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RadOnc Student Scan

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IN THIS ISSUE

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Forward Thinking in the Field of Radiation Oncology

The specialty of radiation oncology is being very proactive in helping to facilitate and minimize burnout. A recent study by the American College of Radiology revealed multiple factors leading to burnout.[1] It noted that burnout had worsened since the COVID-19 Pandemic and is affecting a higher percentage of women than men. The rates of burnout have been rising in all fields of medicine as demonstrated by the Shanafelt article which evaluated 24 specialties and found that radiation oncology was 21st in percentage of respondents experiencing burnout and 7th in greatest satisfaction with wellness.[2] This study demonstrates that burnout is experienced less frequently by radiation oncologists than most other medical fields, likely because of the field's proactive, forward thinking regarding burnout. It is important to know that the field is committed to turning the tide and improving the experience for both current and future radiation oncologists.

The American Society of Radiation Oncology (ASTRO), one of the national organizations for radiation oncologists, has recognized the significance of physician burnout among its members. ASTRO's commitment to the well-being of radiation oncologists is demonstrated by the theme of the 2024 annual meeting: Targeting Provider Wellness for Exceptional Patient Care. The keynote speakers Danielle Ofri, MD, PhD, and Bryan Sexton, PhD, are renowned experts helping physicians learn to bridge the gap between patient care and self-care. Bringing physician well-being to the forefront of their national meeting, ASTRO is leading its specialty to help overcome an often-overlooked problem, which will lead to better lives for physicians resulting in better patient experiences and outcomes.

Radiation oncology is a field that allows physicians the opportunity to spend significant time with patients and their families during one of the most stressful times in a patient's life. This opportunity brings with it both significant personal stress as well as immeasurable rewards. The future for this specialty is bright, as more options are being made available to physicians to learn how to better cope and deal with stressors.

Medice, cura te ipsum. Physician, heal thyself.

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Interview With a Radiation Oncologist

Samir H. Patel, MD; Mayo Clinic, Phoenix, Arizona

Samir H. Patel, MD, is a distinguished radiation oncologist currently serving as professor and vice chair of the Department of Radiation Oncology at Mayo Clinic in Phoenix, Arizona. Dr. Patel obtained his medical degree from Wayne State University School of Medicine and completed his residency in radiation oncology at Henry Ford Hospital, where he also served as chief medical resident. Dr. Patel's expertise is anchored in leveraging state-of-the-art radiation therapy technologies, such as proton beam therapy, to deliver precise treatments while minimizing adverse effects. Driven by a passion for elevating clinical outcomes, Dr. Patel champions a philosophy of continuous learning and pursuit of excellence. His research and clinical interests span the spectrum of radiation oncology, with a focus on intensity-modulated radiation therapy, stereotactic body radiation therapy, and strategies for reducing radiation toxicity. With a compassionate approach to patient care, Dr. Patel has garnered recognition for his comprehensive treatment of various conditions, including head and neck cancer, thyroid cancer, and skin cancer. His dedication to improving patient outcomes has positioned him as a respected leader in the field.

When did you learn about radiation oncology?

I learnt about radiation oncology during my third-year internal medicine rotation. While on the floor, I met a radiation oncology resident on their internship, and that's what introduced me to the field. Even though I was familiar with diagnostic radiology and hematology oncology, I wasn't aware that radiation oncology existed as a separate specialty.

What sparked your interest in radiation oncology?

Being a people person, I thrived on patient care and meeting new people. However, I also loved technology, particularly imaging. Radiation oncology became the perfect blend — it allowed me to fuse technology, especially imaging, with patient care responsibilities. This field is exciting because it requires expertise across many disciplines — surgical oncology, systemic therapy, anatomy — and involves collaboration with various specialties. As a board-certified radiation oncologist, I can treat adults and children with a wide range of cancers, which is incredibly fulfilling. And there's always the option to pursue further specialization if that interests me.

At what point did you decide to pursue a career in the specialty?

I did an audition rotation in radiation oncology later in my third year. That experience solidified my decision. It's hard to know for sure if you want to be a radiation oncologist without spending time in the department, especially considering it could be a 30+ year career. You really want to be sure you enjoy it.

