Health problem addressed

Devices intended for surgical cutting and for controlling bleeding by causing coagulation (hemostasis) at the surgical site. Electrosurgery is commonly used in dermatological, gynecological, cardiac, plastic, ocular, spine, ENT, maxillofacial, orthopedic, urological, neuro- and general surgical procedures as well as certain dental procedures.

Product description

These systems include an electrosurgical generator (i.e., power supply, waveform generator) and a handpiece including one or several electrodes.

Principles of operation

In monopolar electrosurgery, tissue is cut and coagulated by completion of an electrical circuit that includes a high-frequency oscillator and amplifiers within the ESU, the patient, the connecting cables, and the electrodes. In most applications, electric current from the ESU is conducted through the surgical site with an active cable and electrode. The electrosurgical current exits the patient through a dispersive electrode (usually placed on the patient at a site remote from the surgical site) and its associated cable connected to the neutral side of the generator. In bipolar electrosurgery, two electrodes (generally, the two tips of a pair of forceps or scissors) serve as the equivalent of the active and return electrodes in the monopolar mode.

Operating steps

Electrosurgical procedures may or may not be performed with the patient under anesthesia. The patient is prepped and electrodes are applied to the affected areas. Electrical current is delivered to the affected area and the surrounding tissue is heated to cause desiccation, vaporization, or charring to remove diseased or damaged tissue.

Reported problems

There is a risk of surgical fire when using oxygen while performing electrosurgery. Partial or complete detachment of the electrode pad from the patient is a common cause of patient burns. Burns may also result from inadequate site preparation, defective materials or construction, or incorrect placement of the return electrode. The second most common type of electrosurgical injury occurs when the active electrode is inadvertently energized while the tip is in contact with nontarget tissue.

Use and maintenance

User(s): Surgeon

Maintenance: Medical staff; technician; biomedical or clinical engineer

Training: Initial training by manufacturer and manuals; supervised training with experienced surgeons

Environment of use

Settings of use: Hospital operating room

Requirements: Stable power source; smoke evacuation

Product specifications

Approx. dimensions (mm): 777 x 360 x 505

Approx. weight (kg): 28

Consumables: Active and return electrodes

Price range (USD): 1,500 - 14,000

Typical product life time (years): 7 to 10

Shelf life (consumables): Single use or variable

Types and variations

Bipolar unit; monopolar unit; monopolar/bipolar unit