SUMMER 2016

ASTRO news



PALLIATIVE CARE

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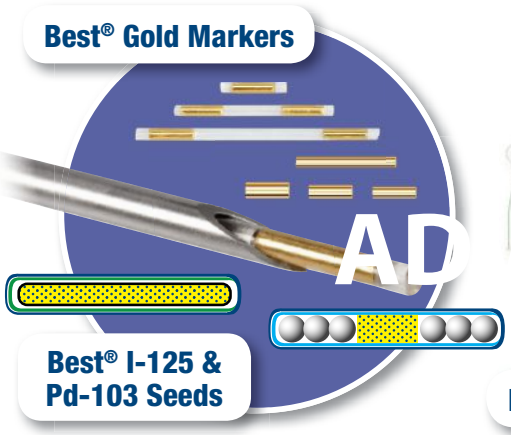

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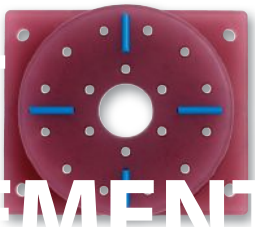

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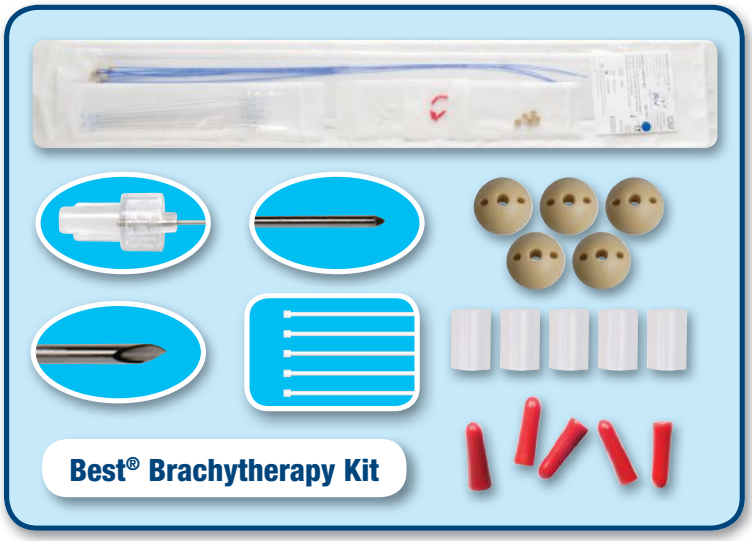

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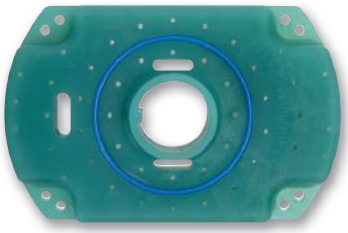

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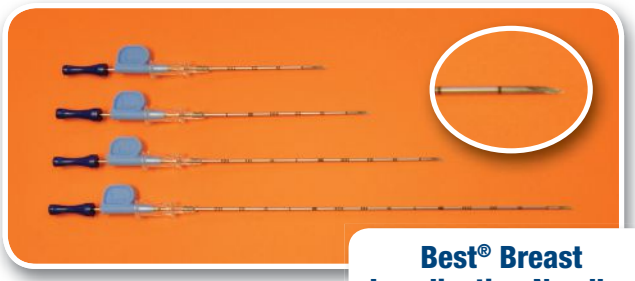

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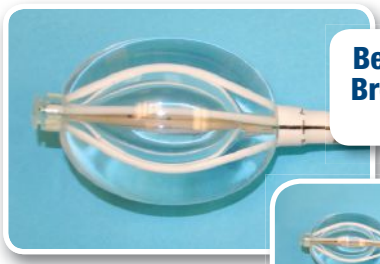

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ASTRO news

AMERICAN SOCIETY FOR RADIATION ONCOLOGY

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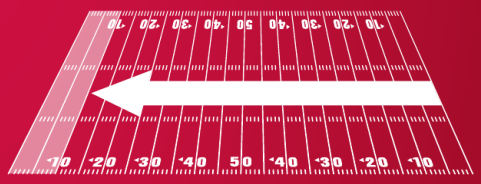

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BY LISA A. KACHNIC, MD, FASTRO

EDITOR'S*notes*



MUSIC CAN HEAL: PERSONAL REFLECTIONS ON PALLIATIVE CARE IN RADIATION ONCOLOGY

LAST NIGHT I ATTENDED A STYX CONCERT (1970's American rock band with hits such as "Lady," "Babe," "Best of Times") with my new roommate … my daughter. While I am overjoyed that she now has a bachelors of art degree in media and film, and graduated college in the "parent allotted" four-year time period, I was surprised to learn that she was relocating from Los Angeles to Nashville, Tennessee. Her goal is to gain work experience and then apply to New York University's film school. Interestingly, she has just commenced an internship, created by Mark Stavas, MD, my colleague at Vanderbilt (see his articles on "What is palliative care?" on pages 12-13 and "Building a palliative radiation oncology program" on pages 28-30 of this issue of *ASTROnews*), to film a documentary that will explore the complex themes that arise for musicians following a cancer diagnosis. Inherent to this piece is the delicate discussion of end-of-life care and wishes, and how music plays an important role in acceptance and healing.

As Tracy A. Balboni, MD, MPH, describes in her article "Patient advocacy and palliative care: Tending to patients' psychosocial-spiritual needs throughout cancer care" on pages 23-24, cancer affects the whole person, including their physical, social, emotional and spiritual being. It is therefore critical as oncology providers to navigate this "whole" care perspective. We must help our patients make sense of their disease, and provide them with the resources and psychosocial support to guide their acceptance of the cancer, and live out their lives with comfort and dignity.

While my daughter has only participated in this Nashville cancer documentary for a few days, she has been especially touched by how musicians with end-stage cancer use music as a component of their support systems. While cancer can shatter an individual's identity and psyche, many factors such as family, spirituality, meditation, arts and music, may help patients heal and make them feel whole again, prepared to face the end of life. My daughter explained that one of the musicians described the anxiety that he felt over his progressive cancer diagnosis and his first palliative radiation treatment to be similar to the nervous feeling he experiences whenever he steps on a stage to perform the first song of his performance. However, once the music (or radiation) begins, he feels acceptance and comfort.

In 2014, ASTRO's Choosing Wisely campaign keenly recognized the importance of improved integration of radiation oncology into early

Continued on next page



PITZER COLLEGE, CLAREMONT, CALIFORNIA, MAY 14, 2016

palliative oncology care with their statement, "Don't initiate non-curative radiation therapy without defining the goals of treatment with the patient and considering palliative care referral." Since then, many of our ASTRO members have worked to define and refine this palliative care integration, much of which is highlighted in this issue of *ASTROnews*.

In addition to the ACGME-Accredited Hospice and Palliative Medicine Fellowship Program (read more on pages 25-26), a few institutions, including Vanderbilt, have implemented a designated inpatient palliative care radiation oncology team, in contrast to site-specific palliative referrals, in recent years. Dedicated attending-resident-nurse radiation providers perform daily bedside rounds and participate in family meetings with the primary team, allowing for a detailed understanding of what is most important to the patient in the last weeks of life. In only the first eight months of implementation, there have been many positive changes at Vanderbilt, including improved patient care and satisfaction, as well as a decrease in hospital length of stay (described further on pages 28-30 of this issue). There have also been other unintended benefits, including a significant increase in new patient consult volume and improved outpatient wait times as clinic visits within the radiation oncology department are no longer disturbed by urgent inpatient consultations.