What do you believe was the most beneficial clinical rotation(s) to prepare you for your radiation oncology residency?

I believe rotations in surgical oncology are crucial to understand proper cancer surgery. Spending time with diagnostic radiologists is also important to become fluent in cross-sectional anatomy. Finally, medical oncology is vital. With systemic therapy becoming increasingly complex due to personalized care and cancer genomics, understanding the latest treatments is essential. The more you know about these areas, the better you can collaborate with the team in a multidisciplinary fashion.

For a medical student interested in radiation oncology but short on time, what's more important: focusing on clinical rotations or medical research?

Balancing clinical rotations and medical research can be a challenge for any medical student, but especially for those interested in a competitive field like radiation oncology. While research can make your residency application more attractive, a strong foundation in clinical care is equally important. Here's why prioritizing clinical rotations might be the better approach if you're short on time: Firstly, fluency in patient care informs your research. If you haven't spent time interacting with patients and understanding their needs, your research questions and approaches may not be as relevant or impactful. Secondly, residency programs highly value practical skills. They can easily identify someone who focused heavily on research over understanding the realities of patient care. This doesn't mean medical research is unimportant. It can still demonstrate your passion and intellectual curiosity. The key is to be selective. Choose research projects that genuinely interest you and contribute to the field of radiation oncology. Ultimately, the goal is to strike a balance. Showcase your research potential while prioritizing clinical rotations to become a well-rounded applicant for residency programs.

How many residency programs did you apply to?

The number of programs I applied to was 13. This was many years ago, and at that time, I faced limitations in terms of both geography and budget.

Did you have a radiation oncology rotation in medical school?

Yes, I did complete a radiation oncology rotation during medical school. In fact, it's quite common for students interested in this field to participate in at least two rotations. Typically,

Interview With a Radiation Oncologist *continued*

one rotation occurs at their home institution, followed by another at a different location. Some particularly dedicated students may even pursue three rotations. Participating in two to three rotations is considered standard practice.

How did you connect with an attending/staff to get your research started?

To jumpstart research during my first audition rotation, I expressed interest in projects. While a one-month rotation wouldn't allow for a complete project, it could be a starting point for tasks like IRB approval or data collection. However, securing a mentor requires careful consideration. Medical students are unfamiliar with research specifics, so faculty with existing projects, like review papers, might be a good fit. Ultimately, time investment is crucial for both parties. Students need to be dedicated to project completion, as faculty may be hesitant to mentor after encountering students who abandon projects due to time constraints. This can lead to research opportunities being directed more towards residents with established research experience.

Which didactic course do you feel prepared you for a residency in radiation oncology?

Entering a radiation oncology residency requires significant initial investment in learning. The first six months are particularly demanding as you encounter a completely new vocabulary and system. Residency programs typically offer structured courses in radiation biology and physics, which are crucial foundations. Supplementing these with clinical oncology and radiation oncology handbooks can provide a foundational understanding of treatment paradigms, staging systems, and radiation treatment indications. However, the learning curve remains steep throughout the PGY2 year.

Opportunities for Career Development

Radiation Oncology Education Collaborative Study Group (ROECSG)

Includes the following:

- Undergraduate medical education (UGME), graduate medical education (GME), continuing medical education (CME), patient education, and interprofessional education groups
- Annual spring symposia
- Online resources about global health, clinical information, study materials, and more
- Social media and blogs
- ROECSG report (visit roecsg.org/roecsg-report for the latest issue)

Learn more by visiting roecsg.org.

Radiation Oncology Virtual Education Rotation (ROVER)

A virtual resource for medical students that includes:

- Networking opportunities to meet radiation oncologists from across the country
- Links to join radiation oncology organizations such as the Association of Residents in Radiation Oncology (ARRO) and The American College of Radiation Oncology (ACRO).
- Educational videos and materials about radiation oncology
- Books, websites, and more

Learn more by visiting radoncvirtual.com

American Radium Society Radiation Oncology Knowledge for Early-career and Training (ARS ROCKET)

Includes resources like webinars for medical students and residents that discuss topics such as the following:

- Away rotations
- ERAS applications
- Legal aspects of oncology
- Alternative radiation oncology career paths
- Applying for jobs

Learn more by visiting americanradiumsociety.org/general/custom.asp?page=rocket

Find a Mentor

The ASTRO website offers students the opportunity to match with a mentor in radiation oncology who can help with the following:

- Making career choices
- Understanding what to expect in residency
- Learning more about radiation oncology
- Developing leadership skills
- Balancing work/life goals and more

Learn more by visiting astro.org.

