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The Benefits of Sharpless Surgery

An Interview with Martin Makary, M.D., M.P.H.

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SURGEON MARTIN MAKARY IS WORKING on a quiet revolution in the operating room: sharpless surgery. Assistant Professor of Surgery at the Johns Hopkins University School of Medicine, he holds a joint appointment as Assistant Professor of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. He credits his public health training with piquing his interest in sharpless surgery. “I was alarmed at the high incidence and generalized acceptance of needlesticks and body fluid splashes during my surgical training. It’s part of the culture. As a systems researcher involved in quality and safety initiatives at Hopkins, I could see that occupational exposures to bloodborne pathogens in the operating room clearly repre-

sented a significant health risk to surgeons and surgeons-in-training.”

One incident is particularly vivid: “It was one of my first cases as an attending surgeon, and I was supervising an intern performing an incision and drainage of a perirectal abscess. I was taken aback when the intern, with an awkward movement, passed a bloody knife over his shoulder to the scrub nurse, with the sharp end pointed towards the nurse. A medical student was standing right next to the intern. The patient had HIV. I was struck by how such a novice maneuver, part of a simple procedure, placed four people at significant risk for contracting HIV. I thought to myself: there must be a safer way to do our job.”

Makary noticed that cases involving HIV- or HCV-infected patients were often the ones assigned to the least experienced residents as part of their training. Patients with HIV or HCV are predisposed to some relatively minor conditions, such as lymph node enlargement and soft tissue abscess formation, which frequently require surgery. Because the procedures are usually simple, often they are relegated to less experienced staff, without consideration of the risk of exposure to bloodborne pathogens.

When Makary first gave serious consideration to the problem of needlestick injuries and blood exposures in surgery, he drew on his

public health knowledge of management systems: “In a systems-based approach, when you’re looking at a safety problem you search for ways to engineer risk out of the system, rather than trying to modify individual behaviors. The traditional method of modifying behavior in surgery focuses on the individual—and sometimes comes down to scolding the resident. That’s a temporizing measure, not a solution. It means that every year you have a new batch of residents who go through the same learning curve, the same set of errors, and while they are learning they may be putting others at risk. By contrast, when you improve the system in which they work and the processes by which they learn, you reduce the chance for human error.”

Sharps pose a magnified risk during urgent and emergent operations. Often, these rushed and critical circumstances are associated with less team coordination and, sometimes, suboptimal visibility in the operative site. When a sharp instrument is added to the system, injuries are almost inevitable, even with the most experienced surgeon. Thus, eliminating sharps as much as technically possible from surgery is, in Makary’s view, the most effective method for reducing injuries. (Makary agrees, however, that implementing safety-engineered devices, such as retractable or

The Benefits of Sharpless Surgery

shielded scalpels that protect the blade after use, are also important, along with safer work practices, such as proper needle handling techniques and the use of a neutral or hands-free passing zone.)

Makary defines “sharpless surgery” as a protocol for performing an operation without any sharps that could potentially cause a percutaneous injury to operating room personnel. In a sharpless protocol, sharps are reserved for emergency-only use during an operation. In developing protocols for sharpless surgery, Makary asked himself what existing technologies were already available that could eliminate the need for a sharp. Next he sought to coordinate the operating room team to keep sharps protected and away from the operative field unless absolutely necessary for patient safety. Some of the sharpless devices and techniques he utilizes have been around for a while, such as electrocautery and surgical staples; others, like skin adhesives, laparoscopic blunt and visual trocars, and laparoscopic staplers, are more recent innovations. “The sharpless protocols we developed are really the common sense application of existing technology. They can be used to perform a wide variety of operations, from incision and drainage of a soft-tissue abscess to an appendectomy.” He estimates that he now performs about 20% of his general surgery practice using exclusively sharpless techniques.

Along with completely eliminating the risk of percutaneous injuries to surgeons and assisting OR personnel, Makary claims that sharpless surgery creates a better working environment. “Intuitively, it makes sense that healthcare workers who feel better protected from occupational hazards will perform better.” His co-workers have responded enthusiastically to the

sharpless protocol: “Nurses, especially, love it; they are worried about bloodborne exposures associated with their profession and find it empowering to know their health and well-being are valued.”

Many of his surgical colleagues, particularly those just starting their careers, have also been receptive to the sharpless protocol and, in gen-

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eral, want to do whatever they can to minimize their occupational risk. “Exposure to bloodborne pathogens, and the risk of infection with HIV or HCV, is something younger surgeons are increasingly concerned about—and something medical students take into account when they are considering careers in surgery.”