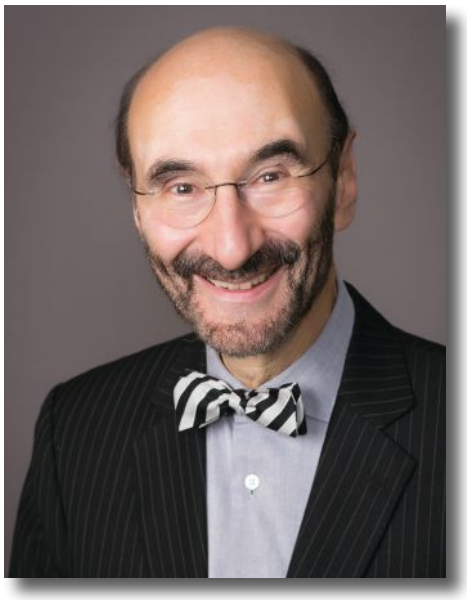
Paul W. Read, MD, PhD, discusses a similar multi-disciplinary palliative care team approach (CARE Track) and one-day radiation oncology simulation, planning and treatment process (STAT RAD) at the University of Virginia (pages 32-33). He initially reported the findings of their pilot work at ASTRO's 57th Annual Meeting. CARE Track patients had significantly fewer end of life hospitalizations and more hospice care admissions than patients in the control group, leading to a reduced mean total cost of care per patient in the final 90 days of life. Dr. Read's group is currently enrolling patients with bone metastases into a phase I/II clinical trial.

As radiation oncologists we cannot be seen as mere technologists in the end-of-life care of cancer patients, pressing the button on the linac to deliver palliative radiation therapy. Rather, in the interest of our patients and value-based medicine, we must take a more active role with the other cancer providers to address the whole patient. To this end, our conversations should extend well beyond radiation dose and fractionation. We must enhance our communication with patients and their families to discuss the goals of palliative care and participate in shared decision-making. We must learn what is most valued by patients in order to best contribute to their care and provide them with maximal quality of life during their last weeks. Most importantly, we must also continue to perform prospective evaluation of our palliative care initiatives in radiation oncology in order to establish more modern evidence-based guidelines.

Dr. Kachnic is professor and chair of the Vanderbilt department of radiation oncology, Vanderbilt University Medical Center. She welcomes comments on her editorial at astronews@astro.org.

BY BRUCE D. MINSKY, MD, FASTRO

CHAIR'S*update*



ASTRO'S OFFERINGS INCLUDE INITIATIVES, GUIDELINES, PALLIATIVE CARE WEB-BASED COURSE

I'M EXCITED TO SHARE WITH YOU, in this Summer 2016 edition of *ASTROnews*, some of the projects and initiatives in development at ASTRO, as well as other Society offerings that include a web-based course on the theme of this edition.

ASTRO initiatives continue to be successful, including the Accreditation Program for Excellence (APEx®). The program currently has 55 applicants, with a total of 110 facilities. On November 30, 2015, four facilities in the Inova Health System in Northern Virginia received the designation of fully accredited by APEx. Those facilities were followed by Tri-Cities Cancer Center, Kennewick, Washington, which received full accreditation in February of this year. Institutions involved in the program have been benefiting from its self-assessment model, which focuses on improving the quality of processes at practices. We're thrilled to see so many applicants joining the program, getting involved with the process and now receiving full accreditation. It's a testament to the great work that facilities have been doing throughout the self-assessment model, as well as all the support that ASTRO staff has been giving them along the way.

RO-ILS: Radiation Oncology Incident Learning System® now has its first year of experience reported, with 208 participating facilities and 1,699 events submitted. Preliminary data reveal that the most common reasons for errors include communication issues, which are a significant driver of error; changes to a patient's treatment plan once underway, which appears to be a risk-prone process; and lastly, inadequate training and education, which can cause problems when students/trainees make errors that are not remedied by staff.

ASTRO continues to make strides in the clinical practice guideline field, with six clinical practice guidelines currently underway. These guidelines will help us continue to deliver the safest and most effective radiation therapy to our patients. They are: Radiation Therapy for Glioblastoma Guideline (projected publication date, July 2016); Partial Update: Palliative Radiotherapy for Bone

"Radiation oncology should embrace a leadership role in palliative care."

Metastases Guidelines (projected completion date, summer 2016); Partial Update: APBI Consensus Guideline (projected completion date, July 2016); Oropharyngeal Cancer Guideline (projected completion date, August 2016); Stereotactic Body Radiotherapy for Early Stage Non-small Cell Lung Cancer Guideline (projected completion date, January 2017); Full Update: Whole Breast Irradiation Clinical Practice Guideline (projected completion date, June 2017). Refer to the ASTRO website for a complete list of ASTRO guidelines in process.

We also have collaborative clinical practice guidelines in process: Autologous Breast Reconstruction Guideline with the American Society of Plastic Surgeons; Treatment of Non-metastatic Muscle-invasive Bladder Cancer Guideline with the American Urological Association and the Society of Urologic Oncology; Locally Advanced Prostate Cancer Guideline with the American Urological Association; and Update: Post-mastectomy Radiotherapy Guideline and the DCIS Margins Width Guideline with the American Society of Clinical Oncology and the Society of Surgical Oncology.

In addition, we're excited to offer a palliative care web-based course, which is designed to meet the interest of primary care providers and radiation oncologists in the use of radiation therapy for palliation of cancer-related pain. This palliative care offering dovetails nicely with the palliative care theme of this edition of *ASTROnews*.

Radiation therapy offers significant palliative benefits to our patients. Short courses of radiation therapy result in rapid relief of symptoms such as pain, neurologic symptoms, bleeding and airway obstruction. They are generally well-tolerated, have limited acute toxicity, are non-invasive and are in contrast to the narcotics that treat the symptom and not the problem. The most effective way to increase awareness of the benefits of palliative radiation therapy to referring physicians is to take an active role in our patient's management. Rather than functioning as a downstream provider, radiation oncologists should be doctors first. See the patient, order whatever imaging is necessary and determine if radiation therapy would be helpful. By increasing our scope of practice and visibility, we will not only help our patients, but we will also increase the knowledge of radiation therapy among our referring physicians.

I view the radiation oncologist's role in palliative care during treatment and for end-stage disease as a "primary care provider" of palliation for pain and symptoms due to cancer. Similar to surgical and medical oncology, radiation oncology has a role in the primary, adjuvant and palliative settings. We need to remember how effective palliative radiation therapy can be. Both retrospective and prospective data confirm complete response rates of >50 percent and associated durable palliation. During patients' weekly visits, it is gratifying to see how much benefit they receive from radiation. Even in patients who are entering hospice care, a single fraction of radiation can reduce symptoms and help with a peaceful passing.