Further mentoring opportunities at the ASTRO 2024 conference will be available as well, including one-on-one connections that can be made if one indicates interest during the Annual Meeting registration process and multiple Speed Mentoring events throughout the conference.

Interview With a Radiation Oncologist

Ann Raldow, MD, MPH; David Geffen School of Medicine at UCLA

Ann Raldow, MD, MPH, is an associate professor, residency program director, and vice chair of education in the Department of Radiation Oncology at the David Geffen School of Medicine at UCLA. Dr. Raldow graduated from Princeton University with a Bachelor of Arts degree in molecular biology. She earned her medical degree at the Yale University School of Medicine. After finishing her internship at Memorial Sloan Kettering Cancer Center, Dr. Raldow completed her residency at the Harvard Radiation Oncology Program. While in residency, Dr. Raldow also obtained a Master of Public Health degree from the Harvard T.H. Chan School of Public Health. Dr. Raldow specializes in the treatment of gastrointestinal and hematologic malignancies. She has expertise in intensity modulated radiation therapy (IMRT), magnetic resonance guided radiation therapy (MRgRT), stereotactic body radiation therapy (SBRT), and other advanced techniques in radiation therapy. Her research focuses on therapeutic decision making, cost-effective care, quality of life, and health outcomes assessment.

How did you learn about radiation oncology?

During college, I shadowed a surgical oncologist and found the clinic experience with oncology patients very meaningful and interesting. However, I realized the operating room wasn't my ideal environment. It wasn't until I started medical school that fate intervened in a rather unexpected way. A fellow student, who was further along in her studies, happened to visit my apartment to pick up a television. In the midst of our conversation, she shared her recent match into radiation oncology with great excitement. Intrigued by her passion, I explored radiation oncology further through a rotation. Little did I know, this ordinary encounter would spark my journey into the world of radiation oncology.

What attracted you to the field of radiation oncology and when did you settle on this specialty?

For me, the allure of radiation oncology lies in its unique blend of emotional and intellectual appeal. On the emotional side, there's something incredibly meaningful about working with oncology patients. Their strength, resilience, and the trust they place in their health care providers make every interaction deeply impactful. I was also drawn to the intellectual challenge it presents. Cancer is a complex disease with multifaceted biology, constantly presenting new puzzles to solve. From understanding the intricate mechanisms driving tumor growth to exploring innovative technologies for treatment delivery, there's a wealth of knowledge to uncover in this field. What initially attracted me to radiation oncology was this perfect marriage between the profound emotional connection with patients and the intellectually stimulating nature of the work. It's a field where compassion meets cutting-edge science.

What advice do you have for students interested in radiation oncology?

Shadowing radiation oncologists, getting involved in oncology-related research projects, and taking part in clinical rotations are great steps in gaining a deeper understanding of the specialty. These experiences offer valuable insights into patient care and technological advancements. Don't hesitate to seek guidance from mentors, both attending physicians and residents, who can provide valuable advice and share their experiences to assist you in navigating your career path. Finally, consider the chance to engage in research projects within radiation oncology, as they not only contribute to the field's knowledge but also enrich your comprehension of radiation oncology practice.

What resources would you recommend to students interested in learning more about radiation oncology?

For students interested in deepening their understanding of radiation oncology, several valuable resources are available. ASTRO webinars provide a comprehensive platform to explore a wide range of topics, including treatment techniques and emerging research areas, allowing students to stay updated on the latest trends and developments within the field. In addition, eContour.org offers interactive contouring exercises, enhancing students' proficiency in this fundamental skill through case-based practice. The Radiation Oncology Education Collaborative Study Group (ROECSG) also provides amazing educational materials such as lectures, case discussions, and study guides.

What made you pursue a role involving medical education?

