

The Surgeon, the Surgery, the new Surgical Techniques

. Surgery has seen continuous technical progress over the last 100 years. However, die last few decades have witnessed the explosion of advances in technology more than in new techniques. In tum, advanced technology has led to the development of original operative procedures-some of them radical departures-that are replacing others that had previously been considered satisfactory. As is peculiar of the modern age, these changes are extremely rapid in "real time," as we say. Often they challenge our ability to absorb and apply them, leaving us with neither the time nor the patience to evaluate their importance or to foresee their positive or negative consequences. It is also hard to predict their effect on the surgical staff and their environment. To better understand these problems, we should briefly analyze the elements of the trinomial: the surgeon, the art and science of surgery, and the new surgical techniques.

The Surgeon

The Greek words $\chi\epsilon\iota\rho$ and $\epsilon\rho\gamma\omicron\nu\nu$ explain who the surgeon is: one who works with his hands. It does not mean that he impersonates the famous arm controlled by someone else's mind. Everyone knows that an individual's hands are an expansion of his or her cerebral activity and that it is precisely the hand that differentiates humans from their close animal relatives. The hand of the pianist, of the painter, of the sculptor, the hand of the creator of the Sistine Chapel, the hand of the surgeon translate thought to deed. In this era of technicism, it may seem rhetorical to continue to compare surgical work with that of an artist. However, an intense mental activity is always present behind our manual efforts, even when surgery seems a matter of routine and practiced movements.

Creativity, imagination, and reasoning are always the basis, the essential premise of a good surgeon; manual ability and proficiency are equally fundamental. In 1888 Theodor Billroth wrote that a surgeon should combine both a Dionysian and an Apollonian nature. Surgeons, like any other artists, are in a "Dionysian" state of mind when they conceive an endeavor but must have a complete control over their manual technique to fulfill their intellectual concepts. These attributes may seem academic, philosophical, and distant from reality. But there are other attributes, other conditions that determine the surgeon's caliber and that today constitute perhaps what can be summarized by an obsolete and outmoded term: vocation.

We have all met surgeons who did not like to operate and for whom any excuse was good enough to stay out of the operating room. However, it is necessary to feel pleasure when operating, almost a physical pleasure, which has led psychiatrists to develop strange and questionable theories about what compels one to become a surgeon. Obviously, they entertain distorted and exaggerated views; However, there is undoubtedly such a thing as surgical sensuality: the physical contact with the object of ones theoretical studies, the object of one's imagination. It is the pleasure of anatomical confirmation, the pleasure of weaving the cloth precisely as we designed it: the surgeon's senses.

Pleasure, then, and often ambition in the noblest sense of the word, are inherent but none of this without courage. A surgeon must be someone who is able to worry, someone who understands fear. The surgeon's courage is to venture forth as far as possible, fully conscious of the human being facing him.

A surgeon is a physician who cures with his hands, but also with his mind and heart. The objective is the recovery of the patient through an act that must be at the same time necessary and beneficial, at the cost of being difficult.

The concept of courage is fundamentally a concept of surgical ethics. A surgeon is always a scientist, because he or she observes, classifies, and interprets. The surgeon must always be a teacher, so that others may learn and pass on this science in continuous progression.

The Surgery

Many bridges have been crossed since the days when surgery was a manual cure for external lesions and considered a poor alternative to the far more noble field of internal medicine. Besides an art, surgery has become a science, a very complex science that is rapidly progressing. It has become an integral and

essential part of all medical science, and it is only right that in Italy the M.D. degree has kept its double denomination of "medicine and surgery" precisely to underscore that surgery is essential in medical training. Actually, surgery has become a multidisciplinary science, which is why it has recorded such spectacular progress and become an essential part of general medical studies.

The merging of the surgeon's charisma, imagination, creativity, intelligence and technique with knowledge, which is a continually expanding process, provided the spark that gave surgery its well-known characteristics and allows us to hypothesize unpredictable future developments.

