In combination with magnesium, the authors posited that ketamine, given as proposed, may have an additive analgesic effect. The authors conducted a randomized double-blind placebo-controlled crossover study that included 20 patients with neuropathic pain. Patients were ketamine-naïve and received one infusion every 35 days in a random order. The infusions consisted of ketamine (0.5mg/kg) plus placebo, ketamine (0.5mg/kg) plus magnesium sulphate (3g) or placebo plus placebo. The cases at three academic hospitals from 1998 to 2004. In addition to direct observation, anesthesia providers were surveyed for details about nonroutine events at the end of each study case. The routine was defined as any aspect of clinical care perceived by clinicians or observers as a deviation from optimal care for that patient in that clinical situation. For the 511 cases with measurable video, 22% of cases had at least one nonroutine event reported. One-third of nonroutine cases had more than one such event. Each event was analyzed by trained anesthesiologists. The authors performed rater reliability assessments and comparisons of patient and case variables. Of 173 cases, 13% involved patient injury and nearly 70% had nonroutine operative events may guide prospective safety interventions. The authors found that daily pain intensity was not significantly different among the three groups over 35 days. There were no significant differences in emotional, sleep and quality-of-life measures. During placebo infusions, 10% of patients reported at least one adverse event. The percentage of patients who had adverse events increased to 20% among patients who received ketamine infusions and 35% among those who received ketamine plus magnesium. The authors concluded that ketamine with neuropathic pain was not different with ketamine, ketamine plus magnesium or placebo 35 days post-infusion. There were no major immediate or late changes in psychological and health-related components. Our next study examines whether the noninvasive plethysmographic variability index could reduce postoperative morbidity and length of hospital stay, Dr. Marc-Olivier Fischer of Normandy Caen University and colleagues there and elsewhere in France conducted the study. They randomized 447 adult patients in sinus rhythm who were going to have elective knee or hip arthroplasty under general anesthesia. Patients having individualized hemodynamic management had a plethysmographic forehead sensor, and the aim was to achieve a plethysmographic variability index under 13%. The standard management strategy aimed to maintain a mean arterial pressure above 65 mmHg during general anesthesia. The primary outcome was the postoperative length of hospital stay according to surgeons blinded to patients’ groups. There was no difference between the groups: both groups had a mean hospital length of stay of 6 ± 3 days. In addition, both groups had a serious postoperative cardiac complication rate of 1%. Both groups had an acute postoperative renal failure rate of 4%. The troponin I concentration was more than 0.06 μg/l within 5 days postoperatively for 3% of the index group and 2% of the control group. Fitness for discharge and actual hospital durations were essentially identical in each group. Complications were rare and similar in each group. The authors concluded that plethysmographic-guided fluid management did not reduce the duration of hospitalization or complications in moderate-risk surgery patients. Our next clinical study delineates the incidence and nature of nonoperative nonroutine events during anesthesia care. Dr. Justin Liberman of Geriatric Research Education and Clinical Center, Tennessee Valley Veterans Affairs Healthcare System, Nashville, Tennessee, and colleagues there and at Vanderbilt University Medical Center conducted the study. The authors prospectively collected audio, video, and relevant clinical information on 536 adults at three hospitals from 2008 to 2012. In addition to direct observation, anesthesia providers were surveyed for details about nonroutine events at the end of each study case. A nonroutine event is defined as any aspect of clinical care perceived by clinicians or observers as a deviation from optimal care for that patient in that clinical situation. For the 511 cases with measurable video, 22% of cases had at least one nonroutine event reported. One-third of nonroutine cases had more than one such event. Each event was analyzed by trained anesthesiologists. The authors performed rater reliability assessments and comparisons of patient and case variables. Of 173 cases, 13% involved patient injury and nearly 70% had patient impacts. Longer case duration and additional comorbidities were associated with nonroutine events. Patient- and anesthesia-provider-related issues were the most common contributing factors. Around one-third of events involved the anesthetic vasculature system, including drugs and equipment. The authors concluded that monitoring nonroutine operative events may guide prospective safety interventions when combined with traditional error reporting.

Our next clinical study examined the use of the vasodilator nitroglycerin in pediatric radial artery cannulation. Dr. Young-Eun Jang of Seoul National University Hospital in Seoul, Korea, and colleagues there and at Baylor College of Medicine, Houston, conducted the study. They tested the hypothesis that subcutaneous nitroglycerin injection would improve the success rate of pediatric radial artery cannulation. This double-blind, randomized, controlled study enrolled 113 pediatric patients. All patients were less than 2 years of age and required radial artery cannulation during general anesthesia. After inducing general anesthesia, the physician injected either nitroglycerin solution (5 μg/kg in 0.5 ml) or normal saline (0.5ml) subcutaneously above the chosen radial artery over 10 s with ultrasound guidance. They performed the ultrasound-guided radial artery cannulation 5 minutes later. Radial artery diameter was measured before and after the subcutaneous injection and after cannulation. The primary outcome was the first-attempt success rate. The first-attempt success rate in the nitroglycerin group was 91%, which was nearly one-third higher than the control group. The authors also found that subcutaneous nitroglycerin injection increased the diameter of the radial artery more than normal saline. Additionally, the overall complication rate in the nitroglycerin group was 3%, which was lower than the 31% complication rate in the control group. The authors concluded that nitroglycerin before radial artery cannulation improved the first-attempt success rate and reduced the overall complication rates in pediatric patients.