Well, for one, it's incredibly enjoyable. Interacting with young minds keeps me youthful. Being involved in education provides the opportunity to influence the future direction of the field. It's rewarding to play a part in shaping the next generation of health care professionals and contributing to advancements in medical knowledge and practice. My own journey was influenced by dedicated teachers who made a significant impact on my path. I find it deeply rewarding to pay that forward and empower others in their educational and professional endeavors.

What do you think defines a good mentor or educator?

In addition to prioritizing the mentee's interests, a good mentor or educator is accessible and approachable. They are readily available to offer guidance, answer questions, and provide support, fostering an environment of open communication and trust. Beyond offering personal mentorship, they also actively connect the mentee with relevant resources and opportunities within their field of interest, facilitating their professional development and growth. Adept at both listening and advising, they create a nurturing space where the mentee feels encouraged to explore new ideas, challenge themselves, and pursue opportunities for advancement. In essence, a commendable mentor or educator embodies not only expertise and experience but also a genuine commitment to the success and well-being of their mentees.

Interview with Radiation Oncology Residency Applicant

Joshua Qian, MD

Hello! My name is Josh Qian. I am a recent graduate from the Emory University School of Medicine who matched into radiation oncology residency at Memorial Sloan Kettering Cancer Center in New York City. I also participated in the couples match and my partner matched into internal medicine at Mount Sinai, also in NYC. We are so excited to explore NYC and learn from the leaders of our respective fields! In my free time, I enjoy rock climbing, playing the violin, and playing video games/board games.

Why RO?

Radiation oncology is the perfect field for me given my excitement for the technical and interpersonal skills needed to succeed. Technical skills are needed for medical decision making, as well as learning radiation physics and radiation technology. The opportunity to combine my background in engineering with my growing knowledge of medicine to treat cancer is incredibly exciting. Interpersonal skills are vital as we help our patients navigate a life-threatening and emotionally distressing illness, not to mention the intimidating treatment plans they receive (radiation, chemotherapy, surgery, etc.). During my RO rotations, I was impressed by the length of appointments (up to one hour for new patients), which allowed for trusting relationships to be built and proper education on both the illness and on radiotherapy to occur. After finishing treatments, patients continue to come to their radiation oncologist for follow-up appointments. I saw my attendings and patients talking about their jobs, hobbies, families, and big life changes as if they were old friends. I can't wait to form these loving, longitudinal relationships with my future patients. Many others are drawn to the field by other reasons that are equally, if not more, important, including: teamwork environment (ROs work with physicists, dosimetrists, nurses, and radiation therapists; as well as medical and surgical oncology teams), oncologic care, research, and more.

How can I learn more about (or get involved with) RO?

I actually wrote about this recently in a previous issue of the Applied Radiation Oncology Student Scan E-Newsletter (link)! The big takeaways are the following:

1. Start with exploring the medical student webpages of national RO organization websites (I liked ASTRO [link] and ROECSG [link]).
2. Reach out to RO faculty for mentorship – Emory's RO department was incredibly welcoming, uplifting, and supportive during my exploration of the field and getting me plugged in with opportunities, such as shadowing, research, and rotations.
3. Gain clinical experience – Your medical school may have a M2 elective and/or a M4 elective to work clinically within the RO department. Away rotations are also recommended in M4 year. Most applications are sent through VSLO and open in March or April.
4. Find your RO niche – Whether you are interested in research, medical education, advocacy, quality improvement, etc, find your passion and get involved!

What is the application process like for RO?

Applications for RO residency are submitted on ERAS, which is identical to most other specialties. You will get plenty of general guidance on components of the ERAS application from your medical school, including advice on personal statement, letters of recommendation, and CV. Three things I learned about the RO application specifically are:

- Transitional Year (TY) or Preliminary Year (prelim) programs: You are required to do 1 year of medicine or surgery through a TY or prelim program. You apply for these programs separately from the RO programs, so keep both the extra time and cost in mind. I also slightly modified the personal statement I sent to TY/prelim programs compared to my RO programs.
- Letters of Recommendation (LoRs): Most programs accept 4 LoRs. I sent 3 LoRs from RO faculty and 1 LoR from internal medicine. If you do away rotations, be sure to ask for a LoR before you leave!
- Geographic preferencing: This was a new component of ERAS that allows applicants to specify either up to 3 regions of the US as preferences or state "no geographic preference". You may be confused as to whether to preference or not (I certainly was!). I am currently working with a group to present and publish data on geographic preferencing soon. For now, my advice is that if you know you want to train in a certain location, go ahead and geographic preference. If you are going to geographically preference, you should list 3 regions. If you are geographically flexible, stating "no preference" could keep more options open.

