other hand, pain in female mice was shown to rely on specific T-cell–mediated pathways. Interestingly, if T-cell numbers were reduced, female mice then appeared to use microglia to support pain sensitization similar to their male counterparts. While the roles of glia and immune cells in human pain remain poorly understood, this work suggests glial modulators may be more effective in male patients. *(Summary: J.D. Clark. Image: B. Wainger, Massachusetts General Hospital.)*

Diagnosing technical competence in six bedside procedures: Comparing checklists and a global rating scale in the assessment of resident performance. Acad Med 2015; 90:1100–8.

Determining procedural competence is crucial in anesthesiology. This study compares two assessment techniques—checklists *versus* global rating scales—by two raters observing 47 internal medicine residents performing a total of 218 simulation-based objective structured clinical exams (OSCE) involving six technical procedures. The procedures include intubation, arterial blood gas sampling, lumbar puncture, knee arthrocentesis, ultrasound-guided paracentesis, and ultrasound-guided thoracentesis. The global assessment includes a 6-point scale ranging from "not competent" to "above average," as well as a section for formative comments. The checklist assessment was a detailed list of specific, expected steps with a predetermined minimum score for "competence." In spite of higher interrater reliability with the checklist, the results of this study suggest that a global rating system may be preferred since even a high checklist score could be judged as "not competent" by global assessment when, for example, clinically significant procedural errors occurred. This study serves as a guide for the design of assessment tools for procedures performed by trainees in anesthesiology. Perhaps easy-to-tabulate results are not sufficient for determining competence. *(Summary: C. Peterson-Layne. Image: ©Thinkstock.)*