Art, Science, and Personalized Cancer Care Through Regional Therapeutics

“...To enable a new era of medicine through research, technology, and policies that empower patients, researchers, and providers to work together toward development of individualized treatments.”

— President Barack Obama

This issue highlights a variety of regional therapies aimed at offering durable disease control, improving quality of life, and impacting survival for patients who present with recurrent, metastatic, or, most often, unresectable disease. Covered herein is a heterogenous group of tumor sites, histologies, patterns of spread, and disease stages, but the intertwining theme is the regional targeting of disease that has failed primary or conventional first-line therapies. In this era of rapidly advancing technology in medicine, clinical oncologists have a wide range of tools for offering cutting-edge treatments to patients. However, no 2 patients with advanced or recurrent disease are exactly alike.

Personalized medicine, especially as it relates to cancer care, is the most important element for successful treatment moving forward. Proof of this came when President Barack Obama announced in 2015 a multimillion-dollar investment from the US federal government aimed at improving our understanding of and ability to develop strategies for treating diseases (most notably, cancers) in a way that takes into account personal differences in genetics and environment. That initiative is focused on promoting discoveries of the specific patient and tumor factors that could predict an individual’s response to treatment. This issue of Cancer Control aims to highlight the personalized care necessary for complex patients with cancer through novel and targeted approaches to difficult and oftentimes incurable disease.

Dr Strom and colleagues detail the difficulties in approaching the clinical scenario of recurrent, unresectable disease in patients with head and neck cancers. With specific and challenging regional anatomical considerations, such as the carotid artery and spinal cord, they show that limiting doses to surrounding structures while providing high doses through conformal stereotactic radiation to recurrent sites in the head and neck can provide outcomes at least as good as standard palliative methods while potentially limiting toxicity and possibly improving quality of life by eliminating the need for prolonged treatments. Outcomes for patients with recurrent, unresectable head and neck cancers still remain poor, with a median survival rate limited to 1 year or less. Thus, significant work in the arena of personalized approaches in recurrent head and neck cancers is vital.

In one of the most notable areas in the development of personalized methods, Dr Sloot and coauthors provide an insightful update on intralesional strategies for the treatment of metastatic or unresectable melanomas. In their article reviewing treatment options for lesions not amenable to surgery, they provide compelling evidence to support the injection of a variety of agents directly into the tumor to reduce tumor volume and overall disease burden, as well as to improve rates of progression-free and, in some cases, overall survival. In addition to the direct antitumor effects observed in the injected primary lesion, many of the proposed agents provide a “bystander effect” — that is, noninjected, anatomic separate lesions show a measurable response likely through an activated immune system. Their article highlights the breadth of possibilities in the realm of personalized medicine by proposing treatments (eg, injection in combination with systemic therapies) that take into account tumor genetics, tumor characteristics (eg, sites of metastases, disease-free interval), and patient factors (eg, medical comorbidities, performance status), potentially providing the optimal individualized formula for future treatment.

Historically, distant metastatic disease was considered to be a state of incurability and called for palliative approaches. However, during the past 20 years, advances in radiation and surgical techniques have, in many cases, reversed the mindset regarding treatment of oligometastatic disease to one of potential curative intent. Drs Ahmed and Torres-Roca describe the techniques and outcomes related to the primary use of stereotactic body radiotherapy for the treatment of lung, liver, and spine metastases from a variety of primary tumor sites, including colorectal, breast, prostate, and sarcomas. With careful patient selection based on site, location, disease burden, and histology, personalized dosing and fractionation strategies can lead to favorable local control rates and improved toxicity profiles over conventional palliative regimens.

Keeping in mind the targeted management of oligometastatic disease with strategies aimed at limiting the traditional toxicities of open surgical techniques, Drs Wong and Cooper present the rationale for local ablative approaches for disease metastatic...
to the liver. They review thermal ablative techniques and electroporation and how these techniques, when used alone or in combination with systemic therapy, can meaningfully prolong rates of survival. By assessing each lesion and its anatomical confines, the best-suited, individualized approach can be selected to limit liver toxicity and postablation syndromes while still providing durable response.

When minimally invasive or ablative techniques fail, aggressive multimodality therapies may be necessary to help increase survival, even in the setting of incurable disease. Drs Rajeev and Turaga review use of cytoreductive surgery in combination with hyperthermic intraperitoneal chemotherapy in the setting of peritoneal carcinomatosis. They present favorable median survival data with aggressive application of the cytoreductive surgery/hyperthermic intraperitoneal chemotherapy technique compared with historical palliative approaches. Controversy still exists on the optimal timing, technique, and regimen to be used, but few would argue that reduced disease burden and perfusion of the peritoneal cavity with regional chemotherapy can lead to improved survival and quality of life in patients with this often poor diagnosis. In addition, with individualized selection, applying these strategies as a preventive measure in high-risk disease has been proposed.

Although we are moving toward an era in which abundant information and updated and new technology are available to all, it is still important to remember that our patients are individuals with unique diagnoses, tumor and staging considerations, genetics, lifestyles, ethics, and belief systems. Personalizing our treatment approaches and keeping the individual in mind will allow oncologists to keep the science of medicine at the forefront of innovation.

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References