What is the role of research (or how important is research) for applying into RO?

RO, like other oncology specialties, is dependent on research to continually advance the field. Cancer treatment has made incredible strides due to ongoing research and discoveries, which have dramatically improved patient outcomes. So, research is an important component in a medical student's RO application. Even if you are unsure of whether you want to be a researcher in the future, getting involved with research during medical school allows you to show residency programs that you have learned about the research process and have gained an understanding of how to interpret other studies, which is an important skill for a field that is everchanging. That being said, getting involved with research can be intimidating. The first thing I will say is finding the right mentor is key. My mentor at Emory, Dr. Mohammad Khan, was committed to my success as his mentee! The second thing is that research can come in many different forms.

Interview with Radiation Oncology Residency Applicant *continued*

It can be lab research, clinical research, education research, advocacy research, global health research, and many more! As I mentioned before, find the niche and passion that will fuel your work.

What resources were helpful in your RO rotations?

1. The "Red Book", also called the "Essentials of Clinical Radiation Oncology", provides concise and comprehensive overviews of disease sites.
2. "NCCN Guidelines" (link) provides details on staging, work-up to consider, and treatment options. I used this with the Red Book to chart review and make plans for my patients. You need to make a free account to access it.
3. "Rad Onc Tables" is an app that has relevant studies organized by disease site.
4. "eContour" is a website that has contouring examples if you are interested in helping with treatment planning/contouring.

Should I be doing any specific extracurricular activities?

Let your passion and your niche guide what extracurricular activities you become involved with. Outside of clinical research, one example is my interest in medical education. I did both non-RO and RO related education projects by participating in my med school's MedEd Interest Group and Oncology Student Interest Group. It certainly does not necessarily need to be RO affiliated. Certainly, as medical students, it is easier to take on too much than to take on too little. So with that, I impart the advice that it is ok to say NO to projects you do not feel strongly about. Wellness and work-life integration should be a priority for anyone in healthcare.

What advice do you wish you'd received as a 1st/2nd/3rd year student?

My number one piece of advice is that, as medical students, our success is strongly dependent on the mentors, teachers, residents, and faculty that support us. We truly have the opportunity to stand on the shoulders of giants. So, do not be afraid to reach out to people and ask for help. Let others know your goals and desires and most people will be more than happy to help or connect you with someone who can. The RO department at Emory was especially supportive of my desires to join the field. I cannot thank them enough.

While it can be intimidating to explore a field that we have so little exposure to in our core curriculum, do not stress too much about gaining all the knowledge as a medical student. As long as you are nice to others and remain curious, you will find success. I wish you all the best of luck in exploring this field, I am certainly beyond excited to be a part of it.

Upcoming Conferences

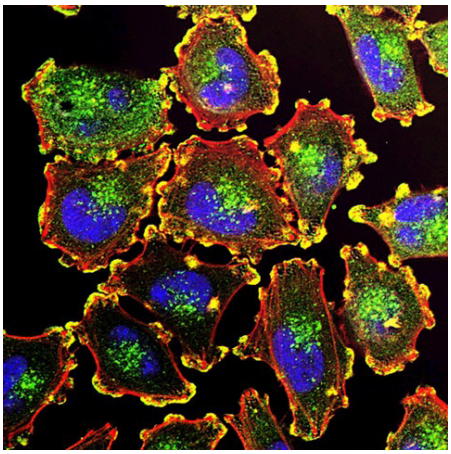
American Association of Physicists in Medicine 2024
July 21-25, 2024 | Los Angeles, CA

8th World Congress on Controversies in Breast Cancer (CoBrCa)
September 11-13, 2024 | Edinburgh, Scotland, UK

