To protect the health of employees and patients in the operating room, the Slovenian Operating Room Nurses Association created an information brochure on the topic of surgical smoke to inform employees and patients about the dangerous effects of surgical smoke and effective measures for its removal. The brochure also presents the guidelines and recommendations adopted by regulatory agencies and global organizations around the world regarding the most effective system for the surgical smoke evacuation.

PURPOSE

Everyone has the right to breathe clean air

EVERYONE HAS THE RIGHT TO BREATH CLEAN AIR

EVACUATE SURGICAL SMOKE!

HOW MUCH DO YOU SMOKE PER DAY?

烟灰的毒性

Smoke from 1 gram of cauterized tissue = 6 unfiltered cigarettes

Surgical smoke is the gaseous by-product formed during surgical procedures. Surgical smoke is produced by various surgical instruments including those used in electrosurgery, lasers, ultrasonic scalpels, high speed drills, burrs and saws. Generally, the composition of surgical smoke and aerosols is 95% water vapor and 5% solid particles (chemicals, blood and tissue particles, viruses and bacteria).

Potential infections from aerosols

- HIV (Human Immunodeficiency Virus)
- HPV (Human Papilloma Virus)
- HBV (Hepatitis B Virus)
- Other virus and bacteria

Gases/odours in surgical smoke

- Toxic gases (some carcinogenic)
- Benzene, Toluene, Formaldehyde
- Furfural, Xylene
- Carbon Monoxide, Hydrogen Cyanide
- Methane, Phenol, Styrene + many more

Effects on personal health

- Headache
- Skin irritation
- Nausea
- Fatigue
- Respiratory problems

RECOMMENDED PRACTICES, GUIDELINES, STANDARDS AND REGULATIONS FOR THE PROTECTION AGAINST SURGICAL SMOKE

- AORN – Association of periOperative Registered Nurses, USA
- International Federation of Perioperative Nurses – IFPN, Canada
- Occupational Safety and Health Administration – OSHA, USA
- The National Institute for Occupationak Safety and Health – NIOSH, USA
- International Council on Surgical Plume – ICSP, USA
- The Joint Commission, USA
- EORNA – European Room Nurses Association
- European Directive 2000/54/EC

STANDARD PROTECTION IS NOT ENOUGH – WHY?

- Ventilation in operating rooms
- Surgical mask

If there is no adequate ventilation in operating rooms, this does not allow sufficient evacuation of the resulting surgical smoke.

A significant proportion of the particles in the surgical smoke are in the range of 0.5–5.0 μm, which is too small to be effectively filtered through the surgical mask. Aerosol-borne diseases require a high filtration-efficiency face mask (FFP3).

- Medical vacuum system

Wallsuction systems are not suitable for smoke plume removal. The accumulation of particles over time eventually decreases suction capability in the operating theatre.

All evacuated airborne particles are deposited into a central vacuum system, which can become blocked and bacteria can then multiply.

PORTABLE SMOKE EVACUATION SYSTEM

The portable smoke evacuation systems are currently the most effective way of protecting employees and patients from inhaling the constituents of the surgical smoke. It can be used as a stand-alone smoke evacuator, or an evacuation system that is incorporated into the electrosurgery or laser system.

Implementa- tion of recom- mendations that provide evidence of the hazards of surgical smoke for patients and employees, and discuss methods and parameters for the safe and effective evacuation of surgical smoke during open and laparoscopic surgery.

Based on the European Directive 2000/54/EC and the recommendations of international associations, the Slovenian Operating Room Nurses Association recommend the use of a portable system for the evacuation of surgical smoke as the best choice. The portable system should include an efficient filtering system, which is the most effective method for protecting employees and patients from the hazardous effects of surgical smoke.

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