

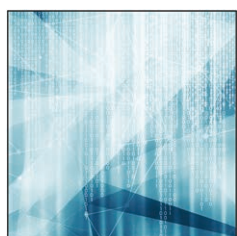
1070 Individual Positive End-expiratory Pressure Settings Optimize Intraoperative Mechanical Ventilation and Reduce Postoperative Atelectasis

While the protective role of more physiological tidal volume has been strongly suggested, there is no agreement on the value of optimal positive end-expiratory pressure. One fixed value of positive end-expiratory pressure is unlikely to fit all patients. The hypothesis that the optimized positive end-expiratory pressure guided by electrical impedance tomography would vary among different patients and that it would reduce postoperative atelectasis was tested in a randomized controlled trial of 40 patients undergoing elective abdominal surgery. Patients were randomized to have positive end-expiratory pressure titrated by electrical impedance tomography or a fixed positive end-expiratory pressure of 4 cm H₂O. The individually adjusted positive end-expiratory pressure, providing the optimum compromise between lung collapse and hyperdistention, ranged from 6 to 16 cm H₂O. Optimal positive end-expiratory pressure not only reduced driving pressure and improved compliance intraoperatively compared to a fixed positive end-expiratory pressure of 4 cm H₂O, but also reduced atelectasis in the postoperative period. See the accompanying Editorial View on [page 1057](#). (Summary: M. J. Avram. Illustration: A. Johnson, Vivo Visuals.)



1132 Ultrasound Is Superior to Palpation in Identifying the Cricothyroid Membrane in Subjects with Poorly Defined Neck Landmarks: A Randomized Clinical Trial

The success of a cricothyrotomy depends on accurate localization of the cricothyroid membrane, which can be challenging when the conventional approach of external palpation is used. The hypothesis that ultrasound is more accurate in identifying the cricothyroid membrane than external palpation was tested in a randomized single-blinded study of 223 patients with poorly defined neck landmarks. Accurate identification of the cricothyroid membrane was defined as identification of a localization point within 5 mm of a point identified by a computed tomography image of the neck. Ultrasound correctly identified the cricothyroid membrane in 92 of 114 (81%) patients but external palpation made a correct identification in only 9 of 109 (8%) patients. The mean \pm SD distance from the ultrasound point to the computed tomography point was 3.4 ± 3.3 mm, while that from the external palpation point to the computed tomography point was 16.6 ± 7.5 mm. (Summary: M. J. Avram. Image: J. P. Rathmell.)



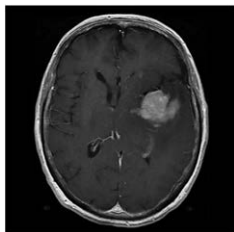
1082 Patient Blood Management Program Improves Blood Use and Clinical Outcomes in Orthopedic Surgery

Recent American Association of Blood Banks (AABB)-endorsed transfusion guidelines recommend a hemoglobin trigger of 8 g/dl for orthopedic surgery patients, but a hemoglobin trigger of 7 g/dl for critically ill hospitalized patients. The hypothesis that after implementation of a patient blood management program encouraging a hemoglobin transfusion threshold of less than 7 g/dl, orthopedic patients would receive less allogeneic blood transfusions without an increase in adverse outcomes was tested in a retrospective analysis of 1,507 patients in the pre-blood management cohort and 2,402 patients in the post-blood management cohort. Between the pre- and post-blood management time periods the mean hemoglobin transfusion trigger decreased from 7.8 ± 1.0 (mean \pm SD) to 6.8 ± 1.0 g/dl. The percentage of patients transfused red blood cells decreased from 16.1% to 9.4% and there was a 32.5% decrease in the number of red blood cell units per 1,000 patients. The composite outcome of any morbidity or mortality decreased by half. See the accompanying Editorial View on [page 1060](#). (Summary: M. J. Avram. Image: ©ThinkStock.)



1149 Morbidity and Mortality of Crystalloids Compared to Colloids in Critically Ill Surgical Patients: A Subgroup Analysis of a Randomized Trial

The hypothesis that administration of colloids for fluid resuscitation alters 28-day mortality compared with administration of crystalloids was tested in critically ill surgical patients in an *a priori* defined secondary analysis of a large pragmatic trial comparing the administration of crystalloids and colloids in a general population of critically ill patients. Eligible patients required fluid resuscitation for acute hypovolemia and were randomly allocated to fluid resuscitation with products belonging to a broad family of fluids, either crystalloids or colloids; 356 patients were allocated to the crystalloids arm and 385 were allocated to the colloids arm. There was no difference between groups in the occurrence of death by day 28; 84 (23.6%) patients died in the crystalloids arm while 100 (26%) died in the colloids arm (adjusted odds ratio 0.86 [95% CI, 0.61 to 1.21]). (Summary: M. J. Avram. Image: J. P. Rathmell.)