Surgery has become an enormous field of study, a central subject that links many different branches. However, continual expansion and constant probing into the various sectors have created and are still creating an opposite effect: specialization. Specialization is unquestionably inevitable and can even be positive if the general sense of surgery is preserved. That is within a strategy that unites all surgical specialties, integrating the various fields and preventing dispersion. Inversely, it is easy to fragment the discipline, hence generating a negative event through the loss of the multidisciplinary vision distinctive to modern general surgery. It is precisely surgical charisma together with knowledge that leads to new techniques and technological developments in the surgical field that could in turn provide additional stimulus to superspecialization

New surgical techniques

New techniques and new technologies are not one and the same. New techniques are created by surgeons-by their experience, by their resourcefulness, by their studies of physiopathology, by their experimenting. New technologies are generally a consequence of new techniques; however, new technologies often originate outside surgery and are applied therein by virtue of a variety of needs and demands for progress.

Surgeons are accustomed to innovation: every patient is different, every surgeon is different; operations always present something new and original. It is well established that repetition tires the surgeon and can lead to errors. Variety, innovation, and changes stimulate the surgeon's attention and therefore his or her operative excellence.

Surgeons constantly renew and update their technique as their experience grows, acquiring additional knowledge of pathogenesis and physiopathology and trying new materials and/or instruments. Applying new techniques always implies speculation, experimentation, and testing on the patient, which presents problems of ethics and informed consent that are not always easily solved. New techniques require confirmation of their validity through controlled trials and discussion during congresses.

Many techniques and surgical procedures have appeared, but not all have been proved valid; today many procedures are only of historical and speculative value. Generally a new technique creates a new surgical treatment for a disease that had been treated differently until then. Sometimes a new technique generates better results than previous ones or provides an alternative. There are times when new techniques lead to the design of new instruments and equipment; other times it is the new equipment, perhaps designed in an experimental laboratory, that affects surgical technique by facilitating variants or even totally new procedures.

There are two definitions of technology in the dictionaries. The first is the noblest: "The science devoted to the practical rules of the various arts, sciences and professions and of their subsequent advancements." The second is less idealistic, but more closely related to modern reality: "The study of the procedures and equipment necessary for the transformation of a given matter into an industrial product." The first definition carries with it the concept of art and of the means capable of perfecting it, whereas the second stresses the concept of the practical use of raw material and subsequent profit. In other words, a surgical stitch can be perfected by technology to achieve an improved endproduct and, at the same time, this same surgical stitch could represent the raw- material capable of being transformed into an industrial product. This is the business of biomedical technology, an extremely important phenomenon from many viewpoints, both positive and negative. On the positive side: the motivation to experiment, the drive to improve available techniques, the inclusion of the surgeon in mostly international trials, the support-even financial-of a series of initiatives facilitating research: congresses, continuing education, residencies, surgical training. Among the negative aspects are the extreme consequence of the positive aspects I have just mentioned, the excessive incitement in particular. The infinitive "to press," besides other meanings, also carries the sense of "to instigate or to pressure continuously and insistently," and the adjective "pressing" also implies the concept of urgency, as in "pressing business." Technology can become pressing for surgeons, who can be pressured by their own instincts to attempt adventure, to apply

innovation, to be modern and up to date. To exploit a surgeon's competitive spirit, to not be less than his or her competitors, to be faster than the others; to exploit the desire to improve a professional position. There are times when even the press is involved: an Italian daily newspaper boasting a large circulation, some years ago published an article on videolaparoscopic cholecystectomy under the heading "Où ed il calcolo se ne va" (Say hey and your stone will go away). Negative aspects; fortunately, amply compensated by the true expression of new technology: progress.

Still, there is one more aspect that deserves to be considered that can threaten anything new in the surgical environment, especially in the sphere of advanced technology, and that happens not solely in the surgical domain: politics. In a recent collection of articles by journalist Giovanni Ansaldo, a leading article from 1934 tells of the outbreak of cholera in Genoa, in 1854. At that time there were two schools of thought, the "contagionists" and the "anticontagionists." The first, Ansaldo reports, "Held true the old teaching that cholera was a disease of Asian origin, transmissible by contagion, meaning the direct contact of the ill with the healthy. . . The route of infection, carriers, form of contamination were unknown, since Pasteur was still a student at this time." The others, the anticontagionists, disbelieved that cholera was spread through contact. They thought that cholera was an endemic disease occurring in certain people as a consequence of alimentary disorders and excesses, such as overdrinking and overeating.

