confirmed postoperative stroke. Sun et al. found that mean arterial pressure <65 mmHg for 10 mean arterial pressure bands of < 55, 55-64 and 65-74 mmHg before, during, and after bypass. U.S. evaluated the association between the severity and duration of intraoperative hypotension occurs before, during, and after cardiopulmonary bypass remains unclear. Dr. Louise Y. Sun of the University of California, San Francisco, investigated whether a prophylactic fascia iliaca block improves postoperative analgesia. They randomized 80 hip arthroplasty patients in a prospective, double-blinded trial. The experimental group received a prophylactic fascia iliaca block with local anesthetic and group received saline. All patients also received an intra-articular injection of 10 ml ropivacaine 0.2% at the procedure’s end. The study’s primary endpoint was the highest pain score reported in the recovery room. Pain scores and opioid use 24 hours after surgery were other endpoints. Additionally, investigators measured quadriceps strength to identify leg weakness. The highest pain scores in the recovery room were similar: 6±2 in the block group vs 7±2 in the placebo group. Postoperative opioid use was also similar between the two groups. Patients experienced similar pain and opioid use in the 24 hours after surgery. However, there were differences. The fascia iliaca block resulted in noticeable quadriceps weakness. Behrends et al. concluded that a prophylactic fascia iliaca block in addition to a hip block may not be enough to improve pain control following hip arthroplasty. The block, however, did result in quadriceps weakness that may contribute to an increased risk of falls. The authors caution against routine use of this block for hip arthroplasty.

Our next clinical study evaluated brain function after surgery. We know that delirium is common after cardiac surgery and has been associated with morbidity, mortality, and cognitive decline. However, there are conflicting reports on cognitive decline, and the magnitude, trajectory, and domains of cognitive change that might be affected. Dr. Charles H. Bourn IV of Johns Hopkins University and colleagues evaluated the association between delirium and cognitive function 1 month after cardiac surgery compared to patients who had not had delirium. The researchers assessed patients who underwent coronary artery bypass and/or valve surgery with cardiopulmonary bypass for inclusion in this cohort study, eventually accruing 182 patients. They used the Confusion Assessment Method to assess delirium. They also gave a neuropsychological battery before surgery, at 1 month, and at 1 year postoperatively. The primary outcome was the association between delirium and the change in composite cognitive Z-score from baseline to 1 month. Secondary outcomes were domain-specific changes at 1 month and composite and domain-specific changes at 1 year. Just over 50% of study participants had postoperative delirium. Patients with delirium had greater decline in cognitive Z-score at 1 month and in the domains of visuospatial construction and processing speed. Brown et al. concluded that the development of postoperative delirium is associated with a greater degree of cognitive decline 1 month after surgery. However, they also determined that the development of postoperative delirium is not a predictor of cognitive decline 1 year after cardiac surgery.

Our next two articles report large scale retrospective association studies. The first looked at ischemic stroke after cardiac surgery, a devastating complication affecting approximately 2% of patients. The relationship between stroke and hypotension that occurs before, during, and after cardiopulmonary bypass remains unclear. Dr. Louise Y. Sun of the University of Ottawa Heart Institute and colleagues there and elsewhere in Canada and the U.S. evaluated the association between the severity and duration of intraoperative hypotension and postoperative stroke in patients undergoing cardiac surgery. They conducted a retrospective cohort study of adult patients who underwent cardiac surgery requiring cardiopulmonary bypass at a tertiary center during a 5-year period. The primary outcome was postoperative ischemic stroke. They defined intraoperative hypotension as the mean arterial pressure bands of < 55, 55-64 and 65-74 mmHg before, during, and after bypass. The investigators examined the association between stroke and hypotension by using logistic regression with propensity score adjustment. Among 7408 patients, 111 patients or 1.5% had a confirmed postoperative stroke. Sun et al. found that mean arterial pressure <65 mmHg for 10 minutes or more during cardiacdiapulmonary bypass was associated with an increased risk of stroke. Additionally, even mild relative hypotension during anesthesia, defined as a <10% decrease from pre-induction baseline, was also associated with an increased risk of stroke. Sun et al. concluded that hypotension is a potentially modifiable risk factor for perioperative stroke. Their findings suggest that mean arterial pressure may be an important intraoperative therapeutic hemodynamic target for reducing the incidence of stroke by 35%.

