



## LETTERS TO THE EDITOR

### Exposure to electrocautery smoke: risk to the health of surgical personnel

*Exposición al humo del electrocauterio: riesgo para la salud del personal quirúrgico*

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### Dear Director:

Surgery, as a medical specialty, has made significant progress throughout history by overcoming three of its main challenges: pain, infection and hemorrhage. This progress was achieved with the discovery of anesthesia, the implementation of asepsis and antisepsis, antimicrobial therapy and the worldwide dissemination of Halstedian techniques.

The introduction of methods such as clamping and ligation of blood vessels, diagnostic imaging techniques, advances in organ transplantation and nutritional therapy. The incorporation of technologies in surgery, such as the

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use of high-frequency monopolar electric energy, allows dissecting and thermosealing blood vessels routinely, achieving effective hemostasis.

The use of electrocautery is a fundamental element in surgical interventions (1) Electrosurgery, laser ablation and dissection with an ultrasonic scalpel generate a gaseous byproduct, surgical smoke, which represents a technical, physical, chemical and biological risk for personnel in the operating room. (2)

In Cuba, the principles and guidelines for patient safety policies are clearly defined and seek to reduce risks or mitigate their consequences in the surgical context during care. However, there is a vulnerability with regard to the safety of the surgeon and the surgical team.

Surgical smoke is composed of aerosols whose components vary according to the types of tissues or energy devices to be used. Since the 1980s, the effects of surgical smoke on personnel who are continuously exposed have been described. These include: headaches, irritation of the ocular conjunctiva, nasal mucosa and respiratory tract, dermatitis, allergy-like symptoms, asthma, as well as the possible transmission of the human papillomavirus (HPV) through inhalation and the dissemination of malignant cells when removing cancerous lesions in patients. (2)

Daily exposure to surgical smoke can cause damage similar to that suffered by passive smokers, as well as those who are in contact with cooking smoke or burning wood. It is estimated that the thermal destruction of 1 gram of tissue by CO2 laser ablation is comparable to smoking three cigarettes, while with electrocautery it can be equivalent to six cigarettes. Tomita-Yoshifumi, et. al (3), in their study: Mutagenicity of smoke condensates induced by CO2 laser irradiation and electrocautery, suggest that continuous exposure during long procedures could be equivalent to consuming 30 unfiltered cigarettes daily.

The size of the particles is inversely related to the energy used in the disintegration of the tissues; that is, the higher the temperature generated by the cutting instrument, the smaller the particle size. This makes their filtration difficult, since they can reach the most delicate areas of the respiratory system, such as the alveoli. (1)

There is a general lack of awareness about the risks of surgical smoke among health professionals. It is crucial to increase education and training on this topic to promote a safer environment in the surgical care setting.



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