1111 Prediction Score for Postoperative Neurologic Complications after Brain Tumor Craniotomy: A Multicenter Observational Study

The primary objective of this study was to develop and validate a score that could predict severe postoperative neurosurgical complications in the first 24 h in the intensive care unit after elective brain tumor neurosurgery in order to improve intensive care unit triage and safely discharge patients to wards. The learning cohort consisted of 1,094 patients undergoing craniotomy for a brain tumor in one center between 2008 and 2012, 125 (11.4%) of whom presented with early postoperative neurosurgical complications. Eight factors were selected for the multivariable model, including Glasgow Coma Scale score before surgery ≤ 14 , history of brain tumor surgery, greatest brain tumor diameter, and midline shift ≥ 3 mm. The prediction score based on these factors provided a probability of postoperative

neurosurgical complications for each patient, expressed as a percentage. In the learning cohort, a 3% threshold had a sensitivity of 100%, a specificity of 6.2%, a positive predictive value of 12.1%, and a negative predictive value of 100%. (Summary: M. J. Avram. Image: J. P. Rathmell.)



1121 Hospital-, Anesthesiologist-, and Patient-level Variation in Primary Anesthesia Type for Hip Fracture Surgery: A Population-based Cross-sectional Analysis

There is substantial variation in the primary anesthesia type used for hip fracture surgery. A population-based cross-sectional analysis of 107,317 hip fracture surgery patients admitted to 80 different hospitals on a nonelective basis from 2002 to 2014 was conducted to determine the extent of practice variation in choice of anesthesia type attributable to hospital-, anesthesiologist-, and patient-level factors. Neuraxial anesthesia without concurrent general anesthesia was used in 57,080 (53.2%) patients. Patient factors accounted for 60.1% of the variation in neuraxial anesthesia use while 20.0% of the variation was attributable to the hospital level and 19.9% was attributable to the anesthesiologist.

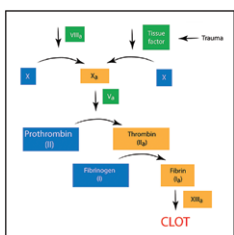
The median odds of a given patient receiving neuraxial anesthesia varied by more than 2.3-fold between any two randomly selected hospitals or anesthesiologists, independent of baseline patient illness, sociodemographic characteristics, or other factors that were postulated to influence a patient's probability of receiving neuraxial anesthesia. (Summary: M. J. Avram. Image: J. P. Rathmell.)



1101 Early Resumption of β Blockers Is Associated with Decreased Atrial Fibrillation after Noncardiothoracic and Nonvascular Surgery: A Cohort Analysis

The incidence of postoperative atrial fibrillation was determined in β -blocker users who had noncardiac surgery between 2008 and 2016, stayed at least two postoperative nights, were still at risk of developing atrial fibrillation at the end of postoperative day 1, and did and did not restart β blockers by the end of postoperative day 1. The incidence of postoperative atrial fibrillation was 4.2% for 7,095 patients who had already restarted β blockers and 7.1% for 994 patients who had not. To control for observed potential confounding variables, each patient who restarted β blockers after the end of postoperative day 1 was matched to a maximum of two patients who restarted by the end of postoperative day 1 using exact and propensity score matching. Within the subset of matched patients, 4.9% of 1,924 retaking β blockers by the end of postoperative day 1 experienced postoperative atrial fibrillation, as did 7.0% of 973 retaking after postoperative day 1 (odds ratio 0.69, 95% CI 0.50 to 0.95). (Summary: M. J. Avram. Image: J. P. Rathmell.)

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1171 Prothrombin Complex Concentrates for Perioperative Vitamin K Antagonist and Non-vitamin K Anticoagulant Reversal (Review Article)

Vitamin K antagonists, such as warfarin, are still widely used in patients with atrial fibrillation, venous thromboembolism, and mechanical heart valves. Because of the increased risk for bleeding associated with vitamin K antagonist therapy, current treatment guidelines recommend 4-factor prothrombin complex concentrates (containing coagulation factors II, VII, IX, and X), with concomitant intravenous vitamin K, as the preferred therapy for urgent vitamin K antagonist reversal in patients who require an emergency surgical procedure. Thirty-six articles published between 2008 and 2017 were reviewed to provide an update on the latest evidence for the use of prothrombin complex concentrates in patients requiring urgent vitamin K antagonist reversal for emergency surgery. The studies identified support current

guideline recommendations. Prothrombin complex concentrates consistently and rapidly reduced patients' international normalized ratio, had greater clinical efficacy than plasma, and were associated with lower rates of fluid overload due to its lower infusion volume compared to plasma and no instances of viral transmission. (Summary: M. J. Avram. Image: J. P. Rathmell.)