The contagionists, being traditionalists in science, were reactionary, or to say the least, conservative in everything else. Their proclamation that to defend the country against cholera it would be necessary to seal off its borders was in keeping with the overall approach of the tyrannical government in power at that time. The aim was to keep nations separated by impeding the passage of people, books, and ideas. Not only did contagionists fear the spread of cholera, but other forms of contagion as well—especially those brought on by impassioned words and audacious purposes. Interestingly, in 1854 the most stringent quarantine enforcers were the Russian Empire and the Kingdom of Naples and the most committed contagionists were Czar Nicholas I and the Bourbon King.

Ansaldo relates that the anticontagionists all believed in free trade, supported the usefulness of speedy communications between countries, and devoted their efforts to making it possible for people, books, ideas, and formulas to cross borders as quickly as possible. The remedies they proposed to prevent the spread of cholera had a flavor of "illuminism" and "progressivism": gut out the old cities, tear down the old neighborhoods, teach the people how to wash and how to take laxatives. They believed that all of these things could fight the spread of cholera, and those concepts combined very well with their tastes and progressivist and humanitarian ideals. As Ansaldo puts it, "A different concept of cholera, a different concept of life, a matter of words, a matter of politics."

Having dissected the elements of our trinomial actually a polynomial, since besides surgeons, surgery, and new techniques we picked up new technology along the way—let us now try to put them back together again. Research, teaching, training are not the institutional duties of university surgeons only but of other surgeons as well, regardless of their affiliation. These are the duty of all physicians. There are surgeons who are excellent technicians, but their work is somewhat sterile with respect to "surgery" within quotation mark. I believe that this should be pointed out to the new generation, who often prefer the technical and applicative aspects of the surgical art. Surgery, new techniques, new technology: one could build an algorithm revealing the interactivity and interdependence of these three components: surgery creates new techniques, and it is not infrequent that new techniques create more new techniques, or perhaps modifying preexisting techniques for the sake of adaptation. For example, the Billroth II gastroenteroanastomosis using a linear stapler transforms an end-to-side gastrojejunal anastomosis into a side-to-side one. There are many similar examples.

As always, what is needed are practical implementation and decanting of data: Many uninspiring techniques have later become well-established procedures, and apparently solidly established procedures have failed the trial of time.

New techniques, new technology, advanced technology—so much for a surgeon to stay abreast of. Every day there is something new; a moment's distraction could mean missing the latest novelty. New suturing materials, artificial implants, mechanical staplers, ultrasound scalpels, laser scalpels, endoscopic surgery, videolaparoscopic surgery, radioimmunoguided surgery, transplant techniques, artificial organs, robotic surgery and on and on and on. Should a surgeon know how to do everything? The categorical reply is: the surgeon must know everything, must accept everything in advance, without refusing innovation, must separate everything that is useful from what is not or from what is even harmful.

Then, as always, there are those who prefer one type of surgery, others who prefer another. It is especially important not to use innovation as a "phosphorescent dye" at the service of one's self regard. There is no surgeon who is first-class simply because he or she disposes of advanced techniques or technologies. A surgeon can be first-class even if he works with his hands, bare handed. When Ton That Tung proposed his classic hepatic digitoclasty, a number of Western surgeons refused to employ this technique because they felt it was primitive and manual. They were wrong: one should never forget that a surgeon's main instrument is his hand even when he is holding sophisticated instruments.

The circle is thus closed: we started out with a man tempting the unknown, conquering his fear with the power of his hands and his mind, then everything - surgical science, technique, technology - returns and takes shape in the human surgeon. Human-surgeon, always alone facing another human, the patient, and confronted by conscience, forever ready to violate the boundaries between life and death, armed with his *virtude* in the words of Dante. "Virtude" means courage, power, passion, love. The surgeon is sustained, at all times and in spite of everything, by his desire to discover his limits beyond those pillars of Hercules, which in the end are the ultimate threshold of life.