Practical way to protect access, eye, airway and skin

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Major field of medical laser safety management is composed of five areas: access control, eye protection, air pollution control, skin protection and fire & electricity hazard control.

In big hospitals where laser safety officer (LSO) is recommended, LSO is responsible for everyday safety procedures while in small clinics where doctor alone or with assistance with non-LSO nursing staff is practicing, doctors should be aware of the essential safety measures.

‘Access control’ means control of access to laser device so that only ‘right’ person can use ‘right’ device in a ‘right’ place and at ‘right’ time. Right person means a person who is certified or eligible with laser safety programs. Right device is a device which an operator is qualified to use with proper knowledge, experience and safety qualifications. Right place indicates proper place where laser beam can be confined and other safety measures are fully prepared. Right time means time of operation when safety measure is not compromised such as after-work hours. It also means the time when you can safely enter laser facility. Log books, door locks, key control, warning signs posted on the site, shot counting and matching with log book, CCTV or intercom are some of the measures recommended for access control.

‘Eye protection’ begins with proper use of protective goggles. Choice of goggles should be based on the wavelength of the laser and workload of an operator. LSO should be able to calculate proper OD based on the Maximal Permissible Exposure (MPE) of a particular wavelength and workload of an operator. When workload is high, high OD should be considered although high OD compromises visibility of an operator. Patients’ eyes should be protected with non-reflective metal or plastic corneal shields especially when lasing is planned around the eye area. Otherwise, wet gauze and non-penetrating over-the-eye shields can be used.

‘Air pollution control’ is to prevent any harmful elements generated during the lasing procedure from getting into respiratory tract of patients as well as operating team. Laser grade vacuum device and laser grade masks are recommended. Surgical masks are not advised because it is to protect operation field from contamination and is not enough to protect operating team from laser-generated airborne contaminants (LGAC).
‘Skin protection’ is provided by covering patients’ as well as operating teams’ non-essential area with appropriate clothing. Considering contamination from laser-generated fume that contains microbial and chemical harmful agents, operating team is advised to wear disposable gowns.

‘Fire hazard’ is relatively rare but when occurs it can be a major safety issue that threatens life of operating team as well as patients. Inflammable or explosive anti-septic agents should not be used in the laser facility and proper fire extinguisher should be available in the immediate proximity. Wet gauze and saline in a pus pan should be easily reached during the procedures. Hair and facial makeup should be removed and hairline should be wetted before the procedure. When removing warts around anus, packing with wet gauze and vacuuming is critical because gas from the GI tract can ignite when exposed to laser beam. When lasing under general anesthesia, endotracheal tube should be covered with wet gauze and air balloon should be inflated not with air but with colored water.

Detailed references are available in Occupational Safety and Health Administration (OSHA), FDA and American National Standards Institute (ANSI) manuals and booklets. KFDA also produced Safety Guideline for Medical Laser in 2005 (#11-1470000-000897-01).