Next, we have a meta-analysis of the frailty instruments used to assess patient frailty preoperatively. Dr. Sylvie Aucoin of the Centre for Perioperative Medicine, University College London and colleagues there and elsewhere conducted this analysis. The study goal was to evaluate instruments’ outcomes in terms of accuracy combined with clinical feasibility. The primary outcome was mortality and secondary outcomes reflected in routinely collected and patient-centered measures. The authors also collected feasibility measures. They included 45 studies in the analysis. These studies used 35 different frailty instruments, 5 of which were meta-analyzed. The Clinical Frailty Scale, which characterizes overall level of fitness or frailty, was most strongly associated with mortality and discharge not to home. The Edmonton Frail Scale was the best predictor of complications. The physical Frailty Phenotype was most strongly associated with postoperative delirium. The Clinical Frailty Scale scored highest for clinical feasibility. The authors concluded that clinicians should consider both accuracy and feasibility when choosing a frailty instrument. Strong evidence in both domains support the Clinical Frailty Scale, while the popular Fried Phenotype may require a trade-off of improved accuracy with lower feasibility.

Our next study used a rat model to examine cryoneurolysis as long-lasting treatment for reducing postoperative pain. Dr. Lifit Garibyan and colleagues at Massachusetts General Hospital conducted the study. They tested the hypothesis that ice slurry could be an injectable, drug-free, and tissue-selective method of cryoneurolysis and resulting analgesia. They developed an injectable and selective method of cryoneurolysis using biocompatible ice slurry. They used rat sciatic nerves to investigate the effect of slurry injection on the structure and function of the nerve. Sixty-two rats were randomized into experimental and control groups. Control rats received room temperature solution. Following treatment, the authors observed and quantified myelin sheath and axon structural integrity, as well as sciatic nerve function. The authors found that ice slurry injection can selectively target the rat sciatic nerve. Its injectable form led to decreased nocifensive function for up to 60 days, with complete recovery by day 112. The authors concluded that cryoneurolysis with an ice slurry led to decreased nocifensive function for up to 60 days, with complete recovery by day 112.

Next, we have a Clinical Focus Review article on the effectiveness and potential of Patient Blood Management. A team of authors led by Dr. Donat Spahn of the University of Zurich and colleagues there and elsewhere wrote this review. They define Patient Blood Management as the timely application of evidence-based medical and surgical concepts designed to maintain hemoglobin concentration, optimize hemostasis and minimize blood loss. Additionally, they note that this concept was first introduced in the anesthesiology literature as an editorial in Anesthesiology in 2008. Twelve years later, they find that Patient Blood Management has significantly decreased the use of allogeneic erythrocyte transfusion and its associated adverse sequelae. In the era of elective surgeries, they note that Patient Blood Management can also benefit urgent or emergent surgical procedures. Its principles can even be applied in nonsurgical disciplines to reduce the transfusion of allogeneic blood products and increase cost savings, they note. Although Patient Blood Management should be considered as the new standard of care, some centers have not yet adopted it.
Spahn and coauthors encourage the implementation of other Patient Blood Management measures such as treatment of perioperative anemia and iron deficiency and advanced coagulation management.

Finally, another Clinical Focus Review article covers the assessment and reversal of direct oral anticoagulants on coagulation. Drs. Arielle Langer and Jean Connors of Brigham and Women’s Hospital and Harvard Medical School, Boston, wrote this review. It focuses on the pharmacokinetics of direct oral anticoagulants, testing methods to assess anticoagulant activity, and the use of reversal agents in a variety of clinical settings. The authors note that, when patients present needing emergency surgery, priority should be given to managing life-threatening bleeding in the setting of direct oral anticoagulant coagulopathy followed by evaluation for the need for surgery. They also offer a clinical decision pathway for direct oral anticoagulants reversal. This pathway can help determine if the patient can proceed to surgery with minimal impairment of hemostasis by direct oral anticoagulants, or whether reversal agents use should be considered. In situations where approved reversal agents are not available, the use of alternatives can be considered based on limited data. Improved testing and new reversal agents are in development; until they are available, the information in this review should help guide clinical practice.

We close this month with a mention of the Editor in Chief Editorial, Certainty and Uncertainty. It addresses some of the challenges and accomplishments of the Journal in response to the coronavirus pandemic, highlights the most read Anesthesiology articles published last year, and previews some of the upcoming changes and improvements to our journal.

Thanks for joining me for this brief exploration of the exciting work being done in Anesthesiology. I’ll be back in just a few weeks with highlights from the August issue.