Surgery and medical education. Present and future

The future of surgery will depend on the appropriate use of technology without sacrificing the basic precepts of medicine. The development of modern medicine began with the publication of the book *Humanis Corporis Fabrica* by Andreas Vesalius in the 16th century, which transformed the teaching of medicine and surgery in a dynamic scientific process.

The breakthrough of education in surgery is attributed to Theodor Billroth, a Viennese surgeon who established the first programs of formal teaching of surgery. In the late 19th century another surgeon, William Halsted, began the same process carried out in the early 20th century.1

During the 20th century, surgery programs were gradually established in all universities and hospitals, and other surgical specialties were developed in response to the inertia of a division of surgery according to organ-specific systems or specific surgical techniques. Today, at the National Autonomous University of Mexico (UNAM), the Graduate Division has 78 different medical and surgical specialties.

The remarkable technological developments mainly during the late 20th century and the beginning of this still young century have changed our way of life. Medicine has received the benefits of this process but needs to more effectively assess the use of these resources to offer patients quality and safety in the practice of surgery.

Major changes have occurred in surgery such as the advent of minimally invasive procedures, improvements in the use of instrumentation initially used for diagnostic procedures and now being used therapeutically (such as endoscopic and radiologic procedures). Other factors that have influenced necessary changes are the decreasing times for medical internships, the need to evaluate the effectiveness of instructional time (internships exist up to 10 years), the emergence of educational resources such as...
simulation, the need for direct medical internships, and the emergence of highly specialized courses to demonstrate that the experience in a surgical procedure offers the patient greater safety with better results and lower morbidity and mortality.\textsuperscript{2}

Over the last few years, internship training programs have been established such as the one developed by the UNAM in Mexico known as the Sole Plan of Medical Specialties (SPMS), which is based on three functions: health care, education and research, a model used by many universities in Mexico and Latin America. The program is problem-based.\textsuperscript{3}

In the search of quality in education and the development of surgery, medical councils were created as accreditation bodies in preparation for professional practice. Certification and recertification have shown that the teaching of medicine and surgery in particular is heterogeneous. The rate of new graduate residents who fail their specialty is of concern.

In the U.S. the irregularity in surgical education is manifested in the study performed by the American Board of Surgery (ABS) through its Minimally Invasive Surgery Fellowship, a survey administered to recognized professors in order to determine the preparedness of young aspirants before beginning a highly specialized course. The survey covers five areas: professionalism, level of independence, psychomotor skills, clinical assessment and academic management. Ninety one professors reported that 30\% of new surgical graduates are unable to perform a cholecystectomy, 66\% are unable to carry out a major procedure, 56\% cannot complete the suture process, and 24\% had no complications during their surgeries.\textsuperscript{4}

To strengthen education in skill areas, the American Council of Graduate Medical Education (ACGME) has established six general competencies that have been implemented in all internship programs. These competencies are patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism and systems-based practice.

Confidence in the quality of the internships will be based on compliance to be certain of the generic and specific competencies of each surgical specialty. The biggest challenge is the continuous assessment of preparedness. Simulation along with developing numerous psychomotor skills reduces the “learning curve” and is an excellent assessment tool with constant feedback. The portfolio is another dynamic assessment tool that evaluates the resident in the educational environment, the hospital, during the course of the internship, and the professors.

The Milestones Project is another evaluation method, which is a joint initiative of the ACGME and the ABS. This is a new method for the assessment of residents based on a number of established competencies with different levels within these competencies, assessing the resident according to his/her knowledge and surgical skills, the relationship with the patient and family, and employment relationship of the resident with the hospital and administrative staff. This project has as its goal to be an objective and comprehensive assessment of residents that can provide more complete information of their integral performance.\textsuperscript{5}

Current and future surgeons will be in constant contact with all the available technological resources. They will manage resources such as ultrasound in the emergency department and intensive care as well as in the operating room. Endoscopy is part of the therapeutic armamentarium. Surgeons may practice surgical techniques in simulators using holograms, resulting in the decrease of uncertainty of the surgical procedure. They will be prepared in fewer procedures that
they will perform more effectively, will have better preparation to treat their patients based on the performance of generic skills and will have closer contact with their professional colleagues based on networks and electronic resources.

The biggest challenge is to educate using generic and specific skills, carry out continuing education projects with spaces that facilitate training, and maintain a continuous evaluation process in the professional development of each surgeon.

REFERENCES