Particle Therapy Cooperative Group – North America (PTCOG-NA)
November 14-16, 2024 | New York City, NY

ASTRO 2024
September 29-October 2, 2024 | Washington, DC

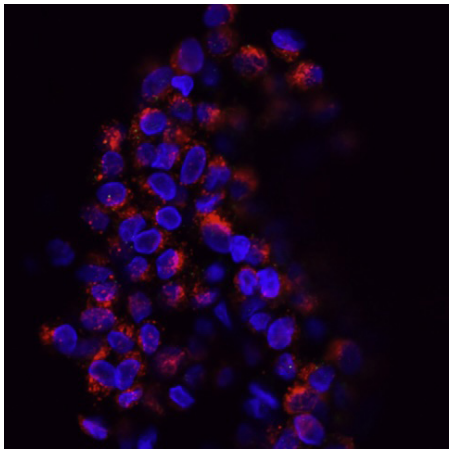
Hot Topics in Radiation Oncology



Radiation Pneumonitis Prediction with Dual-Radiomics for Esophageal Cancer Underwent Radiotherapy[3]

Li C, Zhang J, Ning B, et al; *Radiation Oncology*

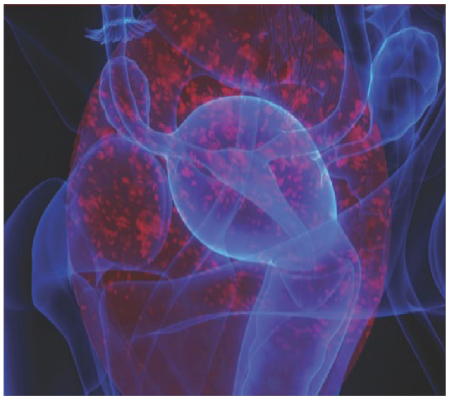
Esophageal cancer (EC) is a highly malignant disease often treated with radiotherapy (RT), which can lead to radiation pneumonitis (RP), significantly affecting patient outcomes. This study aimed to improve RP prediction (grade ≥ 2) in EC patients by integrating radiomics and dosiomics features from multiple regions of interest (ROIs). A retrospective analysis was conducted on 143 EC patients from one hospital and 32 from another, all treated between 2015 and 2022. Patients were classified as RP positive or negative based on CTCAE V5.0. The study developed and evaluated models using features from single and multiple ROIs. Models incorporating Rad_score_Lung&Overlap and Dos_score_Lung&Overlap achieved higher area under the curve (AUC) values of 0.818 and 0.844 in external validation, respectively, compared to single ROI models. Combining these models with a support vector machine (SVM) improved the AUC to 0.854. Additionally, a nomogram integrating radiomics and dosiomics scores with clinical factors, dose-volume histogram (DVH) factors, and mean lung dose (MLD) achieved an AUC of 0.937 in internal validation and 0.912 in external validation. The study concludes that integrating radiomics and dosiomics features from multiple ROIs enhances the reliability and accuracy of RP prediction for EC patients undergoing RT.



A Survey of Cancer Patients' Interest in Undertaking Exercise to Promote Relaxation During Radiotherapy for Breast Cancer and Metastatic Cancer[5]

Moser R, Mayr NA, Nano J, et al; *Radiation Oncology*

Radiotherapy (RT) is a central component of cancer treatment, but it is associated with significant psychological distress and anxiety in 25–50% of patients, which can negatively impact their quality of life and treatment outcomes. Previous research has shown that relaxation exercises can alleviate RT-related stress, but the specific needs for such therapies in radiation oncology remain under-explored. This study aims to investigate the demand for and preferences toward relaxation exercises among RT patients, addressing a critical gap in patient-centered care. A prospective pseudonymized survey was conducted from 2022 to 2023 among patients undergoing curative-intent RT for breast cancer or palliative RT for bone metastases. An 11-item questionnaire assessed their anxiety, interest in relaxation exercises, and preferences for the type and format of instruction. Out of 100 respondents (74 female, 26 male, median age 62), 78% expressed a desire to be actively involved in their RT, yet only 27% had previously practiced relaxation exercises. Notably, 44.8% of these patients wanted to learn how to relax, and 56.4% were willing to spend extra time learning the exercises. The study concludes that both curative and palliative RT patients desire relaxation exercises to mitigate stress and anxiety, highlighting the importance of assessing individual needs and developing suitable programs to enhance patient care.



