

Valleylab Electrosurgical Generators: Cautions and Warnings Before, During, and After Surgery

The [August 2004 Valleylab Clinical Information Hotline Newsletter](#) was the first of two publications focusing on Valleylab generator "General Cautions and Warnings for Patient and Operating Room Safety." This issue will conclude the series with cautions and warnings relating to use of the Valleylab generators before, during, and after electrosurgical procedures.

As stated in our previous *Hotline Newsletter*, the *AORN Standards and Recommended Practices and Guidelines for Electrosurgery* recommends that the... "electrosurgical unit and accessories should be used according to manufacturers' written instructions and ... equipment manuals should be readily available to users"¹.

As you read through the following information, please remember that the information presented in this publication is found in all Valleylab ESU (electrosurgical unit) user's guides, and the guides should be kept with the ESU at all times.

The July 2003 *Clinical Information Hotline News*, [Volume 8, Issue 2](#), "Troubleshooting Electrosurgical Equipment and Accessories," can be used as a reference when using Valleylab generators. All troubleshooting information can also be found in the Valleylab generator user's guides.

BEFORE SURGERY²

Active Accessories

WARNING

Electric Shock Hazard – Do not connect wet accessories to the generator.

Connect accessories to the **proper receptacle**. Improper connection may result in inadvertent accessory activation or other potentially hazardous conditions. Follow the instructions provided with electrosurgical accessories for proper connection and use.

Electric Shock Hazard – Ensure that all accessories and adapters are correctly connected and that no metal is exposed.

(Refer to the following issues of *Clinical Information Hotline News*: "Improperly Seated Active Electrodes — An Alternate Site Injury Risk," [September 2001, Vol. 6, Iss. 3](#), and "Ouch! I Just Got Shocked!" [March 1999, Vol. 4, Iss. 1](#).)

CAUTION

Read the instructions, warnings, and cautions provided with electrosurgical accessories before using. Specific instructions are not included in this manual.

Accessories must be connected to the proper receptacle type. In particular, **bipolar accessories** must be connected to the bipolar receptacle only. Improper connection of accessories may result in inadvertent generator activation or a REM™ contact quality monitoring system alarm.

(Refer to *Clinical Information Hotline News*, "Basics of Bipolar Electrosurgery," [December 1999, Vol. 4, Iss. 4](#).)

Set power levels to the **lowest setting** before testing an accessory.

Inspect accessories and cords (especially reusable accessories and cords) for breaks, cracks, nicks, or other damage before



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every use. If damaged, do not use. Failure to observe this precaution may result in injury or electrical shock to the patient or surgical team.

(Refer to the following issues of *Clinical Information Hotline News*: "OR Fires! Minimizing the Risk," June 1999, Vol. 4, Iss. 2, "Electromagnetic Interference," March 2001, Vol. 6, Iss. 1, "Improperly Seated Active Electrodes - An Alternate Site Injury Risk," September 2001, Vol. 6, Iss. 3, and "'Captain of the Ship', or Nursing Liability?" February 2002, Vol. 7, Iss. 1.)

Do not **reuse or resterilize** accessories labeled "disposable" or "single use only".

Patient Return Electrodes

Valleylab recommends the use of **REM™ patient return electrodes** to maximize patient safety.

WARNING

The safe use of monopolar electrosurgery requires proper placement of the patient return electrode. To avoid electrosurgical burns beneath the patient return electrode, follow all directions on the product package for proper return electrode placement and use.

Do not cut a patient return electrode to reduce its size. Patient burns due to high current density may result.

Do not apply a patient return electrode if only bipolar accessories are being used. Otherwise, the electrosurgical effect may not be limited to the tissue between the bipolar electrodes.

(Refer to the following issues of *Clinical Information Hotline News*: "Basics of Bipolar Electrosurgery," December 1999, Vol. 4, Iss. 4, and "Does Placement of the Patient Return Electrode Make a Difference?" September 1997, Vol. 2, Iss. 3.)

Using a patient return electrode without the REM™ safety feature will not activate the Valleylab REM™ contact quality monitoring system.

Valleylab recommends against the use of **capacitive pads**. These pads do not activate the REM™ contact quality monitoring system and require the use of higher power settings to achieve the desired surgical effect. This **increases the possibility of alternate site burns**.

(Refer to *Clinical Information Hotline News*, "What You Should Know About Stray Current," December 2003, Vol. 8, Iss. 3.)

Shunt Cords

WARNING

Some surgical instruments (e.g., colonoscopes) may allow substantial leakage current, which could burn the surgeon. If the instrument manufacturer recommends the use of a shunt cord (**s-cord**) to direct the current back to the generator, you must also use a Valleylab **E0507-B** adapter. To avoid a REM™ alarm, you must use a REM™ patient return electrode with the E0507-B adapter.

Generator

WARNING

Patient Safety– Use the generator only if the self-test has been completed as described. Otherwise, inaccurate power outputs may result.

