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Challenges in high technology surgery

Cirurgia de alta tecnologia: desafios a enfrentar

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We are experiencing exciting times of surgical procedures. Thirty years ago, in 1987, Phillipe Mouret performed the first cholecystectomy by video-laparoscopy with electronic resources, beginning a historical revolution that completely changed the surgical practice … and surgeons.

Legitimate successors of barber-surgeons, and always associated to incisions, blood and suffering, we have been transmuted in cold professionals acting through bright screens sophisticated equipment performing meticulous risky and precise procedures. As a result, we have the power of reducing suffering and pain.

However, it is essential to put it in correct perspective, considering major impact of changes of technological revolution in virtually all areas of human knowledge. It is important to understand that this revolution, as most others, is associated with both benefits and severe consequences, requiring an accurate evaluation of this new reality.

Thomas Friedman, author of several best-sellers such as "The World is plane", presents an excellent analysis in his most recent book "Thank you for being late". He highlights the main characteristic of modern time as an increased rhythm of changes stressing the low human adaptation to that speed, with consequent increase of **exclusion** from the job market. Similarly, in January 2017, the renowned magazine "The Economist" stated, in a very interesting article about technological changes, that "*when education does not follow the rhythm of technology, the result is* ***inequality***".

Teaching, inequality, exclusion. Should we extrapolate these aspects to high tech surgery? No doubt, the answer is yes.

Minimally invasive surgery is increasingly replacing the use of traditional forceps, scissors and retractors. Whether endoscopic, laparoscopic or robotic, it has emerged a new teaching concept: the Training Centers.

Let's get back to the early decades of last century. Before the advances of anesthesia, antibiotics and ventilatory support, young surgeons were trained in minor surgical procedures, such as herniorrhaphys and amputations by personal observation during daily surgical practice, with no deadlines or pre-defined programs. After 1940, the increasing complexity and volume of surgical procedures have led to creation of formal and rigid Programs of Surgical Residency, so called due to deep personal commitment during a few years, when surgical training occurred under strict supervision of experienced surgeons, aware of quality and safety of patients.

Returning to present days, modern Training Centers aim to present complex operations such as laparoscopic rectosigmoidectomy or gastrectomy, usually in a two-day course, including some animal models. In the audience, experienced or recently qualified surgeons share their frustration by the drawbacks to reproduce them in their daily practice due to unavailability of resources at severely restraining conditions at public hospitals, besides the lack of preceptorship support during their learning curve.

Even in developed countries, high technology surgery is performed mainly in private hospitals, where mostly high cost disposable instruments are available. University teaching hospitals still play an important role-providing the basics for a conventional surgical training, but not enough time or funding are available to minimally invasive surgery training.

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Therefore, it is important to recognize that the present model of surgical training must be carefully reevaluated, since the increasing rhythm of high tech surgery evolution is incompatible to a single training period at the beginning of medical career. On the other hand, short courses in Training Centers, despite useful and informative, are not enough to provide conditions for an adequate learning curve.

So, surgical societies, such as the Brazilian College of Surgeons must play an important role in regulating the system, similarly to other countries. Considering that high tech procedures are mostly stimulated by the medical devices industry, it is essential a critical effort for defining priorities and the real value of each technique, reducing "pioneer" actions with no scientific supportand reducing the pressure fora permanent surgical learning curves.

On the other hand, it is essential the recognition of the importance of industry as the only funding force in high technology surgical training, since traditional teaching programs are mostly unable to play that role.

Therefore, it must be recommended an regulatory action by medical societies for a rational and scientific assessment of new techniques, so that funding efforts are dedicated to an adequate high technology surgical training or a planned regional support for low volume centers.

We believe that the increasing adoption of high tech procedures will not occur automatically; conversely, the current scenario will lead to a crescent inequality and imbalance of modern surgical practice, with consequentreduction of its benefits to our population.