I. CLINICAL APPLICATION OF LASER ENDOSCOPY

The increasing demand for endoscopic treatment by laser techniques accompanied with other techniques as endo/electrosurgery in the same room or alternatively during the same operation, is a challenge in organizing a single surgery room. Furthermore, in our case, at Bellaria Hospital of Bologna, we have to face the necessity of sharing laser service between the two Divisions of Bronchology and Gastroenterology.

The clinical application of lasers in endoscopy requires an appropriate environment. An example of an operating unit arrangement is shown in Figure 1, with reference to some international safety standards. The existing standards and general rules for safety in our country do not require particular application in the present case. The implementation of a few general rules as in the case shown, could be a step towards issuing future standards.

II. SAFETY STANDARDS

During an initial period of operations performed in a traditional operating room which was "borrowed" while waiting for the new one, we observed the following issues to be faced:

Microclimate: The room was not designed for the use of anaesthetic gases, but the fumes produced by burning tissues were sufficiently objectionable to require localized aspiration. As many as ten persons might be present in the operating room in some cases.

Electrical safety: Invasive techniques require both a network fed through a continuously monitored isolation transformer and an equipotential wiring system for grounding. Some critical steps during intervention require uninterrupted power and light. The electronic monitoring systems require a well stabilized power source.

Protection against laser radiation: Although the laser source, classified as Class 4 according to ANSI standards, was equipped with the necessary protective devices for the machine and the personnel (such as micro-switches, interlocks, and glasses for operators), the environment had to be adapted to that purpose.
Regulations in force in our country could easily be applied to cover the first two issues described above. For the third one, the environment, we had to refer to other standards as ANSI (American National Standards Institute), ACGIH (American Conference of Governmental Industrial Hygienists) and LIA (Laser Institute of America), and we were able to secure cross-reference and confirmation from studies published in Italy by CNR (Consiglio Nazionale delle Ricerche) and I.S.S. (Istituto Superiore di Sanità). Other authorities concerned with this matter are FDA (Food and Drug Administration), BRH (Bureau of Radiological Health), NCDRH (National Center for Devices and Radiological Health) and OSHA (Occupational Safety and Health Administration).

It is not our intention to reiterate the possible hazards for skin and eyes or to quote the TLV (threshold limit values), which can be easily obtained from the literature. We want to show only the results of the application of standards and recommendations as implemented in our installation. We merely note that Class IV is the most high and dangerous level actually classified for safety purposes, and that our laser is a Nd:YAG type with 150 Watt output power.

Fig. 1. Plan of the operating room at Bellaria Hospital of Bologna, Pad. "D" (Floor level), Laser Department: 1) Laser Nd YAG; 2) EVE light source and video processor; 3) Anesthesia instruments; 4) Laser; 5) Electro surgery Unit; 6) Operating table; 7) Monitor; 8) Film negative scope; 9) Defibrillator Unit; 10) Cabinet; 11) Desk; 12) Switch board & isolation transformer; 13) Sterilization.