125I Seed Brachytherapy for Non-Central Pelvic Recurrence of Cervical Cancer after External Beam Radiotherapy[4]

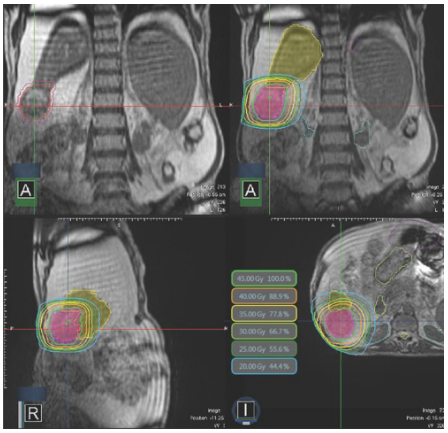
Di X, Gao Z, Yu H, et al; *Radiation Oncology*

Cervical cancer frequently recurs after initial treatment, posing a significant challenge due to local expansion, fibrosis, and metastasis. The study investigates the efficacy of 125I seed brachytherapy for non-central pelvic recurrence of cervical cancer post-external beam radiotherapy (EBRT) and analyzes influential clinical factors. Between June 2015 and April 2022, 32 patients with 41 lesions were treated with 125I seeds guided by CT or 3D-printed templates, with a median dose of 100 Gy. The study found that the local control rates (LCR) at 6, 12, and 24 months were 88.0%, 63.2%, and 42.1%, respectively, and the median survival time was 13.26 months, with 1- and 2-year survival rates of 36% and 33%. No significant adverse events were reported. Multivariate regression analysis identified tumor diameter, tumor stage, and LCR as significant predictors of survival. ROC curve analysis determined optimal cut-off values for tumor diameter (< 5.3 cm) and D90 (> 108.5 Gy) associated with better efficacy. These findings suggest that 125I seed brachytherapy is a feasible, effective, and minimally invasive treatment for non-central pelvic recurrence of cervical cancer post-EBRT, warranting further confirmation in large-scale prospective studies.

Technological Advancements in External Beam Radiation Therapy (EBRT): An Indispensable Tool for Cancer Treatment[9]

Koka K, Verma A, Dwarakanath BS, Papineni RV; *Cancer Management and Research*

Recent advancements in external beam radiotherapy (EBRT) have significantly enhanced its effectiveness, improving outcomes for cancer patients and their overall quality of life. These advancements involve integrating imaging techniques such as positron emission tomography (PET) and computed tomography (CT) and developing innovative tools like the multileaf collimator and advanced dose calculation algorithms. These improvements have enhanced tumor dose distribution and reduced toxicity to surrounding healthy tissue. More recently, a novel approach called FLASH radiotherapy has emerged, delivering ultrahigh dose rates (>40 Gy per second) in a single dose. This innovation aims to minimize normal tissue toxicity while maintaining the effectiveness of tumor treatment. Although the exact biological mechanisms are not fully understood, FLASH radiotherapy is believed to induce hypoxia in normal tissue and trigger a modified immune response, contributing to its observed benefits.

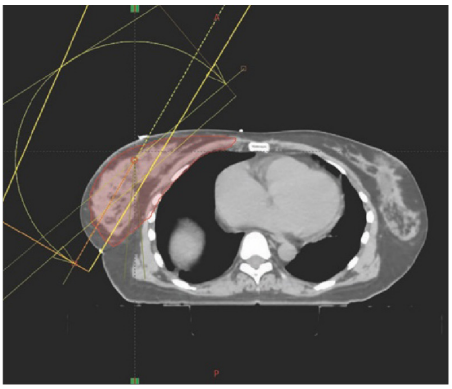


Revolutionizing Radiotherapy: How We're Innovating a Century Old Cancer Treatment[8]

Brooks H; *Cancer News at Cancer Research UK*

Radiotherapy, a long-standing cancer treatment, is undergoing significant advancements thanks to efforts by Cancer Research UK. The key innovation is proton beam therapy, which delivers highly precise radiation to tumors while sparing surrounding healthy tissues. This is especially beneficial for cancers in delicate areas like the brain and spine. Another promising development is the use of artificial intelligence (AI) in treatment planning. AI can analyze patient data to create optimal radiation plans, enhancing the accuracy and effectiveness of treatments. Additionally, improvements in imaging technology now allow for real-time monitoring of tumors during therapy, enabling adjustments that improve patient outcomes. Overall, these advancements aim to make radiotherapy more effective and reduce side effects, ultimately improving the quality of life and survival rates for cancer patients.