Makary notes that part of his motivation for working on sharpless surgery was his sense that hepatitis C was on the rise in some patient populations, particularly in patients requiring surgery. In fact, he and his colleagues recently completed a ret-

rospective study investigating the incidence of HIV, HBV, and HCV in patients presenting for general surgery over a one-year period at the Johns Hopkins Hospital. Patients came mainly from the local East Baltimore community. Of the large group of surgical patients on whom testing for HIV, HBV or HCV was performed, 38% were found to be infected with at least one of these pathogens. “This alarming prevalence rate was much higher than we expected, and is due, we believe, to an association between infection-related disease and the need for surgery—for example, HIV-related lymphadenopathy requiring surgical excision, or I.V. drug use-related abscesses requiring surgical incision and drainage in patients with hepatitis. Many of these cases are what surgeons call ‘intern-level’ cases. My colleagues and I observed a correlation between small surgical cases assigned to low-level trainees and increased injury risk, due to trainee inexperience, along with increased infection risk, due to a higher prevalence of bloodborne pathogens in this patient population. This linkage suggests we need to do more to protect those in the early part of their surgical training. The good news is that many of these same operations—the ones associated with both bloodborne pathogen exposure risk and surgeon inexperience—are ideal candidates for a sharpless protocol. It’s possible to strategically employ sharpless surgical techniques for many basic procedures, in order to reduce or eliminate the risk of percutaneous injury to residents, medical students, and other operating room personnel.”

In Makary’s department, the emphasis on safety comes from the top down: “The chair of surgery, Dr. Julie Freischlag, has identified safety as the number-one priority for the department—and, of course, she sets the culture for the department

as a whole.” The use of sharpless protocols for candidate operations can be institutionalized by making them an automatic part of the surgeon’s preoperative decision-making process. Once a surgeon decides he will perform an operation using a sharpless protocol, he indicates that choice on the OR schedule, enabling the scrub and circulating nurses and technicians to have the appropriate instruments available and on standby.

For Makary, part of creating a “culture of safety”—and an important element in reducing percutaneous injury risk—is having clear and open channels of communication. “When you create an atmosphere of approachability and teamwork, it reduces the chance of mistakes occurring and allows the surgeon to intervene earlier when an issue or problem arises. In my career, I have been amazed at how often surgeons, anesthesiologists, scrub nurses, and OR technicians work closely together on critical problems without even knowing one another’s names. As one remedy, we started performing an ‘Operating Room Briefing’ before each case, to discuss the operation as a team and help avoid potential problems. The simple briefing includes a five-question prompt which ensures, among other things, that everyone knows each other and the goals for the operation. I truly believe that teamwork and communication is at the heart of good surgical outcomes and quality patient care.”

Makary concludes: “A change in culture begins with a recognition of the issues and a willingness to re-evaluate the traditional way in which surgical procedures are performed. The kind of systems approach I advocate views exposure events not as the fault of individuals alone, but more as the inevitable by-product of a system which allows surgeons to be injured so frequently. We want to change that paradigm.” □

Sharpless Surgery Q&A

AEP: “What impact does a change to sharpless surgery have on technique?”

MM: “Many of these techniques are already routinely used in a variety of operations. What we are advocating is using them in combination, in a strategic manner, to minimize the use of sharps to the greatest extent possible.”

AEP: “Is it hard to get older or more experienced surgeons on board with the sharpless protocol? To get them to change their way of doing things?”

MM: “Often it’s just a matter of presenting the sharpless techniques with which they are already familiar in a different light, to promote their own safety. Most surgeons do have a keen interest in protecting themselves from exposures to life-altering diseases.”

AEP: “What is the potential for eliminating sharps from surgery?”

MM: “Sharps play an important and often critical role in most of the operations we perform; they can’t be totally eliminated, at least not with the technology currently at our disposal. However, there are select operations which, when properly thought through, can be performed with substitute techniques that minimize or eliminate the risk of a sharps injury. These ‘smaller’ operations are often performed with sharp techniques as a matter of routine—but don’t have to be.”

AEP: “Are there economic benefits to doing sharpless surgery?”

MM: “It doesn’t necessarily reduce the cost of individual procedures; in fact, some of the sharpless instrumentation may be a little more expensive than traditional sharp instruments. Probably the greatest economic benefit of sharpless surgery is the protection it affords to a surgeon’s investment in his career, decreasing the risk that he might be infected with a bloodborne pathogen and have his career cut short.”

AEP: “As you work on eliminating sharps from surgery, have you had ideas about sharpless instruments that would help support this method? Is there room for product development?”

MM: “Definitely. For example, many laparoscopic operations will be candidates for a completely sharpless technique once an alternative is found to closing a midline fascial defect with a sharp. The technology is very close.”

AEP: “What are the international implications of your work?”

MM: “In countries where the incidence of HIV is over 20%, such as parts of Africa, minimizing the use of sharps in surgery has significant implications for protecting the lives of healthcare workers. Many of the doctors and nurses in Africa are saints; they work long hours for little pay, and carry an incredibly high occupational health risk, given the HIV pandemic there. I hope to see these techniques widely adopted, so that surgeons and other healthcare providers in the poorest regions of the world can do their work more safely.” □