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Editorial
Electrosurgery Revisited

In a previous issue of this journal (Volume 5, Number 4), I wrote an editorial about the need to approach the resurgence of electrical surgery with caution so as not to repeat the history of past mistakes. I now take the opportunity to expand this admonition and also to eat some of my own words.

I continue to believe that coagulation of long organs, particularly with narrow cross-sectional diameters, for example, vessels by monopolar high frequency current is riskier than with bipolar techniques. Another clear benefit of bipolar coagulation relates to diminished tissue damage, since only tissue between the two electrodes is coagulated and by careful observation of the current flow, excessive temperatures are avoided once the vapor barrier is produced.

Contemporary high-quality monopolar generators have isolated circuits to ensure safety during monopolar cutting and coagulation. The current leaving the active electrode and the current returning through the neutral electrode (ground plate) are measured. When a reduction of current from the neutral electrode is sensed, the active electrode is shut down automatically. The isolation of current flow provides a safety valve that prevents electrical burns to the patient. similarly, when high-frequency, low voltage electricity is employed for surgical cutting, low-frequency sensor devices detect leakage. Thus the risk of electrical shock is minimized. The fact that all electrical generators are not created equal must, however, be kept in mind. The clinician who wished to avoid problems should be sure to shop carefully and determine whether a given generator is equipped to detect high and low frequency leakage, output errors, excessive time of discharge, and neutral electrode fault.

New devices employing argon gas to conduct spray coagulating electrical arcs for hemostasis during laparoscopic surgery will be entering the marketplace in increasing numbers. The flow of argon gas from these devices ranges from 2 to 14 L per minute. Care must be taken when using this technology in close proximity to areas of rich vascularity with large open vessels, since high gas flow can enfilade across tissue planes and enter vessels. As with coaxial gas-cooled laser fibers, the risk of gaseous embolism is a real concern.

Since high-frequency electrical current cuts tissue in a manner similar to carbon dioxide lasers, that is, by cellular vaporization, smoke is produced. This vapor consists of fine particulate matter as well as biologic particles. Data already have been published showing that laser and electrosurgical vapors contain viable human papilloma and human immunodeficiency virus DNA. We do not need to repeat history when using electrosurgical devices. An appropriate smoke evacuator equipped with filters capable to trapping particles 0.1 pm or smaller must always be used when this equipment is employed for surgical procedures. Smoke byproducts are hazardous to breathe by everyone present in the operating room. To operate with lasers or electrosurgical devices without proper, specifically designed smoke-handling equipment is reckless.

I believe that monopolar electrical surgery can be performed safely. Understanding the physics and tissue action of high frequency electrical current is vitally important for the gynecologic surgeon who chooses to use it.

Michael S. Baggish, M.D.
Editor-in-Chief