Radiation oncology should embrace a leadership role in palliative care. Given its effectiveness, ease of delivery and minimal toxicity, it is an ideal palliative modality. The move to cost-effective health care is also challenging the paradigm of when we deliver palliative radiation therapy. Traditional teaching was to wait until a patient was symptomatic. However, treating with the goal of preventing symptoms (for example, bone fractures or airway obstruction) may be more cost-effective than dealing with these once they occur. These are exciting questions and are ideal for prospective trials examining the total cost of care.

Dr. Minsky is professor of radiation oncology and holds the Frank T. McGraw Memorial Chair at the University of Texas MD Anderson Cancer Center in Houston. He welcomes comments on this column at astronews@astro.org.

SOCIETY NEWS

ASTRO 2016 Board of Directors Ballot

Now open for 2016–2017

The ballot is now open for eligible members to cast votes in the 2016 Board of Directors elections. The Nominating Committee developed a list of candidates for each open position and reviewed their service to ASTRO and participation in ASTRO activities. The Nominating Committee considered the criteria for each position, the strategic goals of the Society and current and future challenges facing health care and radiation oncology. Following deliberations and approval, the slate was presented to the Board of Directors.





Members eligible to vote include active, affiliate and international. ASTRO has a web-based electronic process of voting that ensures the authenticity and secrecy of votes. View biographical data and policy statements for each nominee by visiting www.astro.org/vote.

The voting deadline is 5:00 p.m. Eastern time on July 1, 2016.

PRESIDENT-ELECT (pictured at left)
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EDUCATION COUNCIL VICE-CHAIR
Lynn D. Wilson, MD, FASTRO, *Yale University*

In Memoriam

ASTRO has learned that the following members have passed away.
Our thoughts go out to their family and friends.

Peter D. Grimm, DO
A. Robert Kagan, MD, FASTRO
William S. Zittrich, MD

The Radiation Oncology Institute (ROI) graciously accepts gifts in memory of or in tribute to individuals. For more information, call 1-800-962-7876 or visit www.roinstitute.org.

BY DAVID C. BEYER, MD, FASTRO



A SNEAK PEEK AT **ASTRO'S 58TH ANNUAL MEETING**

ASTRO'S 58TH ANNUAL MEETING WILL BE HELD SEPTEMBER 25–28, 2016 at the Boston Convention and Exhibition Center, in the historic and charming city of Boston. The city sets the stage for a dynamic meeting highlighting the latest developments in all aspects of radiation oncology as we strive to meet our mission of improving patient care through education, clinical care, the advancement of science and advocacy.

The theme for ASTRO's 58th Annual Meeting is "Enhancing Value, Improving Outcomes." As participants in the radiation oncology team, we all know the value we bring to our patients through both cure and palliation. Yet we are constantly challenged to demonstrate that value to our referring physicians, to patients and the general public, and to policy makers around the world. In the United States, we are five years into a historic revamping of our health care system. This presents challenges to our specialty, but we all must demonstrate our commitment to enhancing and delivering value to all stakeholders.

The Annual Meeting program will highlight the latest technological advances while emphasizing the importance of using our skills to provide what stakeholders most value. I hope to highlight patient reported outcomes, cost effectiveness, innovation in delivery systems and value driven quality care, among other key points. The innovations in technology and biology that drive our field are necessary ingredients to power the specialty through the coming years.

The meeting will begin with the Presidential Symposium, "Prostate Cancer: Defining Value and Delivering It." Louis Potters, MD, FASTRO, will moderate the first sessions, "Value in Radiation Oncology" and "Comparing Treatment Modalities." Jeff M. Michalski, MD, FASTRO, will moderate the session, "Enhancing the Value of Radiation Oncology." We have an excellent line-up of speakers for each session to discuss relevant hot topics in each subject.

The Presidential Address, entitled "On Shifting Ground," will explore some of the dramatic transformations we are seeing in health care systems and lay out a vision for the specialty to manage this rapidly changing environment. Ultimately, if we succeed in both enhancing value and improving outcomes, the future will remain bright for the specialty.

Our three keynote speakers are experts in health care, medicine and safety, and all speak directly to varying aspects of value. This year we will feature Kathleen Sebelius, former U.S. Secretary of Health and Human Services; Thomas James Lynch, Jr., MD, chairman and chief executive officer, Massachusetts General Physicians Organization; and Jason Ragogna, general manager, SMS and Safety Alliances, Corporate Safety, Security and Compliance, Delta Air Lines, Inc., as keynote speakers. They will share their knowledge with us about their respective expert subject matter, and we're excited to have them speaking at the Annual Meeting.

The Annual Meeting Scientific Committee Chair Benjamin Movsas, MD, FASTRO, and Vice-chair Lisa A. Kachnic, MD, FASTRO, and the Annual Meeting Scientific Committee Chair Brian Czito, MD, and Vice-chair George Rodrigues, MD, PhD, have put together an impressive program this year with a variety of speakers, moderators and topics.

This year we have an exciting roster of educational offerings at the meeting, with 29 panel sessions, 52 educational sessions, 48 oral scientific sessions and 20 *e*poster sessions scheduled. The Plenary Session and Clinical Trials Session will offer highlights from the highest impact studies.

As in years past, we will offer a diverse program of educational and scientific sessions, panels and keynote speakers, as well as the Exhibit Hall to give attendees a chance to learn more about the latest in radiation oncology technology and offerings and network with colleagues. Registration is now open. I encourage you to attend this year's 58th Annual Meeting in Boston to learn more, network more and enhance your value and improve your outcomes.

Dr. Beyer is the medical director of Cancer Centers of Northern Arizona Healthcare in Sedona, Arizona. He welcomes comments on this column at astronews@astro.org.

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What is palliative care?

BY ANDREW WOOLDRIDGE, MD, AND MARK STAVAS, MD

Palliative care is a comfort and support specialty for people with advanced or complicated illnesses[1]. It is appropriate at any age and any stage of a serious illness and can be provided alongside curative treatment[2]. Palliative care is commonly described as an interdisciplinary approach that offers an extra level of support to help both families and patients handle the pain, symptoms and stress of a disease. The goal of this approach is to encourage individuals to live fully and maximize quality-of-life throughout the entire illness spectrum. Early integration of palliative care has borne positive results in recent years, demonstrating improvement in myriad outcomes, including prolonging survival for some patients with advanced cancer[3,4].



A common misconception, even among physicians, is that palliative care is just another term for hospice, or that palliative care involvement is only appropriate at the very end of life. This myth is propagated, in part, because physician subspecialty certification includes training in both; the American Board of Medical Specialties titles this board certification "Hospice and Palliative Medicine." However, palliative care and hospice are distinct but related models of care delivery. Palliative care is provided in parallel with disease-modifying and curative treatments, and can follow people with advanced illness for years rather than having a six-month prognostic requirement as with hospice[5,6]. Palliative care consultations include these components[7]:

1. A holistic approach to the stress of illness (assessment/treatment of pain and physical symptoms, psychosocial patient/caregiver support, spiritual support);
2. Communication strategies to elicit patient-centered values and goals;
3. Help with coping and decision-making along the disease trajectory;
4. Shared decision-making regarding hospice referral, when nearing end-of-life and;
5. Facilitating and reinforcing communication between patient and referring provider[8].

