

A Futuristic Overview of Surgical Oncology for the Next Decade

D. Pertile, C. Giannotti, D. Soriero, S. Scabini

General and Oncologic Surgery Unit, "Policlinico San Martino" Hospital, Italy

Article Info

Article Notes

Received: October 7, 2019

Accepted: October 29, 2019

*Correspondence:

*Dr. Davide Pertile, MD, General and Oncologic Surgery Unit, "Policlinico San Martino" Hospital - L.go R. Benzi 10 - 16132 Genova - Italy; Telephone No: +390105553216; Email: davide_pertile@libero.it.

©2019 Pertile D. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License.

The global burden of cancer is going to rise in the next decades, as results of the aging population, the increased life expectancy in developing countries and the difficulty of eradicating consistent risk factors, such as tobacco and Papillomavirus. In spite of the recent advances in medical oncological treatment mainly targeted therapies or immunotherapy (as the checkpoint inhibitory), surgery remains the most efficient treatment for several solid cancer, able to face with the biological heterogeneity and adaptability of cancer¹.

Nevertheless, in the coming years, there is still an urgent need to have less and less invasive, cost effective and safer oncology surgery.

Indeed, in the last decades, the technology has progressively become part of the surgical methodology, going to play a role of primary importance in determining the most recent advances in the field of surgical techniques. For example, in minimally invasive surgery, a new generation of more versatile, lighter, smaller and cheaper robot will be available in the short term. In the longer-term, even if autonomous robots will not be ready before about twenty years, research continues on robotic autonomy and machine learning. Robotic technology will also develop in medical branches related to surgery, such as interventional radiology and endoscopy².

Technology will also have an impact outside the operating field: virtual reality and augmented reality will radically change the world of imaging; 5g technology will allow smarter communications, with a faster exchange of data and the possibility of multidisciplinary meetings with digital tech and outpatients appointments.

Genomics will have a pervasive role in the future of medicine. The possibility of identifying patients at high risk for developing cancer and making an ultra-early diagnosis through liquid biopsy will increase the need for preventive surgery.

Transplantation might increasingly become an option to treat different types of cancer. Short term challenges will be improving the supply of organs, better manage and asses donor organs and re-programming the immune system. In long term period we could imagine that xenotransplantation and 3D Organs printer will become viable options.

As technology allows greater access to information, the relationship with the Patient will move toward the assumption of greater responsibility for their own health, from maintaining good health to making choices about their care. Consent and supported decision-making about treatment options will be centered more around the patient's preferences and self-defined quality of life.

Digital platforms and technologies such as Augmented Reality and Virtual Reality will accelerate and enhance surgical training and augment experience in the operating theatre. Online training, simulation, and training in the operating theatre on patients will be the key components in this evolution. Simulation should not be limited to surgical tasks, but include human factors and whole-team simulations, as a compulsory part not only of training but of career development and revalidation.

The process of centralization in the delivery of surgery will continue, in order to optimize resources, expertise and multidisciplinary. There will be an increasing rate of day-case and overnight stay surgery.

On the other hand, an uncontrolled development of technologies could lead to facing new and unexpected problems: understanding risk of disease could lead to an overestimation, with a possible wide number of useless procedures, and, potentially to discrimination (i.e. for insurance and employment); it will be necessary to regulate ethical aspects regarding gene editing, the use of animal or human parts and body augmentation; the cost of genomics and of new technologies could become consistent, and it could cause healthcare inequalities and detrimental implications for low and middle-income countries.

In a scenario where novel possible system-wide threats could be present, like antimicrobial resistance, new epidemics, technological failures and cyber-crime, clinicians must be sensitive to greater responsibility, to propose, develop and accept technologies that are sustainable, truly useful, safe and ethically acceptable.

So, what are surgeon's perspectives in the future? In a hospital that is increasingly dominated by artificial intelligence, technology must always remain a mere "aid" for the surgeon, not a substitute for it. The medical health care should always be based on a human relationship and it is especially true in the field of oncological surgery in which the relationship with the patient is intimate and irreplaceable: the encounter between the confidence of an individual suffering from cancer, who relies on a surgeon who is able to treat him thanks to his own practical techniques and surgical experiences.

References

1. Wyld L, Audisio RA, Poston GJ. The evolution of cancer surgery and future perspectives. *Nat Rev Clin Oncol.* 2015 Feb; 12(2): 115-24. doi:10.1038/nrclinonc.2014.191. Epub 2014 Nov 11. Review. PubMed PMID: 25384943.
2. Ruers TJM. The future of surgical oncology. *Br J Surg.* 2019 May; 106(6): 663-664. doi: 10.1002/bjs.11207. PubMed PMID: 30973987.