

What is Next in Cancer Care? Ten Years' Predictions from Now

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O Que Vem a seguir no Tratamento do Câncer? Previsões para daqui a Dez Anos
 ¿Qué Sigue en la Atención del Cáncer? Las Predicciones de aquí a Diez Años

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When Sidney Farber and colleagues conceived the folic acid analogs and subsequently tested these compounds in children with leukemia showing disease remissions in 1948¹, following the thrilling observations on the effects of the nitrogen mustards on lymphomas², they probably could not speculate how quickly the knowledge in cancer care would progress.

Surgery and radiotherapy were considered the mainstay of tumor treatment until the 1960s when even using radical local therapies, cancer cure rates stagnated at around 30%. At that time some data pointed out that a combination of systemic to local treatment could enhance the results, introducing adjuvant chemotherapy, and switching in the subsequent years the standard of care for many types of cancer³.

Less than a century later, cancer management has faced advances (not limited to the ones listed below) guiding, over the years, to a decrease in cancer mortality in many countries:

- Changes in surgery techniques with fewer radical approaches, the use of sentinel lymph node biopsy⁴, and minimally invasive, laparoscopic, and robotic surgeries⁵.
- Improvements in radiotherapy, a technology-driven treatment modality, have radically changed over the past few decades with the introduction and popularization of techniques such as intensity-modulated, volumetric-modulated arc therapy, and stereotactic body radiotherapy, allowing a tailored dose distribution sparing the adjacent normal tissue⁶.
- Progresses in cancer pathology and molecular diagnosis fostering a better understanding of carcinogenesis and tumor biology, enabling molecular-stratified treatment in clinical practices⁷.
- New imaging tools for diagnosis and staging⁸.
- Discoveries on basic cancer research and the contemporary design of the studies transforming the clinical trials landscape⁹.
- The introduction of modern classes of antiemetics¹⁰, granulocyte colony-stimulating factor¹¹, erythropoietin¹², and guidelines for pain management¹³, as well as the multidisciplinary approach through the journey of patients, and the early provision of palliative care bringing quality of life¹⁴.
- Not to mention the prevention measures, screening, and early diagnosis procedures related to an incidence reduction in many tumor types.

It is unequivocal that the inclusion of systemic therapy has led to a tremendous improvement in long-term oncologic results. Considering the last two decades, the introduction of groundbreaking classes such as targeted therapy¹⁵, checkpoint inhibitors antibodies¹⁶, and cellular therapy¹⁷ have modified dramatically the therapeutic options and associated objective responses and survival results.

However, despite all the practice-changing amelioration and the broad use of more effective systemic options, there are still several unmet medical needs in the oncology field, and thousands of basic and clinical researchers are dedicated to creating and getting new interventions approved by regulatory agencies.

Therefore, what is the forecast for cancer treatment within the next decade?

Coming from basic and translational research, the refinements in epigenetics, gene editing, and structural biology will probably allow researchers to target cancer proteins historically deemed undruggable.

The use of synergistic combinations targeting independent cellular pathways to surpass primary and acquired resistance will boost. Shifts in the schedule of systemic treatment, moving to the neoadjuvant setting or the use of systemic options as definitive treatment are also hot upcoming topics.

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The “liquid biopsy” for the detection of circulating tumor DNA, tumor cells or other biomarkers will certainly impact cancer care. In the next few years, these techniques are going to be employed to define adjuvant therapies for patients with minimal residual disease, diagnose early recurrences, monitor resistance in advanced tumors and early detect cancer.

Genomic risk scores, considering potential differences across diverse populations, will be incorporated not only for risk stratification and definition of the therapeutic strategy but also for early detection and prevention.

New immunotherapy combinations and especially a new generation of checkpoint inhibitors will take place. Cell therapies are still immature and, in the future, will expand and be considered a critical therapeutic alternative, not only for hematological neoplasms but also for solid tumors. The composition of the tumor microenvironment is going to be sufficiently understood, and inhibitory signals that interfere with the immunological response will be an obstacle that new drugs will overcome. Effective cancer vaccines delivering to the host immune system specific cancer targets that are unique to the patient’s tumors have been tested in clinical trials¹⁸ representing a growing strategy.

The antibody-drug conjugate, which combines a monoclonal antibody to a specific target plus a cytotoxic drug, is part of a new therapeutic class. Novel tumor targets, linkers and payloads have been developed and antibody-drug conjugates are going to be the new blockbuster of systemic care¹⁹.

The use of artificial intelligence will permanently take place in oncology as it is going to be widely applied in digital pathology, imaging, and data mining.

Finally, patient advocacy, education on primary prevention, healthy lifestyle, vaccination, screening, early diagnoses, and survivorship are topics to be deeply included in the debate on cancer care in the ensuing decade.

As a medical oncologist, struggling in my daily routine with severe diseases leading to patients and families suffering, I expect that these ten years’ predictions can overcome most of the drawbacks we still face in cancer care. Besides all the advances, we are going to genuinely save lives from cancer by eliminating health disparities and ensuring access and equity to standard cancer care for all diagnosed patients.

Let’s live to see!

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