Much like radiation oncology, palliative care has matured over the past 30-40 years and is still undergoing rapid growth. At the end of 2014, two thirds (67 percent) of U.S. hospitals with 50 or more beds had palliative care programs, up from 15 percent in 2001[9]. Outpatient clinic-based palliative care remains less prevalent, but is available in the majority of National Cancer Institute-designated cancer centers[10], as outlined in a recent Institute of Medicine report. However, opportunities for improvement remain. Workforce training is needed in the core principles and practices of palliative care, and engaging patients and providers in an ongoing dialogue about prognosis and supporting patient preferences across the continuum of care are imperative moving forward[11].

In addition, this growth invites innovative collaborative care delivery opportunities for the specialties of radiation oncology and palliative care. As you will see in this issue, this mutually-beneficial relationship expands new service lines for radiation oncology, brings radiation oncology interventions and expertise to more patients seen by palliative care specialists and improves care overall for some of the most vulnerable patients.

Dr. Wooldridge is assistant professor, department of medicine and biomedical informatics, Vanderbilt University Medical Center. He is board-certified in internal medicine as well as hospice and palliative medicine. Dr. Stavas is assistant professor, department of radiation oncology, Vanderbilt University Medical Center.

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The palliative radiation oncologist

Prognosis and goals for care

BY MARK STAVAS, MD

The palliative radiation oncologist must be well-versed in prognosis and recognize the trajectories of the diseases they treat. There are several prognostic models specifically pertaining to individuals receiving palliative radiation, including the number of risk factors and TEACHH (type of cancer, Eastern Cooperative Oncology Group performance status, age, prior palliative chemotherapy, prior hospitalizations and hepatic metastases) models[1,2]. Common variables to consider are age, performance status, burden of extra-osseous metastasis and histology. Only after assessing the patient and carefully considering the prognosis can radiation planning begin. Here are two cases that demonstrate that (all names have been changed):

Case 1

> *Ms. R. is a 48-year-old female with a diagnosis of extensive stage small-cell lung cancer with widespread metastases including a large burden of thoracic disease causing narrowing of her central airway and respiratory distress. Medical oncology reviewed the spectrum of treatment options, and the patient elected against chemotherapy. After reviewing her goals with palliative care, the patient expressed many years of poor quality of life with chronic pain. She did not want to pursue treatments that would prolong*

her current quality of life. In addition, she did not want to escalate care, but was amenable to brief interventions that would improve her symptoms burden. Radiation oncology was consulted. Following multidisciplinary input, her estimated prognosis was days to weeks. Radiation was recommended to improve her respiratory distress prior to discharge. The patient received high dose steroids and thoracic radiation to 1500 cGy in two fractions. At the time of discharge, her shortness of breath improved. She transitioned to hospice and expired five weeks later.

Case 2

Mr. L. is a 68-year-old male who presented with a rapidly progressive anaplastic thyroid carcinoma causing significant dysphagia, shortness of breath and functional decline. His disease was determined to be unresectable. Both palliative care and radiation oncology were consulted to discuss goals of care and treatment options. His survival was estimated to be one to three months, but he wanted to attempt aggressive therapy. Radiation was recommended to improve his respiratory distress. The patient was scheduled to receive 4000 cGy in 10 fractions; however, his trajectory continued to decline on treatment, and he transitioned to comfort care following his third fraction. The patient expired four weeks later.

Both cases highlight unconventional radiation approaches for individuals with poor prognosis. They introduce the idea that our conversations should begin with a discussion about prognosis and end with a decision about dose and fractionation. They bring biologic principles back to the bedside and stress the importance of prognosis and disease trajectory. The issue of prognosis is crucial for patients and families for several reasons: 1) An understanding of what might happen helps individuals reconcile and plan for their future; 2) without realistic information about the future, patients and families may choose treatments they would otherwise decline and miss important moments for healing and closure and; 3) recognizing that life is limited may create opportunities for integration of palliative care services.

GOALS OF CARE

There are many possible goals of palliative radiotherapy, many of which change over the course of a disease, as what was once the hope for cure becomes the hope for a good passing. Radiation oncologists can play a key role during this continuum. In all situations, the disease prognosis should align with the patient and family's goals when determining the value of palliative radiotherapy. Once overall goals have been defined, the physician can help the patient and family prioritize specific treatments based on values and preferences. Examples of values and preferences may include: costs, fear of pain, time away from home or living to reach a specific moment like a birth or marriage.

Ultimately, it is less about the decision to treat and more about the conversation that leads to that decision. If a patient and physician carefully discuss prognosis, goals of care and treatment options, and the patient decides to proceed with therapy, one can emphasize the intent regardless of the outcome.

SELECTING A TREATMENT

Prognostication and goals should guide the physician when choosing his or her treatment approach (see Figure 1). The algorithm becomes fluid, just as goals do, and palliative treatments can flow from simple 2-D setups to complex stereotactic treatments, depending on the scenario. See Table 1 for the common palliative prescriptions used at Vanderbilt Medical Center. As one can see, multiple options are available with comparable two Gy equivalent doses. Each fractionation scheme is germane to our standard 3000 cGy in 10 fractions regimen. With modern CT planning and field arrangements, conformal and safe plans are certainly achievable.

Working with the medical team to find a schedule that works for the patient will improve delivery and access to care. When radiation is a barrier to discharge or it delays enrollment into hospice, shorter courses (≤5 fractions) are used at our facility. Finally, one must be mindful of the field size and volume of normal tissue within the treatment field. Anecdotally, we have limited one-two fraction fields to less than 20x20 cm and three-five fraction fields to less than 35x35 cm. Hypofractionated constraints including V20 <15 percent for lungs are used for quality control.

Continued on next page

IMMEDIATE AND ONGOING VALUE

A dedicated palliative radiation oncology program potentially provides a number of benefits to hospitals and clinicians including: cost savings, improved patient and staff satisfaction, improved efficiency in handling complex interactions between patients and families and enhanced reputation amongst referring providers. After Vanderbilt Medical Center opened the inpatient Palliative Radiation Oncology Service at Vanderbilt (inPROV) service, there have been many noticeable changes (see full story on page 28). Daily bedside rounds allow close monitoring of clinical changes and adjustments in the radiation plan if warranted. When patients decline treatment, they are discussed in a multidisciplinary fashion and often transitioned to the palliative care unit where a timely referral to hospice is arranged. Participation in family meetings allows us to incorporate specific details about patient goals and prognosis into the radiation plan.

During the first six months of inception, inpatient referral numbers increased by 15 percent. Goals of care and prognosis were documented in 65 percent of radiation oncology consult notes and short course radiotherapy (≤5 fractions) increased from 30 percent to 70 percent. Moreover, palliative care was involved alongside radiation oncology in 60 percent of inpatient palliative radiation cases.

MOVING FORWARD

Over the next few decades the U.S. will experience considerable growth in its aging population, leading to nearly double[3] the number of individuals over the age of 65. Medical decisions become more complex with age, and we must engage patients and providers in an open dialogue about prognosis and the benefits and harms of treatment. As we move away from fee-for-service and toward bundled and global-based strategies, there will be more emphasis on supportive and palliative care services at the end of life.

Radiation oncologists must redefine their role as providers across the continuum of cancer care. We should explore new models for treatment delivery in the elderly and for those individuals no longer living at home. We should assist in informed decision-making and prognostication during the transition points in a patient's life. Ultimately, we must ask what clinical value we can provide beyond dose and fractionation.

