If you look behind some of the major studies on patient safety in surgery, you’ll find a common name—Atul Gawande, MD, MPH. He led the well-known 2003 study documenting the incidence of retained items in surgery. He’s just finished a clinical study of a bar code technology to aid sponge counts. He participated in a human factors study that yielded, among other things, the controversial finding that surgical counts competed with other patient care tasks for nurses’ attention and disrupted other activities.

He and his group reported recently on a “surgical Apgar score,” which will be piloted in 6 countries as part of the World Health Organization’s Global Challenge for Safer Surgery.

He’s also a popular author. His new book, Better: A Surgeon’s Notes on Performance, was published in April by Metropolitan Books. An earlier book, Complications: A Surgeon’s Notes on an Imperfect Science (Metropolitan Books, 2002), compiles a series of essays he wrote for The New Yorker while he was a resident.

Dr Gawande is a general surgeon at Brigham & Women’s Hospital and assistant professor at the Harvard Medical School and the Harvard School of Public Health in Boston. He holds a MacArthur Fellowship, which goes to some of the nation’s most creative scientists and artists.

OR Manager interviewed Dr Gawande about his work.

Most of our readers will be familiar with your study on retained foreign objects. What do you see as the future of technology for addressing this?

Dr Gawande: We found that in 90% of cases when something is left behind, the nurses have taken all the proper steps and counted everything, yet something is missed. Often, it’s because of situations that stress the ability to get a good, accurate count and recognize that something is left inside. The number one factor was emergency cases. Number two was an operation where there was a change in the procedure done. The last factor is the obese patient, and I suspect it’s just harder to recognize that something is tucked inside.

What this study told us was that a technological solution is going to be important to drop our current rate of retained foreign objects of about 1 in 15,000 operations. That’s about 1 to 2 cases per year for a typical large hospital.

We did focus groups with nurses on various kinds of technological solutions. For a variety of reasons, the focus groups found the idea of the bar code most appealing. So we worked with a company called SurgiCount to develop a bar-coded sponge counting system. Then we did a trial for them with 300 patients, 150 of whom had the usual counting methods and 150 who had the bar-coded sponge system. We finished the study a few months ago, and we’re submitting it for publication.

I think the future is going to be some way to automate the counting process. The dream is that you just wave a wand or have a radiofrequency ID tag in a sponge. Sponges are only about 2 cents apiece, so having a technology that’s affordable and is even more reliable than the current 1 in 15,000 error rate is tricky.
You were involved in a human factors study led by Caprice Christian. One finding was that counting played a surprisingly negative role. Yet counting is a standard of care. Would you please comment on the findings and on counting as a patient safety strategy?

Dr. Gawande: I think counting is absolutely necessary. The study involved a surgeon and a human factors engineer, who is not an expert in health care. Interestingly, it was the human factors engineer who provided the most insight. What they looked at basically is the flow of information and work. The study was not intended to be about sponge counts. These were complex cases like APRs [anterior-posterior resections]. The net result was that looking at the work flow of nurses, counts became a bottleneck for them.

The counts took about 15% of the operating room time. At times, the nurses had conflicting responsibilities when they were trying to do the counts, and the surgeon wanted more equipment, or an issue came up from anesthesia. Trying to make it so the nurse is not distracted, but the flow of the case can go on is important. I think the main lesson was that counts are absolutely essential for safety but also can’t interfere with the case. How to remedy that is sort of unclear.

A counting process like radiofrequency ID would allow the nurse not to be distracted and not have to spend a lot of professional time counting things. I think we are a few years away from being able to make it part of any standard. But I think that’s the next step.

You have just published a study on an Apgar score for general and vascular surgery. Why is this important?

Dr. Gawande: That gets to a fundamental question about how we make things better in medicine, and it’s evolved across our research group. It’s also the subject of the new book I have out.

The core of it is that a decade ago we weren’t ready to accept our fallibility in medicine and admit it to the public, and now we’re comfortable doing that. Then the question is, what do we do, knowing we’re fallible?