Our next study looks at neurocognitive performance, which is being used more frequently for elective hip and knee replacements. Currently, it is unclear whether increasing rates of hospital-level use of neuraxial anaesthesia is associated with improved medical or economic outcomes. Dr. Stavros G. Mentzos of Weill Cornell Medical College in New York and colleagues there, elsewhere in New York, and in California, assessed the relationship between hospital-level neuraxial anaesthesia utilization and outcomes. They examined data from 800,000 total knee replacements and nearly 375,000 hip replacements gleaned from 550 hospitals over 9 years. They measured multivariable associations between hospital-level neuraxial anaesthesia volume and outcomes. These outcomes included respiratory and cardiac complications, need for blood transfusions, adhesion, opioid utilization, and length and cost of hospitalization. The investigators also assessed volume-outcome relationships by plotting hospital-level neuraxial anaesthesia volume against predicted hospital-specific outcomes. Mentzos et al. found that annual hospital-specific neuraxial anaesthesia volume varied greatly. Increasing frequency of neuraxial anaesthesia was not associated with reliable improvements in any of the study’s clinical outcomes of respiratory/cardiac complications, need for blood transfusion, intensive care unit admission, opioid utilization, and length/cost of hospitalization. However, significant reductions of up to 15% were seen for hospitalization cost in knee and hip replacements. Cohen et al. concluded that neuraxial anaesthesia is not associated with reliable improvements.

Our next study focuses on the basic science of anesthetic receptors and dexmedetomidine. We know that dexmedetomidine is effective in reducing postoperative delirium, but the mechanism by which it preserves cognition is unclear. Dr. Dan-Shi Wang of the University of Toronto and colleagues there and in Japan hypothesized that dexmedetomidine prevents excessive function of α5-containing α-amino-3-hydroxy-5-methyl-4-isoxazole propionate type A (5GABA) receptors. They studied injectable (romidate) and inhaled (sevoflurane) anesthetic drugs using cultured mouse hippocampal neurons, cultured mouse and human cortical astrocytes, and ex vivo mouse lumbar spinal discs. They also used electrophysiological and biochemical methods to study GABA receptor function and cell-signaling pathways. Wang et al. found that dexmedetomidine reduced the etomidate-induced sustained increase in 5GABA receptor cell-surface expression. Dexmedetomidine also reduced the persistent increase in tonic inhibitory current in hippocampal neurons. Similarly, dexmedetomidine prevented an etomidate-induced increase in the tonic current. Dexmedetomidine stimulated astrocytes to release brain-derived neurotrophic factor, which acted as a paracrine factor to reduce excessive α5GABA receptor function in neurons. Finally, dexmedetomidine attenuated memory and problem-solving deficits after anesthesia. Wang et al.’s data suggest that suppression of anesthesiainduced sustained increase in α5GABA receptor expression may be a potential target for the prevention of postoperative and ICU delirium.

In our Clinical Focus Review article this month, Dr. Sabri Soussi of Hôpitaux Universitaires Saint-Louis-Lariboisière in Paris and colleagues from other Paris institutions describe the early hemodynamic management of critically ill burn patients. Burn injury is associated with early profound hypovolemia, followed by a systemic inflammatory response, with a subsequent hyperdynamic state. Hemodynamic management has long been identified as a key factor affecting the prognosis of burn patients. The challenge of initial hemodynamic resuscitation of critically ill burn patients is under-recognized. New York and Jaye et al. examined current fluid resuscitation solutions with albumin are the cornerstone of early resuscitation strategy, which is best guided by hemodynamic monitoring. There are, however, many knowledge gaps that still need to be addressed regarding hemodilution targets, the use of colloids, adjunct therapies, and vasopressors and their impact on outcome and the immune system. Soussi et al. provide an overview of the hemodynamic consequences of burn injury. They also propose strategies for initial hemodynamic management of severe burns patients using available evidence combined with a physiological approach.

Finally, our Review Article this month addresses the pathophysiology and preventive pharmacological considerations of persistent postsurgical pain. Dr. Philippe Richebé of the University of Paris and colleagues there, offices in Paris and colleagues describe the early hemodynamic management of critically ill burn patients. Burn injury is associated with early profound hypovolemia, followed by a systemic inflammatory response, with a subsequent hyperdynamic state. Hemodynamic management has long been identified as a key factor affecting the prognosis of burn patients. The challenge of initial hemodynamic resuscitation of critically ill burn patients is under-recognized. New York and Jaye et al. examined current fluid resuscitation solutions with albumin are the cornerstone of early resuscitation strategy, which is best guided by hemodynamic monitoring. There are, however, many knowledge gaps that still need to be addressed regarding hemodilution targets, the use of colloids, adjunct therapies, and vasopressors and their impact on outcome and the immune system. Soussi et al. provide an overview of the hemodynamic consequences of burn injury. They also propose strategies for initial hemodynamic management of severe burns patients using available evidence combined with a physiological approach.

More noteworthy articles await readers in the September issue of Anesthesiology. I’ll be back in just a few short weeks with an inside look at our October issue. As always, I hope that this podcast and our journal help you deepen your knowledge and strengthen your clinical practice.