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Risk Prevention Measures in Laparoscopic Electrosurgery

Over the past 10 years, the practice of laparoscopic electrosurgery has expanded dramatically as an increasing number of surgeons have switched from traditional methods of open surgery to minimally invasive techniques. According to the Society of Laparoendoscopic Surgeons (SLS), an estimated 2 million laparoscopic procedures will be performed in the United States in 1997, and it is projected that laparoscopy will account for 40% of urology procedures, 50% of general surgery procedures, and 70% of gynecology procedures by the year 2000.

Despite the burgeoning use of laparoscopic techniques,currently no universally recognized standards or credentialing for surgeons who perform laparoscopic electrosurgery exist. Instead, credentialing is determined by individual healthcare facilities, and as a result, surgeons in many hospitals can operate electrosurgical equipment without receiving adequate training on how to use it. Findings from a survey conducted at a 1994 SLS meeting indicated that 50% of all responding laparoscopists had no formal training in electrosurgery and that 86% worked in facilities that did not require credentialing in order to practice electrosurgery. According to Gerald Kirshenbaum, M.D., an experienced laparoscopic surgeon, *"...many surgeons are unaware of the dangers involved with laparoscopic electrosurgery and think that at worst they will convert to an open procedure. They don't take into account the possibility of accidentally cutting the common bile duct or perforating the bowel."*

While laparoscopic monopolar electrosurgery has long been a versatile and effective laparoscopic technique to cut and coagulate tissue, it can expose patients to certain safety risks. Some of these risks are related to surgical skill, such as the misidentification of anatomy, direct thermal injury with the tip of the active electrode, or trocar puncture wounds. A recent study published in *Urology* (1993;**42**(1):2–12) found that complication rates of surgeons who performed fewer than 100 laparoscopic procedures were almost four times greater than those of surgeons with more experience. Results of a study published in the *Journal of the American Medical Association* (1993;**270**(22):2689–2692) on predictors of laparoscopic complications after formal training in laparoscopy showed that attending one post-residency instructional course did not result in optimal clinical performance. Instead, continuing education with a more experienced surgeon, for example, could decrease long-term complication rates.

Not all patient-safety risks posed by laparoscopic monopolar electrosurgery are due to surgeon error; others can stem from the very nature of the electrosurgical environment. Stray electrical energy can "leak" from the 35 cm shaft of the active electrode and cause severe morbidity and even death. Such risks are poorly understood or appreciated. At the 1994 SLS meeting, 77% of surveyed surgeons admitted that they could not define capacitive coupling—one of three

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Arizona Physician Insurer Launches Model Risk Management Program

The Mutual Insurance Company of Arizona (MICA), headquartered in Phoenix, Ariz., is one of the first physician insurance companies to proactively address the problem of electrosurgical injury during laparoscopy. The company provides medical malpractice insurance to approximately 1,000 surgeons statewide, 80% of whom utilize laparoscopy in their practices. A growing body of literature, observations by physicians, and losses experienced by other physician insurers convinced MICA's Risk Manager, Donna Young, that the problem was of sufficient magnitude to warrant a response. *"We knew that it was just a matter of time before some of our surgeons would experience a problem,"* she said.

MICA's laparoscopic risk management program,introduced in 1994, consists of a three-tiered educational strategy. First, the company recommends that surgeons become familiar with active electrode monitoring, the only technology available that eliminates the risk of unintentional burns to non-targeted tissues during laparoscopic electrosurgery. Second, MICA suggests that surgeons obtain specialized training before performing laparoscopic procedures. Last, surgeons are encouraged to discuss the possible complications associated with minimally invasive electrosurgery with their patients prior to surgery and to secure their informed consent.

As a result of its educational program, Young feels that MICA has been extremely successful in avoiding malpractice cases due to unintended burns incurred during laparoscopy.