Goals for Palliative Care

Questions to ask patients to determine treatment goals for palliative care

one:
What are you hoping for?

two:
What matters most to you now?

three:
What do you hope to avoid?

four:
What are you afraid will happen?

five:
What do you expect radiation to be like?

six:
If this is your last chapter, no matter how long, what do you hope to accomplish?

Figure 1: Decision tree

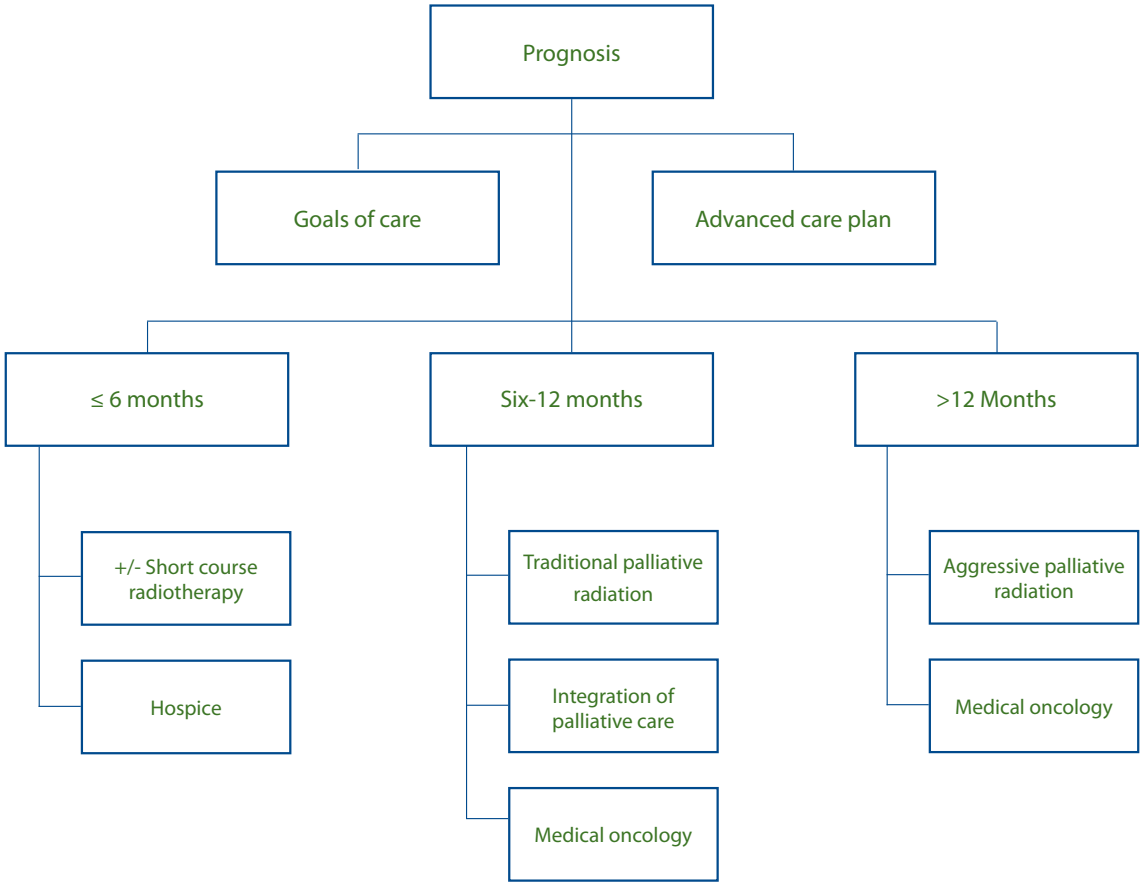

Table 1

COMMON PALLIATIVE DOSE SCHEDULES					
Number of fractions	**Dose per fraction (Gy)**	**Total dose (Gy)**	**Acute BED (α/β =10)**	**Late BED (α/β =2)**	**Two Gy equivalent dose**
1	8	8	14.4	40	20
2	7.5	15	26.2	71.2	35.6
3	6	18	28.8	72	36
4	3.5 BID	14	18.9	38.5	19.25
5	4	20	28.0	60	30
7	3.5	24.5	33.1	67.4	38.6
10	3	30	39	75	37.5
12	2.5	30	37.5	67.5	33.8

The information in this Table 1 is provided by the author and has not been reviewed, approved or endorsed by ASTRO. ASTRO's evidence-based clinical practice guidelines on palliation can be found at www.astro.org/Clinical-Practice-Statements.aspx. ASTRO disclaims all liability arising from or related to the information contained herein.

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Radiation oncology and palliative medicine:

A natural and evolving collaboration

BY JOSHUA JONES, MD

In 2010, the world of oncology was introduced to the era of early palliative care with the publication of the landmark Temel study[1] that compared early palliative care with standard oncology care in patients with metastatic non-small cell lung cancer. The study demonstrated what many in palliative care had suspected: that early exposure to palliative care improved quality of life and mood for patients with advanced cancer.

What was surprising in the study, however, was a statistically significant benefit in overall survival. Several other randomized phase III studies[2,3] have demonstrated similar improvements in symptoms, quality of life, satisfaction with care and spiritual well-being.

Other developments in palliative care have strengthened the case for early palliative care for patients with advanced cancer. The American Society of Clinical Oncology (ASCO) provisional clinical opinion from 2012 recommends concurrent palliative care as the standard for patients with advanced cancer due to improvements seen in the studies by Temel and others.[4]

In 2014, the Institute of Medicine published a report, "Dying in America," that calls for rethinking how we honor patients' wishes throughout the continuum of care and at the end of life[5]. The report calls for improved integration of palliative care in all areas of medicine, not just oncology.

Also in 2014, ASTRO recognized the importance of integrating palliative care into radiotherapy with

a statement in the "Choosing Wisely" campaign[6] that seeks to improve value in medical care: "Don't initiate non-curative radiation therapy without defining the goals of treatment with the patient and considering palliative care referral." These practices of defining goals and helping to provide symptom relief for patients with advanced cancer have been an integral part of the practice of radiation oncology for more than a century[7], but challenges remain with integration (see the story on pages 14-17 for more discussion on goals for care).

Integration of palliative care and radiation oncology should not be limited to patients with metastatic disease. Rather, radiation oncologists, like all physicians, should have basic palliative care attitude, skills and knowledge and should be able to collaborate with colleagues in palliative medicine for patients and families with complex needs in symptom management and psychosocial support.

For patients with metastatic disease, dramatic changes in oncologic care over the past 50 years have allowed improved survival, owing to new advances in diagnosis and staging, new techniques in surgery and radiotherapy and the development of novel systemic therapies including targeted therapies and immunotherapies. In the context of this new era of palliative care and improved cancer outcomes, though, fundamental questions remain about how to integrate oncology and palliative medicine. For us in radiation oncology, much of the previous work on palliative radiotherapy explored differences between dose-fractionation schemes for palliation of bone metastases and brain metastases. However, there are pressing questions about the collaborative relationship between radiation oncology and palliative care in today's era of precision oncology that extend beyond simple questions of dose-fractionation:

- How do we achieve personalized, patient-centered care for patients with advanced cancer, delivering the right treatment for the right patient at the right time?
- What is the role of the radiation oncologist and the radiation oncology team in helping to consider patient and family goals of care?
- When is treatment with hypofractionated RT with single or a few fractions the most appropriate palliative radiotherapy? When is more extended fractionation appropriate?
- When are advanced techniques, such as stereotactic radiotherapy, intensity modulated radiotherapy and image-guided radiation therapy, appropriate?
- When is hospice care without radiotherapy most appropriate?
- What models demonstrate best practices in collaborating with our colleagues in medical oncology, surgical oncology, palliative care and primary care?

