



# **SUMMARY OF SCIENTIFIC BREAKTHROUGHS** FROM THE 2019 ASTRO ANNUAL MEETING

THE ROLE OF RADIATION THERAPY IN CANCER CARE

# Introduction

Hearing a cancer diagnosis is scary. Overwhelming. Confusing. Many questions flood your mind when you learn you or a loved one have cancer. And trying to learn and understand all the treatment options can be daunting to say the least. At the American Society for Radiation Oncology (ASTRO), our mission is to advance the practice of radiation therapy by promoting excellence in patient care, which includes promoting radiation oncology research and disseminating results to both our members and patients.

For more than 100 years, doctors have been using radiation therapy, also known as radiotherapy, to treat patients diagnosed with cancer. Radiation therapy is often combined with other treatment options, like chemotherapy or surgery, or used as a stand-alone treatment. Radiation therapy is an effective option for many people faced with a cancer diagnosis. In fact, nearly two-thirds of all cancer patients are treated with radiation during their illness.

Radiation therapy targets cancer cells and damages the DNA of the cell. The radiation destroys the ability of the cancer cells to reproduce and repair, causing the cells to die. Once these cancer cells die, the body naturally eliminates them. Normal cells that surround the cancer cells are affected by the radiation treatment as well, but the normal, healthy cells can repair themselves far better than the cancer cells. Advances in radiation therapy have allowed doctors to better target the cancer to reduce the risk of side effects from radiation. Despite the name, radiation therapy does not cause a patient to become radioactive. Radiation therapy treatments allow most patients to continue with their typical daily activities. Side effects vary based on the location and type of cancer, and many patients continue to work or go to school while undergoing treatments.

With radiation therapy, research often focuses on this question: What is the right dose of radiation for each patient? Sometimes more intense therapy is needed, and in others, is it possible to reduce the amount and intensity of treatments while still achieving excellent outcomes for patients? How do radiation oncologists find the right balance between reducing treatment doses to improve patients' quality of life while making sure that the reduced treatment remains powerful enough to stop the cancer from spreading?

The answer is research, where scientists and physicians work together to discover new cancer treatments. Today, radiation oncologists are actively researching safe and effective radiation treatments, including more personalized approaches and studies of lower doses for a variety of cancers.

In an effort to disseminate the latest science related to radiation therapy, ASTRO prepared this pamphlet, which highlights some of the top research presented at our 2019 Annual Meeting.



We encourage you to review all of your treatment options, including radiation therapy, with your primary care physician before determining which option or combination of options is best for you and your lifestyle.

Theodore L. DeWeese, MD, FASTRO  
Chair, ASTRO Board of Directors



## Head and Neck

The American Cancer Society estimates that, in the United States, approximately 3-5% of all cancers will be in the head and neck region. Treatment options vary based on the specific location of the cancer (e.g., base of neck, throat, tongue), but the two main treatment options are surgery or radiation therapy. Sometimes, chemotherapy and/or targeted systemic therapy is used in combination with radiation therapy.

### **Radiation de-escalation may be possible in some locally advanced head and neck cancers**

Sue Yom, MD, PhD, MAS, of the University of California, San Francisco, recently examined two different de-escalation strategies, treatments which lower the dose of radiation, for patients with human papillomavirus (HPV)-positive head and neck cancer. “We tested two approaches to reduce the dose of radiation to a specific group of HPV-positive patients with very limited extent of cancer,” she said.

Dr. Yom and her co-authors hypothesized that reduced-dose radiation therapy would prevent cancer relapse for at least two years in 85% or more of the participating patients. Some patients received radiation therapy only on a slightly compressed schedule, while others received radiation therapy in conjunction with the chemotherapy drug cisplatin.

After more than two years of follow-up, the researchers concluded that the combined radiation-chemotherapy regimen met the two-year progression-free survival goal, but the radiation-only regimen did not. “We designed the two trial arms [segments] hoping they would both be successful, but one was not,” Dr. Yom said. “In light of this and other data showing negative outcomes from de-intensifying treatment, additional studies should be undertaken with caution. However, we are excited to move forward with our successful de-intensification arm in a new large-scale study attempting to develop a new de-intensified standard of care.”



## Proton beam therapy offers esophageal cancer patients reduced toxicities versus intensity-modulated radiation therapy

Esophageal cancer is a disease that often reduces a patient's quality-of-life. The esophagus is the hollow tube that connects your mouth with your stomach. When you swallow food or liquid, it travels through the esophagus to reach your stomach and begins the digestion of food process.

Tumors in the esophagus can make swallowing difficult or impossible, and the radiation treatment used to treat them can also cause side effects that make swallowing a challenge. When patients receive radiation therapy for esophageal cancer, in addition to treating the cancer, top priorities are preserving patients' ability to swallow and protecting the nearby heart and lungs from radiation damage.

A Phase II randomized study measured the severity of the side effects of radiation therapy associated with two different types of treatment. Specifically, the study compared the side effects of proton beam therapy (PBT) with those of intensity-modulated radiation therapy (IMRT).

The study, led by Steven H. Lin, MD, PhD, a radiation oncologist at MD Anderson Cancer Center in Houston, hypothesized that the greater precision of PBT could reduce esophageal cancer patients' total toxicity burden (TTB) without affecting their clinical outcomes, such as progression-free survival (PFS).

Lin, and his team assigned numeric values to 11 side effects that often occur within one year of starting radiation therapy. Severe side effects increased each patient's TTB score more than mild ones.

The investigators found that, at a median follow-up time of 52.9 weeks, patients in the IMRT group had worse side effects, with an average TTB score that was 2.3 times higher than those in the PBT group. About half the patients in each group had surgery as part of their overall therapy. For these patients, the average complications score after surgery was 7.6 times higher in the IMRT group than in the PBT group. Additional research is being conducted to determine whether PBT or IMRT helps patients live longer; these results will not be available for several years.

