Modified Cautery Tip and Dissection Technique for Subpectoral Breast Augmentation

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In performing subpectoral breast augmentation, monopolar electocautery (more properly called the electrosurgical unit, or ESU) is frequently applied to achieve adequate hemostasis during the course of dissection. One problem, however, is that the electrical current can cause muscle contraction; when this occurs, the muscle may impale itself on the cautery tip, causing deep muscle belly bleeding. This deep bleeding, which is often at the cranial end of the subpectoral pocket, can be difficult to locate in the substance of the muscle and more difficult to stop, especially through the small incision used for breast augmentation. This is a common complaint I hear among colleagues, and these episodes are not infrequent. They can add 10 to 15 minutes of operating room time, with added expense, prolonged anesthesia time for the patient, greater chance of postoperative bleeding, and certainly increased frustration and exhaustion for the surgeon.

A number of factors come into “play” in this situation. The first is the frequency of the ESU electrical current that is passing through the patient: the higher the frequency, the less muscle contraction that will occur (although some will still occur in certain circumstances). Most ESU devices have a fixed frequency range. Another factor is the ESU setting—that is, whether “cut” or “coagulation” is chosen. These settings are somewhat arbitrary and are not true indicators of their function. The cut mode is typically a better choice for dissection and for deep bleeding coagulation because there is more energy penetration at this setting. A third factor is the dissection tip itself. I use a blade or spatula tip rather than a needle tip, as the ultrafine needle is actually a disadvantage due to a greater chance of vessel damage in the event of the tip being impaled in the muscle during a contraction. The larger tip surface area also decreases the energy density and allows for more adequate hemostasis with little or no loss of dissection ability.1

During the course of a subpectoral breast augmentation, most of us start with a short ESU tip and, as the pocket is developed, switch to the extended cautery tip. I use a 6½-inch insulated, coated blade or spatula tip for the extended ESU tip. Taking the above factors into consideration and observing exactly what was happening during previous events of muscle contraction and ESU tip-muscle impaling with subsequent bleeding, it became clear that 2 things determined the severity of this type of injury. The first was the surface area of the tip. Although I use the spatula tip rather than a needle tip, this is still thin enough to easily transect tissue and vessels, especially with the force of a pectoralis contraction. It was clear that a larger surface area was needed to minimize deep penetration so that the thin edge of the tip would not be exposed to the tissues. The other determining factor was the direction of the dissection and its relationship to the contraction that may occur. Normally, as the dissection for pocket development progresses, the direction proceeds from the incision to the apex of the breast pocket. When a muscle contraction occurs, the muscle is contracting in the opposite direction, primarily toward the incision and the chest wall, meaning that the muscle and ESU tip are traveling toward each other and increasing the likelihood of a deeper penetration into the muscle. A method to correct both aspects—the tip surface area and the dissection direction—would help to decrease the likelihood of a tip-impaling injury.

In examining current ESU tip designs available for various purposes, including endoscopic work, I concluded that the “J-hook” configuration—in which the tip is bent 180 degrees upon itself—would satisfy the requirements. The actual edge of the tip would not be exposed, the curve would yield a larger surface area, and the hook would allow dissection in a more favorable direction. J-hook designs are currently available for laparoscopic and endoscopic work and are composed mostly as a wire rather than as a spatula, although there are a few designs for a J-hook spatula tip. The wire tip would not be adequate because the thin surface area would once again cause the same problem of tip impaling. These are designed for endoscopic equipment and not for standard ESU pencil handpieces. Although I am currently in discussion with some manufacturers for a ready-made version, in the meantime, there is a method for creating a J-hook from the current extended spatula tips available to us in plastic surgery.

The tip that seems to be most amenable to this technique is the Covidien (Mansfield, Massachusetts) E1455-6 insulated, coated 6½-inch spatula tip. Other tips that I have tried have broken during the process of creating the
J-hook. To create the J-hook, grasp the first 2 mm of the tip with a hemostat or needle holder. Then, placing thumb pressure on the remaining tip, slowly bend the tip 90 degrees. Then, place the hemostat just at the newly created bend and use the same technique to make another 90-degree bend, thus creating the J-hook (Figure 1).

Figure 1. (A) The electrosurgical unit (ESU) tip, which will be molded into a J-hook to increase surface area and reduce the risk of “muscle impalement” on the thin tip. (B) The surgeon grasps the ESU tip. (C) The first bend is made, using a hemostat for leverage. (D) The appearance of the tip after the first bend is completed. (E) The tip is grasped for the second bend. (F) The tip bending is complete and a J-hook has been created from a standard ESU tip.
Although I have broken 1 tip, if the steps are performed carefully and without twisting, the J-hook can be created without problem and without damage to the coating or insulation.

After the initial dissection of the pocket is performed with the short ESU tip, the newly created J-hook tip can be used to dissect, but it requires a modified technique. As the medial and lateral wall of the pocket is created, the tip should be placed at the most cranial aspect of the dissection; the hook then hooks the tissue, the ESU is activated, and the tip is pulled back toward the surgeon, all while the surgeon keeps the hook in the tissue and dissects as the tip is pulled back. At the apex of the pocket, tissue and muscle strands can be hooked, and once again, the tip should be pulled back slowly toward the surgeon. As the side of the pocket closest to the surgeon is dissected, the open end of the J-hook will be facing the surgeon. On the opposite side of the pocket, the tip in the pencil handpiece should then be turned away from the surgeon, so that the activation button on the handpiece is held in proper position.

This technique will not only speed up the dissection, but the decreased frequency of muscle-impaling injuries and time spared from trying to stop the subsequent bleeding can save many minutes—perhaps an hour or more per month—in operating room time (and added frustration). There will still be the occasional muscle contraction, but when this happens, the likelihood of damage is reduced because the tip surface area has been increased and the dissection is proceeding away from the contracting muscle (which forces the tip inferiorly toward the chest wall). Also, due to the increased surface area of the tip, there is less energy density, and in my experience, there seems to be somewhat less contraction that occurs when cauterizing a bleeding surface of the muscle. This method is also applicable to breast implant exchange when release of the capsule is necessary. With this technique of modifying the ESU tip and dissection, instances of tip muscle impaling with resultant bleeding will be reduced, thus improving surgical safety and the surgeon’s peace of mind.

**Disclosures**

Dr Wiener is a stockholder with the Ideal Implant Corp.

**REFERENCE**