Fortunately, we are making headway in each of these areas. There are ongoing randomized studies comparing stereotactic radiotherapy to conventional single fraction radiotherapy for uncomplicated bone metastases[9]. There are groups looking at combined palliative care/radiation oncology clinics for patients with brain metastases to explore patient goals in addition to options about types of radiation and its relationship to surgery.[10] With modeling work done in Canada in the rapid response radiotherapy clinics, several institutions in the U.S. are conceptualizing new approaches to the integration of palliative care and radiation oncology.

As highlighted in this edition of *ASTROnews*, the early abstracts comparing pre- and post-intervention outcomes show increased collaboration as demonstrated by higher numbers of referrals for palliative RT; more hypofractionated treatment courses for patients with bone metastases in concordance with ASTRO Guidelines; higher rates of referral to palliative care and hospice care; and decreased hospital lengths of stay and costs[11, 12, 13].

In addition, efforts are underway to determine best practices to elicit and honor patient goals of care, to enhance shared decision-making, to educate palliative care clinicians about radiotherapy and radiation oncologists about palliative medicine and to continue to explore outcomes of dedicated palliative care and oncology practices.

Work remains to be done, including continuing to refine our understanding of prognosis and how to translate prognostic information to patient and family decision-making, continued research into

Continued on next page

best practices with palliative radiotherapy and how to disseminate best practices in the U.S. and abroad, how to encourage appropriate hypofractionated radiotherapy regimens when appropriate and advanced techniques when appropriate. Much of this work will continue to be highlighted at the ASTRO Annual Meeting and at the third annual Palliative Oncology Symposium set for September 2016 in San Francisco, as we continue to grow the evidence for improved integration of radiation oncology into the era of early palliative oncology care.

Dr. Jones is a radiation oncologist and palliative care clinician at the Hospital of the University of Pennsylvania, specializing in the treatment of advanced and metastatic cancer with a focus on the use of radiotherapy to improve symptom control and quality of life.

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STEPHEN LUTZ, MD, FASTRO

How do we increase awareness of palliative radiation therapy among referring physicians?

BY STEPHEN LUTZ, MD, FASTRO

In order to help our referring physicians view us as excellent palliative oncology practitioners, we must first embrace that role ourselves. From a global perspective, we need to continue increasing our efforts to promote palliative radiotherapy research, education and advocacy. In our communities, we must consistently brainstorm with our colleagues to come up with the best palliative care options for patients presented at tumor conferences and on palliative care rounds. Opportunities to educate our referring physicians reside in each phone call we make, all the consultation notes we dictate and every continuing medical education talk we present.

Our referring physicians are much more likely to be familiar with the general radiation oncology literature regarding curative-intent treatment than they are about palliative radiotherapy studies. They need to be reminded that properly delivered palliative radiotherapy provides relief that is successful, efficient and cost-effective. We owe it to our patients to educate our referring physicians with the knowledge that we are dedicated to relieve suffering, whether that requires us to offer our most technologically advanced treatment capabilities available in radiation therapy, or to give a single fraction on the same day that we meet a patient in consultation.

Community radiation oncologists are commonly relied upon to be the members of the oncology team that are the most data-driven and up-to-date on recent medical literature. That perception, when coupled with a desire to improve overall palliative oncology care, leaves the radiation oncologist in a unique position to lead the discussion about end-of-life oncology care. Community radiation oncologists must consistently open the minds of their referring physicians to see the benefits of palliative radiotherapy in circumstances beyond treatment of symptomatic bone metastases. Referring physicians must be reminded of the usefulness of radiotherapy for neurologic symptoms related to spinal cord compression or brain metastases and thoracic tumor symptoms, such as shortness of breath, cough or hemoptysis, even in cases where patient survival may not exceed 12 weeks.

Palliative radiotherapy is unique in its dedication to prognosis-driven care. Our interventions range in intensity from simple, hypofractionated courses for patients with poor prognoses whose goals are maximum symptom relief and limited side effects, to highly complex interventions for better prognosis patients whose goals of care are symptom prevention, improved local control and prolongation of life.

We can also serve our patients and referring physicians well by appropriately recommending supportive care alone, especially in patients with a life expectancy of less than four weeks.

Dr. Lutz is a radiation oncologist who is certified in hospice and palliative medicine. He practices in the Blanchard Valley Health System at Eastern Woods Radiation Oncology, Inc., in Findlay, Ohio.

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Patient advocacy and palliative care:

Tending to patients' psychosocial-spiritual needs throughout cancer care

BY TRACY A. BALBONI, MD, MPH

According to the Merriam-Webster dictionary, an advocate "defends" or "promotes the cause of another person or group." Within palliative care, what are the ways in which our patients need their care promoted, their needs defended? You might assume that I would write of particular applications of radiation therapy to improve palliative care quality, and though this is an important topic, I believe such technical efforts to improve care are secondary to a more primary need for advocacy. That is the need to advocate for a paradigm of advanced cancer care that recognizes and addresses the whole person.

Cancer does not simply impact the body; it affects people—unique people in families and communities that exist in a complex web of relationships impacted by their illness. Dame Cicely Saunders, founder of the modern hospice movement, called for this recognition and attention to "total pain"[1]—pain that includes physical, social, emotional and spiritual suffering. This approach is not only relevant to the hospice setting, but also is applicable throughout cancer care, and is made even more poignant as we care for patients with incurable disease. Eric Cassel, MD, in his landmark article, "The nature of suffering and the goals of medicine,"[2] likewise calls us as caregivers to see suffering, and hence our calling to alleviate suffering, in this deeper way. He tells the story of a 35-year-old woman, a sculptor, who is suffering from metastatic breast cancer. This story is recognizable by radiation oncology practitioners; she is like so many patients cared for daily in our departments. She undergoes initial curative-intent breast radiotherapy, followed by palliative supraclavicular radiation therapy for cancer-related brachial plexopathy. Her sculpting abilities are destroyed. And in her care, and in medicine more generally, Cassel names the problems associated with seeing only an illness-plagued body: "Not only is such identification misleading and distorting, for it depersonalizes the sick patient, but it is itself a source of suffering," he wrote. "It is not possible to treat sickness as something that happens solely to the body without thereby risking damage to the sick person."

According to Cassel, a singular focus on the body is itself a source of suffering for our patients. One might consider such a claim extreme, but consider for a moment the desire of many patients for alternative forms of medical therapies—therapies that are often based on more holistic, often mystical conceptions of health and illness. Is this motivated in part by a desire for care that addresses them as a whole person—care that is perceived as more "natural" because it does not artificially segregate body from mind and spirit?