Electric Shock Hazard– Connect the generator power cord to a properly grounded receptacle. Do not use power plug adapters.

Fire Hazard– Do not use extension cords.

The instrument receptacles on the generator are designed to accept **only one instrument at a time**. Do not attempt to connect more than one instrument at a time into a given receptacle. Doing so will cause simultaneous activation of the instruments.

CAUTION

Do not stack equipment on top of the generator or place the generator on top of electrical equipment (except a Force™ GSU or Force Argon™ II unit). These configurations are unstable and/or do not allow for adequate cooling.

When using a smoke evacuator in conjunction with the electrosurgical generator, place the smoke evacuator at a distance from the generator and set the generator volume control at a level that ensures that the activation tones can be heard.

Provide as much **distance** as possible between the electrosurgical generator and other electronic equipment (such as monitors). An activated electrosurgical generator may cause interference with them.

Do not turn the **activation tone** down to an inaudible level. The activation tone alerts the surgical team when an accessory is active.

Nonfunction of the generator may cause interruption of surgery. A **backup generator** should be available for use.

NOTICE

If required by local codes, connect the generator to the hospital equalization connector with an equipotential cable.

Connect the power cord to a wall receptacle having the correct voltage. Otherwise, product damage may result.

DURING SURGERY

Generator Power Settings

WARNING

Confirm proper power settings before proceeding with surgery. Use the lowest power setting possible for the minimum time necessary to achieve the desired effect.

Never increase the power settings without first checking both the active electrode and the patient return electrode and their connections. Use the active electrode or forceps only for the minimum time necessary to achieve the desired surgical effect in order to minimize the possibility of burns. This is especially true in **pediatric and neonatal patients or in any patient where small appendages** are involved.

(Refer to the following issues of *Clinical Information Hotline News*: "What Factors Influence Electrosurgical Tissue

Effect?" [April 2000, Vol. 5, Iss. 1](#), "Patient Return Electrode Lesions," [September 2000, Vol. 5, Iss. 3](#), and "Alternate Site Lesions," [December 2000, Vol. 5, Iss. 4](#).)

CAUTION

The Force FX™-C electrosurgical generator cuts effectively at power settings lower than previous models offered by Valleylab. If the proper setting is not known, set the generator at a very low setting and cautiously increase the power until the desired effect is achieved.

Forceps

NOTICE

Do not activate the generator until the forceps have made contact with the patient. Product damage may occur.

Suction Coagulators

WARNING

To avoid the possibility of a burn to the surgeon, always turn the generator off **before bending or reshaping the coagulator** suction tube.

Ensure that the outside of the coagulator suction tube remains **free of blood and mucus**. Failure to clean the coagulator suction tube can allow electrical conductance by means of the contaminants that may result in patient burns.

Do not immerse the suction coagulator handswitch mechanism in saline solution or other conductive fluids. Unintended activation may result.

Contact with Metal Objects

WARNING

Contact of the active electrode with any **metal** (such as hemostats, Gomco clamps, Kocher clamps, etc.) will greatly increase current flow and can result in unintended, catastrophic burn injury.

While using electrosurgery, the patient should not be allowed to come into direct contact with **grounded metal objects** (e.g., surgical table frame, instrument table, etc.). If this is not possible during certain procedures (e.g., those in which noninsulated head frames are used), use extreme caution to maximize patient safety.

- Use the **lowest power setting** that achieves the desired effect.
- Place the patient return electrode as **close to the surgical site** as possible.
- Place **dry gauze** between the patient and the grounded object if possible.
- Continually **monitor** the contact point(s).

(Refer to the following issues of *Clinical Information Hotline News*: "Does Placement of the Patient Return Electrode Make a Difference?" [September 1997, Vol. 2, Iss. 3](#), "What You Should Know About Stray Current," [December 2003, Vol. 8, Iss. 3](#), "Electromagnetic Interference," [March 2001, Vol. 6, Iss. 1](#), "Alternate Site Lesions," [December 2000, Vol. 5, Iss. 4](#), and "'Captain of the Ship', or Nursing Liability?" [February 2002, Vol. 7, Iss. 1](#).)

Active Accessories

WARNING

Fire Hazard – Do not place active accessories near or in contact with **flammable materials** (such as **gauze** or **surgical drapes**). Electrosurgical accessories that are activated or hot from use can cause a fire. Use a **holster** to hold electrosurgical accessories safely away from patients, the surgical team, and flammable materials.

(Refer to *Clinical Information Hotline News*, "OR Fires! Minimizing the Risk," [June 1999, Vol. 4, Iss. 2](#).)

Simultaneously activating suction/irrigation and electrosurgical current may result in **increased arcing** at the electrode tip, burns to unintended tissues, or shocks and burns to the surgical team.

(Refer to *Clinical Information Hotline News*, "Irrigation Solution: Will Your Choice Affect the Electrosurgical Outcome or Patient Safety?" [July 2002, Vol. 7, Iss. 2](#).)

