Recent studies have shown a link between intraoperative hypotension (IOH) and injury to the patient, from acute kidney injury (AKI) and adverse cardiac events to inadequate organ perfusion. Though the data suggest that a link exists, there is not yet clear evidence of a causal link, and no clear standard for avoiding IOH-related injuries specifically. As studies continue to search for answers, clinicians are faced with a choice of how to best treat patients based on limited information and, of course, the desire to avoid injury that could be mitigated.

IOH arises during general anesthesia, with an incidence ranging from 5%-99% (Anesthesiology 2007;107:213-20) and may be associated with organ ischemia (Anesth Analg 2021;132:1654-65). During noncardiac surgery, IOH is common and associated with increased 30-day major adverse cardiac or cerebrovascular events, which are magnified with increasing hypotension severity (Anesth Analg 2021;132:1654-65). Research also found a high incidence of perioperative AKI, with 27% of study participants developing AKI in the perioperative period; that subgroup had more hypotensive events ing AKI in the perioperative period; that was missed in patients who do not have postoperative troponin screening, because most cases are asymptomatic. But asymptomatic MINS patients are nearly as likely to die as those who present with crushing chest pain. MINS and uncontrolled surgical bleeding are the two perioperative events most associated with 30-day mortality. MINS is therefore something every clinician should take seriously. It is important to make the diagnosis because much needs to be done for MINS patients. For example, they need to be referred to cardiology or internal medicine for ongoing care because one in seven will reinfarct within 18 months. They should be started on aspirin, and often on statins. A large trial showed that chronic anticoagulation reduces major adverse cardiac events in MINS patients by 28%. Blood pressure and tachycardia should be treated if necessary. And finally, MINS represents a teachable moment and should prompt a discussion about smoking cessation, healthful eating, and exercise.

ASA Monitor: What are the biggest health threats related to IOH?
Dr. Sessler: Myocardial injury after non-cardiac surgery (MINS) is common, silent, and deadly. More than 90% of MINS will be missed in patients who do not have postoperative troponin screening, because most cases are asymptomatic. But asymptomatic MINS patients are nearly as likely to die as those who present with crushing chest pain. MINS and uncontrolled surgical bleeding are the two perioperative events most associated with 30-day mortality. MINS is therefore something every clinician should take seriously. It is important to make the diagnosis because much needs to be done for MINS patients. For example, they need to be referred to cardiology or internal medicine for ongoing care because one in seven will reinfarct within 18 months. They should be started on aspirin, and often on statins. A large trial showed that chronic anticoagulation reduces major adverse cardiac events in MINS patients by 28%. Blood pressure and tachycardia should be treated if necessary. And finally, MINS represents a teachable moment and should prompt a discussion about smoking cessation, healthful eating, and exercise.

ASA Monitor: Are any studies being conducted to search for a potential causal link?
Dr. Sessler: POISE-3 (NCT03505723), which evaluated hypotension prevention, recently completed enrollment and the results should be available in 2022. GUARDIAN (NCT04884802) is a trial that evaluates sicker patients and tightly controls blood pressure; however, the results will not be available for four to five years.

ASA Monitor: What can anesthesiologists do to monitor and eliminate the relationship between hypotension and injury during surgery?
Dr. Sessler: Hypotension differs from other risk factors in usually being relatively easy to prevent. Continuous blood pressure monitoring, whether invasive or not, doubles the amount of observed hypotension and halves the amount of hypotension patients experience.

ASA Monitor: Knowing what we know, the big question is: Do we need new standards on hypotension?
Dr. Sessler: Observational analyses from many groups report that the harm threshold is a mean arterial pressure below about 65 mm Hg. At this point, there is little evidence that the relationship is causal, although a causal relationship is certainly biologically plausible. Until robust trials prove that hypotension causes organ injury and clearly define the harm threshold, clinicians might object to being held to a particular blood pressure standard.

The Value of Community
Continued from previous page

We met online to identify clinical and nonclinical topics that were of most significance and interest to residents and developed strategies to improve resident awareness of ASA’s role in the evolution of the specialty of anesthesiology. Topics we raised included understanding systems and processes across various programs, sharing a difficult day at work, advice on work/life balance, help with decisions for pursuing a fellowship, early-career strategy/advice, navigating transitions, and, of course, soft skills like communication and people management. Fellow residents reluctant to post about sensitive topics were strongly encouraged to post anonymously. You can find resident-related community content at community.asahq.org/browse/residents-corner.

So, residents, do you have a question or thorny issue to navigate? Consider crowdsourcing ideas from “near peer” physicians who are a few years ahead in their career journey. There are significant benefits to online networking within one’s own professional society – don’t overlook the power of this important resident resource.

The author would like to thank Emily Cowan and Dr. Kumar Belani for their valuable input.

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