> "Cancer does not simply impact the body; it affects people."

I will never forget a patient of mine, Kate, who received energy healing as well as traditional medical therapies for her progressive metastatic cancer, saying to me during one visit, "Whenever I come to this hospital, I feel like I can almost hear this place saying to me that all I am is just a body full of cancer that's dying. I have to do energy healing for days after coming here to be whole again."

As I've pondered her words in the years since she passed, it has grown clearer to me that she was articulating something akin to what Cassel describes—a separation of body and spirit that runs deep within the culture of medicine and then into patients.

Of course, it is easy to agree in concept with Sanders, Cassel and Kate, but quite another matter

Continued on next page

to take this approach into practice. We as caregivers are people ourselves, but we are assailed by the litany of forces that combat our ability to engage with our patients as whole people, including demands on time, ever-increasing forms and insurance approvals, requirements of electronic medical records and financial pressures. This is not to mention the mounting technical complexities of care, including knowing and applying the literature pertaining to the problem at hand, which consume much of the energy and time we have to give to each patient and family.

Such forces raise the question, is the care that Dame Sanders, Dr. Cassel and Kate are hoping for unrealistic? Some may deem it infeasible and suggest that an acceptable alternative is that we as medical caregivers accept these harsh realities and confine our role to that of bodily technicians. However, data informing perspectives of both patients and medical caregivers belies this conclusion. Consider a study among advanced cancer patients receiving palliative radiation therapy in which 86 percent perceived attention to patient spiritual needs as an important part of cancer care from physician and nurses,[3] and other data that show that when patients' spiritual needs are met by their medical caregivers, they have better quality of life and transition to hospice more frequently, avoiding aggressive medical interventions at the end of life [4]. Or consider the burnout literature that suggests 45 percent of oncologists are experiencing significant burnout[5] with increasing patient loads (and hence diminishing time per patient) and loss of meaningful connections being implicated as causal factors[6]. Seemingly, to be whole as caregivers, we must care for patients as whole people.

If we are to accept this charge to advocacy, we are faced with an even more daunting question. How do we advocate for whole person care in the face of these pressures? Unlike technical, bodily care, there are no clear protocols to apply to achieve this outcome—no dose-volume histograms to evaluate, no fractionation schemes to apply. Rather, we must forge ways as individuals, departments and ultimately as a community within the field of medicine, to embrace this aspect of our patients and of ourselves. We must advocate for personal and departmental practices, and practices at our annual meetings, to actively uphold the humanity of the people we care for and of ourselves as caregivers. There are many examples of this, spearheading hope that we can meet this challenge even in the face of difficulties. As a few examples, consider our colleague Ben Corn's 2009 editorial in the *Journal of Clinical Oncology*, "Every cancer patient needs radiation therapy!"[7] in which he articulates to the field of oncology the needs of every patient for whole person care. Consider the educational session at ASTRO's 2015 Annual Meeting on the role of spirituality in cancer and a 2015 ASTRO Annual Refresher Course session that provided education on patient and family communication for challenging conversations in advanced cancer.

Rivaling our task to advocate for the best technical, evidence-based care for our patients is the task to advocate for the paradigm of whole person care. Such a model applies across the cancer care continuum and becomes all the more salient at the end of life. Our patients must have upheld throughout their care that they are so much more than a body assailed by cancer—they are unique people deserving of our care no matter the cancer outcome.

Dr. Balboni is an associate professor of radiation oncology at Harvard Medical School and Clinical Director of the Supportive and Palliative Radiation Oncology Service, Dana-Farber/Brigham and Women's Cancer Center.

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Hospice and Palliative Medicine Fellowships offer insight into palliative medicine for radiation oncologists

BY ERIN L. BOYLE, COMMUNICATIONS MANAGER

Given that radiation oncologists regularly see patients with advanced disease and administer radiation therapy with palliative intent, some in the field may benefit from a focused year of palliative care training through an ACGME-Accredited Hospice and Palliative Medicine (HPM) Fellowship Program.

"Slowly, palliative care has grown to be one of the fastest growing departments in health care," said Suresh K. Reddy, MD, professor, department of Palliative Care and Rehabilitation Medicine, Division of Cancer Medicine, the University of Texas MD Anderson Cancer Center, Houston.

Dr. Reddy is program director of the University of Texas MD Anderson Cancer Center's ACGME-Accredited HPM Fellowship Program. The program there and at Memorial Sloan Kettering Cancer Center (MSKCC) are unique among the more than one hundred HPM programs around the country, as they are sponsored by the American Board of

Continued on next page

Radiology and linked to radiation oncology residency programs. Hospice and Palliative Medicine was approved as a subspecialty in 2006, and since 2012, HPM Fellowship training has been mandatory for American Board of Medical Specialties (ABMS) and American Osteopathic Association (AOA) certification in the subspecialty.

ABOUT HPM FELLOWSHIPS

The HPM Fellowships are matched one-year clinical fellowships that cover all aspects of palliative medicine. The University of Texas MD Anderson Cancer Center has five clinical fellow positions a year, four with a clinical focus and one with a hospice focus. MSKCC has six clinical positions for physician fellows and three for nurse practitioner fellows on an annual basis. One physician can stay for a second research-focused fellowship year.

"There's a lot of standardization that comes with that ACGME accreditation, but programs are very different at different places," said Stacy M. Stabler, MD, PhD, is a medical oncologist at the MSKCC and program director of the institution's ACGME-Accredited HPM Fellowship Program. "So coming to a program at a cancer center is obviously going to be more exposure to patients with cancer, a little closer to the patient population that radiation oncologists would already be seeing, but there are also community programs that have a stronger connection to hospice."

At MSKCC, fellows have about five months of in-patient consult experience on palliative medicine, a month at an outside hospital for non-cancer cases and more than two months in hospice. They also visit long-term care facilities and see a pediatric population and an ambulatory population. A communications program at the center, Comskil Training Program, has fellows interacting with actors who role play patients and family members to help with their communication skills.

"I think there used to be this idea that either you're naturally good at communicating or you aren't," Dr. Stabler said. "But, more and more, the field has defined particular approaches and skills that can be taught. For example, clinicians can learn how to articulate empathy and respond to emotion, which can improve communication and build trust with patients," she said.

At the University of Texas MD Anderson Cancer Center, fellows are given a special orientation and then cases, seeing up to 40 newly referred patients each year.

"They need to do a research project before they graduate," Dr. Reddy said. "They have bedside discussions, weekly case presentations and grand rounds. They're monitored and constantly supervised."

The specialty has unique challenges, with emotional and psychological issues that are not always easy for new fellows to process. The center has a focus on preventing burn out in the HPM realm by teaching fellows self-care practices that can help them through the difficult terrain of end-of-stage care, Dr. Reddy said. "We teach them so they don't cross boundaries with patients, they set limits. This can be new and fascinating to them. We watch them closely." Structuring and managing teams is also vital to preventing burnout by aiding clinicians in seeing that they are not alone in struggling with the death of a patient, he said.

"Taking care of the health care professional is important and an area that's been neglected," Dr. Reddy said. "The health of the health care worker improves the patient experience."