WARNING

Some surgeons may elect to "buzz the hemostat" during surgical procedures. This is not recommended, and the hazards of such a practice probably cannot be eliminated. Burns to the surgeon's hands are possible. To minimize the risk:

- **Do not lean** on the patient, the table, or the retractors while buzzing the hemostat.
- **Activate cut** rather than coag. Cut has a lower voltage than coag.
- Use the **lowest power** setting possible for the minimum time necessary to achieve hemostasis.
- Activate the generator after the **accessory makes contact** with the hemostat. Do not arc to the hemostat.
- **Firmly grasp** as much of the hemostat as possible before activating the generator. This disperses the current over a larger area and minimizes the current concentration at the fingertips.
- "Buzz the hemostat" **below hand level** (as close as possible to the patient) to reduce the opportunity for current to follow alternate paths through the surgeon's hands.
- When using a **stainless steel blade** electrode, place the flat surface against the hemostat or other metal instrument.
- When using a **coated or nonstick blade** electrode, place the edge of the electrode against the hemostat or other metal instrument.

(Refer to *Clinical Information Hotline News*, "Buzzing a Hemostat, What You Should Know," [December 1997, Vol. 2, Iss. 4](#).)

When not using active accessories, place them in a holster or in a clean, dry nonconductive, and highly visible area not in contact with the patient. Inadvertent contact with the patient may result in burns.

(Refer to *Clinical Information Hotline News*, "OR Fires! Minimizing the Risk," [June 1999, Vol. 4, Iss. 2](#).)

Patient Return Electrodes

WARNING

To avoid patient burns, ensure that the patient return electrode **firmly contacts the skin**. Always check the patient return electrode periodically and after the patient is repositioned and during procedures involving long periods of activation.

(Refer to the following issues of *Clinical Information Hotline News*: “Does Placement of the Patient Return Electrode Make a Difference?” [September 1997, Vol. 2, Iss. 3](#), and “Patient Return Electrode Lesions,” [September 2000, Vol. 5, Iss. 3](#).)

Laparoscopic Procedures

WARNING

For laparoscopic procedures, be alert to these potential hazards:

- Laparoscopic surgery may result in **gas embolism** due to insufflation of gas in the abdomen.
- The **electrode tip** may remain hot enough to cause burns after the electrosurgical current is deactivated.
- Inadvertent activation or movement of the **activated electrode outside of the field of vision** may result in injury to the patient.
- Localized burns to the patient or physician may result from electrical currents carried through **conductive objects** (such as cannulas or scopes). Electrical current may be generated in conductive objects by direct contact with the active electrode, or by the active accessory (electrode or cable) being in close proximity to the conductive object.
- Do not use **hybrid trocars** that are composed of both metal and plastic components. For the operative channel, use all metal or all plastic systems. At no time should electrical energy pass through hybrid systems. Capacitive coupling of RF current may cause unintended burns.
- When using laparoscopic instrumentation with metal cannulas, the potential exists for abdominal wall burns to occur due to direct electrode contact or capacitive coupling of RF current. This is most likely to occur in instances where the electrosurgical generator is **activated for extended periods at high power levels** inducing high current levels in the cannula.

- Ensure that the insulation of disposable and reusable laparoscopic instrumentation is intact and uncompromised. **Compromised insulation** may lead to inadvertent metal-to-metal sparking and neuromuscular stimulation and/or inadvertent sparking to adjacent tissue.
- Do not activate electrodes while in **contact with other instruments** as unintended tissue injury may occur.
- Do not activate the generator in an **open circuit** condition. To reduce the chances of unintended burns, activate the generator only when the active electrode is near or touching the target tissue.
- Use the **lowest power setting** that achieves the desired surgical effect and use a low voltage waveform (pure cut or desiccate) to lessen the potential for the creation of capacitive currents.
- **Carefully insert and withdraw** active electrodes from cannulas to avoid possible injury to the patient or damage to the devices. (Refer to *Clinical Information Hotline News*, “What You Should Know About Stray Current,” [December 2003, Vol. 8, Iss. 3](#).)

AFTER SURGERY

WARNING

Electric Shock Hazard – Always turn off and unplug the generator before cleaning.

CAUTION

Do not reuse or resterilize accessories labeled “disposable” or “single use only.”

(Refer to *Clinical Information Hotline News*, “Reprocessing Single Use Medical Devices: A Manufacturer’s Viewpoint,” [July 2001, Vol. 6, Iss. 2](#).)

NOTICE

Do not clean the generator with abrasive cleaning or disinfectant compounds, solvents, or other materials that could scratch the panels or damage the generator.

¹ AORN. *Standards, Recommended Practices and Guidelines*. Denver, CO: 2004, p. 246.

² Valleylab. *Force FX™-C Electrosurgical Generator with Instant Response Technology User’s Guide*. Boulder, CO: 1999.