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ARTICLE

## Future Oncology: Is there a Place for Breast Cancer Surgeons?

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## Introduction

The number of breast cancers is rising worldwide: 2088000 in 2018 and 2833000 estimated in 2040 i.e. an 35% increase. (1-4)

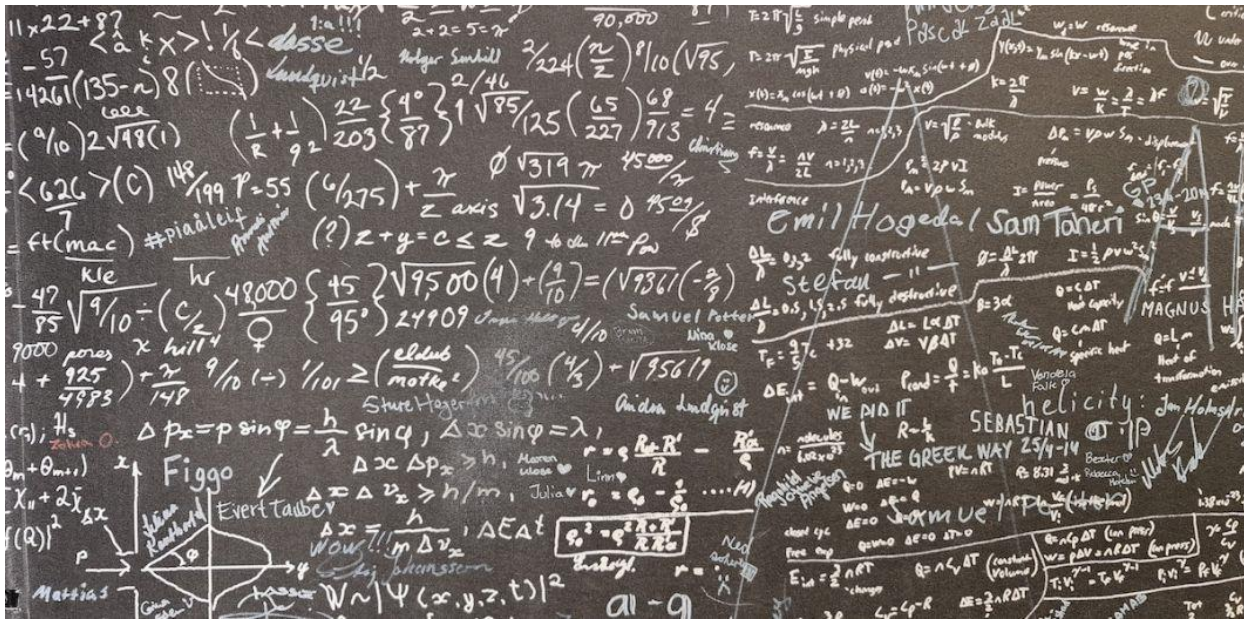
This increase in number will concern mainly the LMIC (Low- and middle-Income Countries), like sub-Saharan Africa where the rising control of malaria, HIV, diabetes and tuberculosis will be associated with a longer life and consequently an increase in the number of cancers.

Facing these disparities how can we avoid to increase the gap between the patients living in rich countries and those living in the LMIC.

Actually, the number of cases does not correspond to the TNM classification. Technical and biological progress as well as Artificial Intelligence (IA) developments allows more and more targeted approaches in all the aspects of breast cancer management.

Statistics however demonstrate that most breast cancers are still operated on in most countries by a percentage over 90% (1,2)

At the same time costs are dramatically increasing and our Health systems are greatly concerned by the present and future costs. (5,7) It is described as « FINANCIAL TOXICITY »



IA will probably be simpler to analyze the mass of coming data than the above image, due to the help of computers!

What will happen in the developing countries when the cancer incidence will reach ours and when the health organization and access to treatments will remain at random.

Few screening, low access to mammograms, few biology and pathology, no genetics, scarce departments of radiotherapy and finally few accesses to the new molecules with stratospheric prices making the drugs unavailable for the majority of the population.

On the other hand, early screening allowing the diagnosis of « early breast cancers » and its corollary « operable breast cancer », will soon make radiological screening obsolete. The necessity of a second lecture, absence of ultra sound reproducibility, age limitation and the profitability i.e. the rate of screened cancer by comparison of

the number of realized exams is a concern. New radiology technics, IA assisted, circulating cells, DNA and RNA and the pan-genomic analysis will be soon accessible on cards, analogues to a credit card!

Studies issued from the Human Genome Project will select and target the « high risk » populations in which the screening will be « profitable. (9-12)

The title of Nature Medicine editorial of august 2023 is « we need a genomic -savvy healthcare work force » paraphrasing the opening lecture of ESMO 2022 from its President F. André « In the coming five years, we will need more physicians, surgeons and nurses, with more health facilities for diagnostic and treatments, to take care of an increasing number of patients who will benefit from multi cancers detection tests »

Aside the Human Genome Project some other projects have been developed in GB and France with the 2025 Genomic Plan offering

1) Public health organization

Genomic medicine is a revolution in the patient management. Daily basis of genomic sequencing will allow a diagnostic and therapeutic targeted management. It will be done initially in orphan diseases and cancers then progressively to other patients

2) Scientific and clinical aspects

The process from pathologies to treatment for a given patient should be reinforced

3) Technological aspects

The rise of a convergence between new technologies and life sciences. The ability to learn, collect, distribute, match and analyze that mass of data is the heart of this convergence

4) Economical aspect

The economical skate is a major point for our health system as well as the industrial development.