Educational seminars are offered to surgeons by MICA on a regular basis at different sites throughout Arizona. In return for participating in the training sessions, physicians are awarded continuing medical education credits. According to Young, the seminars have made a big impression on the surgeons. *"When the*

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causes of stray electrical energy burns—or explain how to avoid it. Thermal burns from stray electrical energy can also result from insulation failure and direct coupling. (See *Laparoscopy Risk Report,* 1997;**1**(1):1–2, for more information.)

According to a recent article in *Laparoscopic Surgery Update* (February 1995:14–16), inadequate training is a principle cause of adverse clinical outcomes, which result in malpractice cases against laparoscopists. Recognizing the patient-safety risks posed by laparoscopic electrosurgery, some malpractice insurers have increased their premiums 15–20% for laparoscopists while others have established incentives, such as continuing medical education credits or premium discounts, for member physicians who attend training sessions.

Robert E. Taylor, M.D., is the Medical Director of the Oregon-based Northwest Physicians Mutual (NPM) Insurance Company. He has organized seminars to further educate NPM member physicians about how and why stray electrical energy burns can occur during laparoscopic electrosurgery. Dr. Taylor noted that although *"...physicians do a lot of surgery..., their level of didactic training in electrophysiology is limited. Some finer points of electrophysiology may be briefly taught, so reviewing it is very helpful."*

While the incidence of stray electrical energy burns is fairly low, the extreme severity of the complications combined with the practice of discharging seemingly healthy patients soon after minimally invasive electrosurgery can result in serious legal ramifications for surgeons and hospitals, not to mention deleterious health consequences for patients. *"It was our perception that it was an area with potential liability issues, and then we saw several cases, so we thought additional training was worth the effort,"* Dr. Taylor said. Member physicians who took the NPM seminars qualified for a three-year, 7.5% premium discount. More importantly, they learned about the power of the electrical energy used in laparoscopic procedures and ways to avoid the risks associated with stray energy.

Improved surgeon training efforts—while critical—cannot fully address the safety risks associated with stray electrical current. Additional methods to minimize risk include specific training of technical personnel, visual examination of electrodes for insulation damage, the use of disposable electrodes, prohibiting the use of hybrid (plastic-metal) cannulas, and, in limited circumstances, adopting the use of bipolar electrosurgery. Currently, the only way to *eliminate* patient injury due to stray electrical energy is to use *active electrode monitoring,* a shielding and monitoring system that interfaces with electrosurgical units (ESUs) to help detect and manage stray electrical energy. This safety device will shut down the ESU in order to protect a patient from injury should a stray electrical energy leak occur.

The absence of credentialing and standards in laparoscopic electrosurgery may unnecessarily compromise the safety of patients who undergo these procedures. Until universal standards are developed and adopted, ongoing participation in training and educational seminars, coupled with prevention techniques such as the use of active electrode monitoring, may help to significantly reduce patient injury, and thereby minimize surgeons' and hospitals' risk of litigation. ■

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surgeons saw that stray electrical current can cause patient injury during electrosurgery, they were amazed." Young says that the risk management seminars have become very popular over the last three years.

With the growth and popularity of laparoscopy among surgeons and patients alike, an investment in prevention programs similar to the MICA model seems worthwhile. These programs are a cost-effective strategy for protecting both patients and surgeons during laparoscopic electrosurgery. ■

To raise awareness about the need to ensure patient safety during laparoscopic surgery, Communicore announces the availability of a White Paper and Educational Issues Video, ***Avoiding Electrosurgical Injury During Laparoscopy: An Emerging Patient Safety Issue,*** which explore the medical, economic, and legal liability risks associated with laparoscopic electrosurgery and discuss appropriate safety procedures and technologies that can be employed to mitigate these risks.

For a complimentary copy of the White Paper and/or Issues Video, please call 206/224–4240 or fax us at 206/224–4241. For an online version of the White Paper, visit the Media Resource Center on the Communicore Web site (http://www.communicore.com). ■

Laparoscopy Risk Report is a publication dedicated to enhancing patient safety during laparoscopic electrosurgery through education and risk prevention.

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