

Alternate Site Lesions

Patients entering an operating room expect to be protected from all known and unknown hazards. The anesthetized or sedated surgical patient has the right to be free from injury and impaired skin integrity due to positioning, skin preparation, and electromedical devices.

Skin injuries, particularly on patients who have undergone lengthy procedures, might be due to pressure, heat, moisture, friction, vascular insufficiency, chemicals, electromedical devices, or any combination of these. Although the true cause may be unknown, many post-operative skin lesions, whether discovered immediately or days later, are attributed to electrosurgery.

A *lesion of unknown origin* is often mistakenly labeled a "burn", which implies negligence. It is imperative to chart exactly what is observed. If the lesion is directly under the patient return electrode (PRE) and noted immediately after surgery, it is more likely to be electrosurgical in nature. However, when lesions are discovered at sites distant to the PRE (alternate sites) or discovered hours to days later, they should be treated as lesions of unknown origin. These injuries will occur on anesthetized or comatose patients because these patients are unable to react to pain stimuli.

Positioning:

One of the most important responsibilities the perioperative team performs for the surgical patient is positioning. The patient is usually required to remain in a certain position for hours and, if the epidermis, dermis, or muscles are under undue pressure, tissue damage can occur.

Moving a patient onto the OR table or repositioning the

anesthetized patient may seem to be a routine task but, in fact, requires great care. Adequate precautions must be taken to protect the patient from potential pressure areas.

A pressure insult is a localized area of ulceration and cellular necrosis affecting the skin or underlying tissues, including fat, muscle, and bone. Within minutes of positioning, vessels may become occluded as a result of the pressure exerted by body weight against an unyielding surface. These injuries usually occur below the waist.

If the patient's skin should experience friction or shearing force, there will be some degree of skin injury. While *friction* affects the epidermis and is observed as a superficial "rash" or blistering, a *shearing force* affects the dermis, muscles, and even bone. Although visible redness or blistering may be apparent at first, the true extent of the injury may not be discovered for hours or days. These areas of tissue insult are usually located under the patient or at the application site of an adhesive drape.

Skin Preparation:

The surgical site is routinely disinfected with a variety of prep solutions. Patients are rarely allergic to these agents and it is a general hospital practice to document specific allergies. Millions of patients have undergone a surgical prep with no ill effect. However, if any solution is allowed to pool under the patient, in skin crevices or draping materials, some degree of tissue damage could occur. The pooling of solution combined with positioning, warming devices, wet skin creases, and surgical drapes, may exacerbate a chemical reaction. These skin injuries usually occur under the patient, especially at the sacral or buttocks area, and



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can be associated with wet surgical draping materials. The area of tissue damage will follow gravity, and are more commonly discovered after gynecological and orthopedic procedures. Under no circumstances should prep solutions be allowed to pool under the patient, around surgical drapes, or tourniquets. Also, never allow prepping solutions to pool at the PRE site.

Although uncommon, other chemicals such as Ethylene Oxide (EtO), or strong acids and alkalis may cause varying degrees of tissue damage. Burns from topical chemicals are usually superficial, have a fluid outline, and follow gravity.

Electromedical Devices:

It is recommended that personnel who operate any electromedical equipment be trained in the appropriate use and the precautions associated with using the equipment safely. Always follow manufacturer's instructions for use.

Warming lamps and hyperthermia units (over or under the patient) are generally used to maintain the patient's body temperature at 37° C (98.6° F). (These units require biomedical safety testing on a routine basis.) When a warming unit is maintained at a setting of 37° C (98.6° F) there is little risk of skin damage. However, if a warming device is set and remains at a higher temperature, the patient's skin temperature will increase where it is exposed to the warming device. A combination of prep solution, electrosurgical (ES) current, and a hyperthermia device can increase skin temperatures quickly. Skin temperatures of 45° C (113° F) for even a short time may result in tissue damage. The monitoring of warming devices is good perioperative practice.

Electrosurgical units (ESU), lasers, and any other devices that produce heat to destroy tissue may be unintentionally activated and an alternate site burn or a fire may occur. It is of extreme importance to place instruments in a clean, dry, non-conductive area when they are not in use. It is the responsibility of the entire perioperative staff, including the surgeon, to maintain a safe environment for the surgical patient.

There are three areas where electrosurgical tissue effect may occur:

- **Intended surgical site** is where the surgeon directs the electrical current for an appropriate tissue effect of cutting or coagulation.
- **Patient return electrode (PRE)** where the current is expected to be dispersed and returned safely to the ESU. Contact quality monitoring systems have reduced pad-site burns substantially.
- **Alternate site**, which is any place other than the surgical site or the PRE. Alternate site burns, although not common, do occur and are the least likely to be understood.

An alternate site burn may occur if the electrosurgical current concentrates at an unintended point along the circuit pathway. Most electrosurgical burns will be apparent immediately. Solutions or body fluids, warming devices that are too warm, or poor positioning of the patient and PRE could increase the incidence of an unintended ES current pathway.

- If the current finds a conductive solution, the tissue damage might extend to an area as large as the solution's contact with the patient's skin.
- If the current concentrates at a metal object, such as jewelry, EKG, EEG, or other electromedical leads, the injury will be as large as the contact point and will be immediately noticeable.
- Skin-to-skin contact may direct ES current to a shorter path of least resistance. This can occur at any place where body parts come into contact such as axilla, arms to thorax, hand to thigh, or leg to leg. Skin-to-skin contact will mirror tissue damage where contact was made between the points of contact. The greater the concentration of current to a small contact site, the greater the chance of producing an alternate site burn.

Although all of these occurrences are rare, they can happen and safety measures should be implemented.

- Eliminate skin-to-skin contact by insulating body contact points.
- Do not allow prep solutions or body fluids to pool or soak into surgical drapes or around tourniquets.
- Place the PRE as close to the surgical site as is practical.
- Remove unnecessary metal objects from the patient.
- Do not have any metal, such as jewelry, between the surgical site and the patient return electrode. Place EEG and EKG leads out of the ES current pathway.
- Always place instruments in a non-conductive holster (or other safety device) when not in use. If a safety holster is not available, place ES instruments onto a Mayo Stand or back table, away from the patient.
- Use the lowest possible power settings, including low-voltage coag modes, when possible.

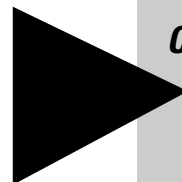
Anesthetized or sedated patients do not react to most pain stimuli. Preparing patients by careful positioning, cautious prepping, and thoughtful PRE placement as well as maintaining the patient in that safe environment during the surgical procedure is the responsibility of all the perioperative team members.

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