To conclude this paragraph, most industrialized countries are converging in helping their population to benefit from the genetic progress.

At the same time countries edit annuals recommendations, yearly actualized, according to the major publications and presentations, in high standards journals and meetings international or national.

In addition, in France a decennial plan against cancer has been established in 2021 (9). All these recommendations are about to change within the coming decades. Back to the surgeons and their role in the loco regional treatment of breast cancer, what will be their place in this evolution?

The concept of the tumoral biopsy to confirm the diagnosis and characterize the biology will become obsolete. Circulating cells, Circulating DNA/ RNA will soon replace the biopsy.

The screened tumors becoming smaller and smaller, the concept of « margins » will have to be reconsidered.

Local destruction in these non-palpable tumors will progressively replace » lumpectomies « as long as these tumors are visible and targetable. Focalized radiotherapy, Ultra sounds, Cryotherapy will be realized by interventional radiologists and /or by surgeons specially trained to these new techniques. No more surgery, no more anesthesia, no aesthetical defects, disappearance of oncoplastic techniques

Axillary surgery was already shrinking over the last decades with the development of sentinel node biopsy (13-15) Abstention of the surgical approach has been demonstrated as safe as axillary dissection when radiation therapy is given in the axilla (with more than 20 years of follow up (13-15)

A recent paper in the New England Journal of Medicine just demonstrated the absence of post operative benefit of radiation in luminal A breast cancers

Is the ultimate goal of de-escalation, limiting the arms of the multidisciplinary management obtained? Obtaining a better control of the disease with reduced treatments and limited sequelae, including an early diagnosis with IA, desperation of the classical surgery, suppression of total gland irradiation replaced by « cyber knife » treatments (the term knife was purposely chosen!) and finally targeted therapies selected from the genomic analysis.

Clearly the mass of information will require the help of AI (fig ahead) to decide the best treatment for a given patient, hoping that physicians and the multi-disciplinary conferences (MDC) will remain apt to resist to the algorithms.

Prevention and screening are strongly associated, especially in mutated patients BRCA and variants. Surgery removing the target organs, breast and ovaries will prevent the occurrence of cancers in the mutated patients. The development of mastectomies associated with immediate reconstruction by robotic surgery is currently used in these indications, still limited by the financial aspects.

Exclusive lipofilling associated with resorbable matrix is in progress and will replace soon the silicone prosthesis and the Myo cutaneous flaps.

However, facing this trans humanist vision of living longer, in good shape, without diseases due to the genomic approaches, classical management will remain necessary, namely in some cancers, extensive intra ductal, local recurrence, control lateral summarization.

The morphology of the patients and the management of cancer in the extremes ages, youth and older patients, will modulate the management associated with the surgeon experience.

This management of breast cancers will also rely on socio economic status in industrialized countries as well as in the LMIC.

Future world health organization's announcing new epidemics will also modulate the management of breast cancer. One can recall that, due to the COVID lock down, a 17% decrease of stage I disease was observed in USA in 2022(15-19).

### **Now how are we going to train the future surgeons, companionship is no more up to date!**

Videos are available for any and every operation, in the surgical departments, on internet, during the surgical meetings, explained by the operators themselves.

Numerical twins (virtual doubles of a complex system) can avoid the training of young surgeons on the patient herself

Resorbable matrix will be on the market soon avoiding most of the complications of silicone prosthesis, associated with lipofilling which can be more difficult to teach, and eventually impossible in very thin patients (19,20).

The cost of these techniques will again separate, due to the « financial toxicity » the population who can afford these new developments and the others.

### **What does our universities have to do to train our future surgeons?**

Should we train hyper specialists, trained to molecular biology, PhD's working in experts' centers, publishing while the waiting list of patients is increasing, inducing a modification in the TNM, due to the delays.

On the other hand, should we train basic « breast surgeons » coming from gynecology, general, plastic or thoracic surgery.

There is no world consensus. A meeting organized in October 2023 in Strasbourg France by the International society of breast surgeons, raise this question and send a questionnaire to the list of breast surgeons, to try to define better the requirements on this field. Who are the future surgeons going to manage on one hand the

« molecular disease » and on the other hand the massive recurrence with axillary involvement, and who is going to train them

« We had a dream » in which the surgical egos will disappear for a little while, to define a common base for all breast surgeons, followed by specialized modules, according with the local practices, in order to treat this increasing announced number of patients

How surgical oncologists will have their continuous training? Who is going to evaluate their practice, knowing that it is always better to be evaluated by other surgeons than by pure administrative people and worst by algorithms!

In France there were 62000 new cases of breast cancers in 2022. The recommendation of the ministry of health is a minimum of 70 patient with new cases of breast cancers per center to be « accredited » to manage breast cancer cases, far from the EUSOMA recommendations of yearly 150 cases.

In our country the continuous control of practice remains embryonic. An initial formation in expert centers, followed by site visits and regular validation of formation, as it is realized in Holland, would be fine. In USA a minimum point of continuous medical education (CME) is necessary to be insured.

The recent creation of expert centers for advanced gynecological centers is worth. However, it seems unrealistic to create expert centers for the 62000 patients.

The urgent reforms in Medicine are conducted by governments, under the European recommendations. The duration of ours Health ministers is around 5 years in the best cases. Av surgical formation last about 15 years, and the logarithmic progress of biology is omni present.

### **Who and how will we be treated in the coming years?**

To conclude everything has a cost and highly trained surgeons should be honored in accordance with their expertise and their training. The likelihood that their honorarium will increase by the social security system is low.



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