Checklists in operating rooms improve performance during crises

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In an airplane crisis—an engine failure, a fire—pilots pull out a checklist to help with their decision-making. But in an operating room crisis—massive bleeding, a patient's heart stops—surgical teams don't. Given the complexity of judgment and circumstances, standard practice is for teams to use memory alone. In a new study published in the January 17 issue of the *New England Journal of Medicine*, however, researchers at Ariadne Labs, a joint center for health system innovation at Brigham and Women's Hospital and Harvard School of Public Health, have found that teams using checklists have markedly better safety performance. Specifically, the research shows that clinicians provided with checklists in a novel study using advanced simulation of surgical crises were three-fourths less likely to miss key life-saving steps in care.

With many surgical procedures happening simultaneously and around the clock in a hospital setting, crises in operating rooms occur frequently, however, for individual clinicians, these incidents are rare. These high-risk, stressful events require rapid, coordinated care, and failure to rescue surgical patients who have life-threatening complications is the largest source of differences in rates of surgical death between hospitals. Researchers report that the failure rate for performing life-saving processes of care dropped from 23 percent to 6 percent during simulations when checklists were available.

"For decades, we in surgery have believed that surgical crisis situations are too complex for simple checklists to be helpful. This work shows that assumption is wrong." said Atul Gawande, MD, MPH, senior author

of the paper, a surgeon at BWH, professor in Health Policy and Management at HSPH, and director of Ariadne Labs. "Four years ago, we showed that completing a routine checklist before surgery can substantially reduce the likelihood of a major complication. This new work shows that use of a set of carefully crafted checklists during an operating room crisis also has the potential to markedly improve care and safety."

For this work, researchers recruited 17 operating room teams, comprised of anesthesia staff, operating room nurses, surgical technologists, and a mock surgeon participant to participate in 106 simulated surgical crisis scenarios in a simulated operating room at the STRATUS Center for Medical Simulation at Brigham and Women's Hospital. Each team was randomized to manage half of the scenarios with a set of crisis checklists and the remaining scenarios from memory alone.

Researchers found that in addition to reporting a reduction in the failure to adhere to life-saving processes of care during simulations when checklists were available, 97 percent of participants indicated that they would want these checklists used if they experienced an intraoperative crisis as a patient

"Given these findings, Brigham and Women's Hospital has now committed to implementing these checklists to increase the safety of our patients and to evaluate the effect they have on care. I would encourage other hospitals and surgical centers to consider doing the same," Gawande said.

Up-to-date checklists and implementation materials can be found at www.projectcheck.org/crisis.

Researchers note that because the study was performed in a simulated operating room, rather than in actual operating rooms with real patients,

it is unclear if adherence would improve in a real world scenario. However, high-fidelity simulation has become increasingly accepted in medicine as a means of training and evaluation, and well-structured simulation testing has been shown to efficiently assess the value of safety protocols in other fields.

Provided by Brigham and Women's Hospital