Improving Head and Neck Cancer Outcomes: Technology, Used Wisely

Ringash and Thariat

In this edition’s Oncology Scan, Ringash and Thariat review 3 articles suggesting strategies for improving process and outcomes of radiation therapy for head and neck cancer. One looks at the role of PET-CT for surveillance of the neck after definitive chemo-radiation therapy for patients with N-2/3 disease. It demonstrates surveillance is non-inferior in terms of survival, similar for quality of life, and has clear cost savings. A second study documents time-savings per case for contouring normal tissue organs at risk by modifying contours created by auto-segmentation software, as compared to manual contouring. Finally, a study using the SEER-Medicare database shows that provider volume correlated with survival and toxicity of head and neck cancer patients if treated by IMRT, but not among those receiving non-IMRT techniques.

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Supply and Demand for Radiation Oncology in the U.S.: Updated Projections for 2015 to 2025

Pan et al

Prior studies have forecast that the demand for radiation therapy will grow 10 times faster than the supply between 2010 and 2020 in the United States. In this updated analysis, the demand for radiation therapy between 2015 and 2025 was estimated by combining current radiation utilization rates, determined by the SEER data, with population projections, provided by the U.S. Census Bureau. The supply of radiation oncologists was forecast by using workforce demographics and full-time equivalent status provided by ASTRO, current resident class sizes, and expected survival according to life tables from the United States Centers for Disease Control. Between 2015 and 2025, the expected demand for radiation therapy is now projected to grow by 19%, in comparison with an expected 27% increase in the supply of full-time equivalent practicing radiation oncologists.

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The Radiation Oncology Job Market: The Economics and Policy of Workforce Regulation

Falit et al

Falit et al examine more deeply the potential for an oversupply of radiation oncologists. Despite these concerns, residency slots continue to expand. Payment policy changes now significantly threaten radiation oncologist income, which may encourage physicians to care for greater patient loads, obviating the need for more personnel. Furthermore, the implementation of alternative payment models, threatens to decrease both the utilization and price of radiotherapy by turning referring providers into cost-conscious consumers. There are practical concerns associated with a market-based solution in which medical students self-regulate according to job availability, but antitrust law would likely forbid collaborative self-regulation that restricts supply. Since Congress is unlikely to create one central body to control residency entry for all specialties, these authors recommend better reporting of program-specific employment metrics and careful, re-evaluation of existing ACGME accreditation standards.

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Risk of Symptomatic Stroke After Radiation Therapy for Childhood Cancer: A Long-Term Follow-Up Cohort Analysis

van Dijk et al

Long-term childhood cancer survivors are at high risk of late adverse effects, including stroke. These authors aimed to determine the cumulative incidence of symptomatic stroke (transient ischemic attack, cerebral infarction, and intracerebral hemorrhage) using a single-center study cohort of 1,362 survivors of childhood cancer diagnosed between 1966 and 1996. Patients were treated with cerebral radiation, supra-diaphragmatic radiation, or both. Prescribed doses were converted into the equivalent dose in 2-Gy fractions (EQD2). At an attained age of 45 years, the estimated cumulative incidence was: 10% among survivors treated with brain radiation; 5% with supra-diaphragmatic; and 13% with both. Dose dependence was seen.

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Stroke After Radiation Therapy for Head and Neck Cancer: What Is the Risk?

Arthurs et al

These authors used the Ontario Cancer Registry and regional cancer treatment centers to determine the risk of ischemic stroke following curative radiotherapy in adult head and neck squamous cell carcinomas. More than 14,000 patients were identified who had been treated for cure between 1990 and 2010. The cause-specific hazard ratios for ischemic stroke following radiation therapy alone and following any exposure to radiation therapy (as part of combined modality therapy) compared to surgery alone were 1.70 and 1.46, respectively, after adjusting for stroke risk factors, patient factors, and disease-related factors. The recent shift toward a younger head and neck cancer patient population speaks to the need for adequate follow-up and survivorship care among those treated with radiotherapy.

A Prospective Clinical Trial Combining Radiation Therapy With Systemic Immunotherapy in Metastatic Melanoma

Hiniker et al

Local radiation therapy in combination with systemic anti-CTLA-4 immunotherapy may enhance induction of systemic anti-melanoma immune responses. In this prospective clinical trial, 22 patients with stage IV melanoma were treated with palliative radiation therapy and ipilimumab for 4 cycles. Radiation therapy to 1-2 disease sites was initiated within 5 days of starting ipilimumab. Patients had >1 non-irradiated metastasis that could be followed for an assessment of systemic effects. Combination therapy was well tolerated without unexpected toxicities, and with half the patients having clinically meaningful responses in the unirradiated sites. Analysis of immune response data suggests a relationship between elevated CD8-activated T-cells and response. This is one of the few prospective clinical trials of treatment of metastatic melanoma with the combination of radiation therapy and systemic immunotherapy, and the first using this sequence. Results from this trial demonstrate that a subset of patients can benefit from combination therapy.

18F-Fluorodeoxyglucose Positron Emission Tomography Can Quantify and Predict Esophageal Injury During Radiation Therapy

Niedzielski et al

This study investigated the ability of mid-treatment FDG-PET studies to objectively, and spatially, quantify esophageal injury in vivo from radiation therapy given for non-small cell lung cancer. FDG-PET uptake was normalized to each patient’s low-irradiated region (<5Gy) of the esophagus, as a radiation-response measure. Increasing normalized SUV was related to esophagitis severity. It can objectively, and non-invasively, quantify esophagitis during radiotherapy, and predict eventual symptoms among asymptomatic patients.

Evaluation of Functional Marrow Irradiation Based on Skeletal Marrow Composition Obtained Using Dual-Energy Computed Tomography

Magome et al

These authors report two studies aimed at improving the delivery of total marrow irradiation (TMI). They evaluated a new fast megavoltage CT imaging modality for set up, first in human cadavers, and then in TMI patients, to show that the both scanning time and the imaging radiation dose could be reduced. They also used whole body dual energy CT (DECT) to segment red and yellow marrow regions and to simulate dose escalation. While CT-guided TMI delivers radiation to skeletal regions, the DECT-based imaging would allow precisely determined doses delivered to particular bone marrow compartments either for dose escalation to these sites or for better sparing of the organs at risk.