Hot Topics in Radiation Oncology *continued*



Declination of Treatment, Racial and Ethnic Disparity, and Overall Survival in US Patients With Breast Cancer[6]

Freeman JQ, Li JL, Fisher SG, et al; *JAMA Network Open*

Breast cancer (BC) is the most common malignancy and the second leading cause of cancer deaths among women in the US, with significant impacts on patients' physical, mental, and financial health. This study examines trends in treatment declination and racial and ethnic disparities in BC treatment and overall survival (OS) using data from the 2004 to 2020 National Cancer Database, covering 2,837,446 patients. It was found that treatment declination was highest for chemotherapy (9.6%) and lowest for surgery (0.6%). Racial disparities were notable: American Indian, Alaska Native, Asian, Pacific Islander, and Black patients were more likely to decline chemotherapy, radiotherapy, or surgery compared to White patients, while Asian, Black, and Hispanic patients were less likely to decline hormone therapy. Multivariate logistic regression and Cox regression models, controlling for various factors, indicated significant differences in treatment declination and OS among different racial and ethnic groups. For instance, Black patients who declined chemotherapy had higher mortality risk than White patients. These findings underscore the need for equity-focused interventions, improved patient-clinician communication, and shared decision-making to address disparities and improve survival outcomes for BC patients.

Review of Recent Improvements in Carbon Ion Radiation Therapy in the Treatment of Glioblastoma[7]

Koosha F, Ahmadikamalabadi M, Mohammadi M, et al; *Advances in Radiation Oncology*

Gliomas constitute about 51% of all brain malignancies, with glioblastoma making up 15% and having a high mortality rate. Despite efforts to develop new treatments, challenges like the blood-brain barrier and tumor variability persist. Conventionally, glioblastoma has been treated with surgical resection followed by ionizing radiation and alkylating therapy with temozolamide. The goal of this therapy is to reduce any remaining cancerous tissue infiltrating normal tissue. Resistance to conventional radiation, like x-rays and gamma rays, is often due to radio-resistant glioma stem cells, leading to tumor recurrence. Carbon Ionizing Radiation Therapy (CIRT) offers a promising alternative due to its unique physical properties, such as the Bragg peak phenomenon, which allows precise targeting of tumor cells, sparing surrounding healthy tissue. Carbon ions deposit energy in a distinct pattern, minimizing damage to nearby structures due to decreased uptake by normal tissue. Additionally, CIRT's ability to generate a Spread-Out Bragg peak (SOBP) ensures uniform dosage across irregularly shaped tumors. While range uncertainty poses a challenge, technological advancements along with combination therapies are underway to mitigate this issue. Overall, CIRT proves to be an effective and precise treatment for glioblastoma, offering hope for improved outcomes and reduced side effects compared to traditional therapies.

Adaptive Radiotherapy for Pancreatic Cancer Hosts Jessica Aduwo (Ohio State University College of Medicine 3rd year) and Sohil Reddy (Ohio State University College of Medicine 1st year) meet with the Vice Chair and Medical Director of the Department of Radiation Oncology at the Miami Cancer Institute, Dr. Michael Chuong, to discuss the role of radiation therapy for locally advanced pancreatic cancer treatment.

ARO INSIGHTS

BLOGS COVERING TODAY'S ISSUES IN RADIATION ONCOLOGY

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Navigating the Data-Poor Landscape of Salivary Gland Cancer

As medicine evolves through enhanced molecular testing and genomic knowledge, we must continue to dance around treatment standards, opportunities for de-escalation, and novel approaches, with the delicate balance of toxicity and efficacy for our patients at the forefront.

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