We know that our major complication rate in general and vascular surgery is around 8% to 10%, and we haven’t made a difference in that in over a decade.

Then think about obstetrics. Childbirth was the single most common killer for women of childbearing age until about 50 years ago. And now it is 1 in 20,000 women who have a risk of dying in childbirth.

The question is, how did they do that? What turned out to be important is the score developed by Virginia Apgar. She was an anesthesiologist; she never delivered babies, but she was concerned because babies would be born blue, and they would say, ‘It’s a still birth.’ But no one really tried to think, how do we make it so we don’t have this happen?

What she did is to make a score asking, on a scale of 1 to 10, how did the baby come out? That led to the question, ‘Can we make more of those babies have a 10 rather than a 2?’ Within 10 years, that led to dozens if not hundreds of changes.

Obstetricians started to get rid of general anesthesia because they found it was lowering the Apgar scores and started switching to spinal anesthesia. They recognized that routine ultrasound helped to identify problems before delivery. Within 3 years of introducing the Apgar score, we had neonatal intensive care units.

When Virginia Apgar was working, about 5% of kids were born with a score of less than 5, a high-risk grouping. Today it’s less than 1 in 1,000.

An ‘Apgar score’ for surgery

In surgery, when we finish an operation, we can’t tell people how well the patient really did. We can say, ‘Oh, that operation didn’t go too great, or the operation went well.’ Then we wait for the 30-day measure of complication rates.

We thought if we could create a score that lets you know at the end of an operation how well things went, it could potentially make a big difference. In the study, we looked at almost 38 different measures for how a patient does.

It turned out 3 things were the strongest predictors of whether patients would have a complication in a month:
• the amount of blood loss
• the lowest blood pressure during the operation
• the lowest heart rate.

The lower the heart rate, the better the patients did. The lower the blood pressure, the worse they did. And obviously, the more the blood loss, the worse they did.

If a patient has a score of 9 or 10, that meant you had less than a 100 cc blood loss, the mean arterial pressure never fell below 70, and the heart rate didn’t go above 65. Those patients had less than a 4% chance of a complication and 0 deaths.

A score of less than 5 meant greater than a liter of blood loss and/or very low blood pressure, and a heart rate that didn’t come down. Those patients had a 14% death rate and greater than a 50% chance of major complications.

That’s very much like the Apgar score. The number we zero in on is, “How many patients have a score of less than 5?” At Brigham, we put in the record the surgical Apgar score for every patient in general and vascular surgery. It has let us identify about 40 patients in the last 3 months who haven’t done well.

Now we’re trying to think, “How can we lower that number?”

Please tell us about your work with the World Health Organization project to make surgery safer.

Dr Gawande: Number one, we want to try to see if we can introduce kind of an OR checklist, a pilot’s checklist, worldwide. The second is, we want to try to see that we have some basic vital statistics that we can collect for surgery in countries around the world. We’re also going to be piloting the surgical Apgar score in 6 countries this fall to see whether it helps.

That sounds like an ambitious agenda.

Dr Gawande: Kind of what the new book is about is the people who have tried to shoot high in medicine have had extraordinary results. There’s a chapter on the folks who said, “Let’s get rid of polio,” and they’ve got it down to 5 countries. They’ve eliminated it in even some of the poorest countries in the world. They did it by marshalling people for a 48-hour immunization of 5 million children because of a single case of polio.

Another example was how military teams in Iraq and Afghanistan have lowered the mortality of soldiers from 25% mortality down to 10% just since the Persian Gulf War.

They did it by thinking big, by being willing to say, “Look, we’re going to have a whole lot of soldiers hurt. Can we make a quantum leap in what we’re doing?”—and they did.

It’s partly by measuring yourself. That’s why I feel one of the most important things we could do is the surgical Apgar. And it’s also by being innovative and empowering people to think about what you can do on the local level to change results. At the end of the day, I think about how can we help the ordinary surgical team, the ordinary hospital get great results?

You know, we don’t have centers of excellence for childbirth—we make sure everywhere that you have a child is safe and reliable. And I think we can do that in surgery.

—Pat Patterson

References