RADIATION ONCOLOGY AND HPM FELLOWSHIPS

Because neither University of Texas MD Anderson Cancer Center nor MSKCC has an internal medicine program to link for ACGME requirements, fellowships at those institutions are linked to the radiation oncology training programs, but are more general in their approach to palliative care education. Following training, most HPM Fellows will practice in a hospice or as a palliative medicine specialist in the community or at an academic center, Dr. Stabler said. Some fellows do specialize in oncology before or after their HPM Fellowships: for instance, two incoming fellows to MSKCC for 2016 are currently completing pediatric heme-oncology fellowships.

However, most fellows applying to fellowship programs at the schools are not involved in radiation therapy, Drs. Reddy and Stabler said. "The specialties where we get the most of our palliative medicine trainees from are internal medicine and family medicine. Then there are small scatterings of people who are coming from less traditional backgrounds,

whether it be surgery or anesthesiology or radiation oncology," Dr. Stabler said.

"I can see a clear connection between radiation oncology and palliative medicine, and I hope that more radiation oncologists will pursue HPM training," she said. "We need champions in different specialties who develop a high level of palliative medicine expertise and then bring that skill set back to their peers. I think this is the best way to ensure that all physicians have the basic palliative care abilities in communication and symptom management that are essential to their medical practice."

WHY DO AN HPM FELLOWSHIP?

Dr. Stabler said there are advantages to growing the relationship between radiation oncology and HPM Fellowships, including raising the awareness of referring palliative care specialists to the benefits of palliative radiation treatment. There are also advantages for radiation oncologists themselves in pursuing an HPM Fellowship. For instance, doing an HPM Fellowship can enhance your consult etiquette and your communication skills with patients, as well as teach you in-depth pain management techniques.

"One of the skills that the fellows walk away with, specific to the training at Sloan, is a real expertise in opioid titration and management," Dr. Stabler said. "Effective pain management can significantly improve the quality of life for such a large number of these cancer patients."

And for those moments when trained expertise in refined, nuanced communication is needed for difficult conversations in cancer care, a year of training in palliative medicine can be invaluable.

"The medical community is encouraging radiation oncologists who do have this interest to spend the extra year in training to build up that skill set and bring it back to their meetings and champion the field, which I think is really important," she said.

For more information about the ACGME-Accredited Hospice and Palliative Medicine Fellowship Programs, visit the Applicant FAQ at the The American Academy of Hospice and Palliative Medicine.

ASTRO issues radiation oncology palliative care model for public comment

ASTRO is leading the way to ensure that the radiation oncology community can participate fully in new alternative payment models and demonstrate improved cancer care outcomes for patients. ASTRO's Payment Reform Workgroup, comprised of a diverse group of ASTRO members from freestanding and hospital practices and various geographic locations, is working to develop alternative payment models based on leading quality guidelines and metrics with the potential to reduce overall costs. ASTRO's Payment Reform Workgroup focused its first effort on the development of a Radiation Oncology Palliative Care Alternative Payment Model for the palliation of bone metastases. This particular disease site was chosen because evidence exists demonstrating the value of radiation therapy for the palliation of bone metastases; however, there is also evidence of underuse of radiation therapy, as well as overuse in terms of delivering more than the recommended dose and number of treatments or fractions to patients. The ASTRO Radiation Oncology Palliative Care Alternative Payment Model establishes a value-based payment methodology that features two diagnosis categories and bundled payments for care management, treatment and follow-up care, as well as incentives for adherence to quality measures. The goal is to establish a patient-centered model that maintains the highest quality of care, while reducing the overall cost of care that can be consistently leveraged by Medicare and private payers to improve quality and incentivize appropriate utilization of services. The Payment Reform Workgroup is pleased to issue its first model, the Radiation Oncology Palliative Care Alternative Payment Model, for public comment. Comments will be accepted through Friday, June 10, 2016. Please contact Anne Hubbard at Anne.Hubbard@astro.org if you have any questions.

Building a palliative radiation oncology program

A look at the inpatient Palliative Radiation Oncology Service (inPROV), which the Department of Radiation Oncology at Vanderbilt Medical Center opened last summer

BY MARK STAVAS, MD



Over the past decade we've witnessed a renewed partnership between palliative care and medical oncology. This is due in part to a growing body of evidence demonstrating improved outcomes with early integration of palliative care and reimbursements shifting from volume- to value-based metrics. For instance, starting in 2016, Medicare will begin covering advanced care planning as a separate and billable service.

Despite these advances, significant barriers remain, including: limited palliative resources, physician buy-in and insufficient education in communication strategies and prognostication. Furthermore, these successes are matched with rising health care costs and growing debate about the appropriate utilization of medical resources at the end of life. Balancing treatment recommendations from multiple consultants is a tough task for most palliative care providers. Identifying where radiation oncology fits into the palliative care model is equally challenging.

In this article, I'll describe a service that we opened last year at Vanderbilt Medical Center.

BARRIERS

While most radiation oncologists perceive themselves as part of the palliative care team, less than 10 percent of palliative care professionals feel the same way. On the surface, this is perplexing given the fact that approximately 40 percent of all radiation treatments are delivered with palliative intent. Furthermore, 75 percent of palliative care professionals think that radiation oncologists are reluctant to prescribe a single fraction of radiation, subjecting terminally ill patients to unnecessary inconveniences[1-4].

Radiation oncology departments often structure clinical care according to specific disease sites and facilitate the majority of treatments in the outpatient



setting. These constraints prove challenging for patients who require highly-individualized and timely treatment strategies. In addition, palliative patients require more time-consuming interactions centered on advanced care planning, goals of care and symptom management. Lastly, care coordination for patients admitted to the hospital can enervate outpatient recourses without well-trained personnel dedicated to managing these complex scenarios.

The costs, transportation, turnaround time and length of treatment are well-documented barriers to receiving radiation. Moreover, common indications for palliative treatment—such as symptomatic brain metastasis, malignant spinal cord compression, hemoptysis and pain crisis—often require a hospital admission. Initiating radiation as an inpatient can become an obstacle to discharge or increase the length of stay. Patients who start radiation in the hospital may be unable to continue with outpatient treatments.

Finally, most hospice agencies may not approve radiation therapy for their enrollees. Patients who are planning to enroll in hospice must choose between radiation treatment and delayed enrollment or no treatment at all. These issues help clarify why only one percent of hospice patients in the U.S. receive radiation therapy, despite the fact that more than 50 percent of hospice patients have cancer[5]. Radiation oncologists must recognize these constraints and adjust their treatment approaches accordingly.

CATALYST FOR CHANGE

Prior to 2015, patients requiring outpatient palliative radiotherapy at Vanderbilt University in Nashville, Tennessee, where I am assistant professor in the department of radiation oncology, were referred to site-specific physicians. Additionally, inpatient consultations were integrated into the outpatient model. These "add on" consults were triaged to the on-call a.m. or p.m. physician and then transported from the hospital floor to the outpatient clinic. Scheduling was both erratic and tense, and inpatients were sandwiched between routinely scheduled outpatient consults and follow-ups. Families were frequently left behind while the patient was transported down to the clinic. Patient encounters were hurried, and the decision to treat was made following limited interaction with the inpatient teams, consideration of prognosis, goals of care and overarching medical plan. Patients that required routine monitoring, or situations when the decision to treat was less clear, were a burden to the system.

In the summer of 2015, the department of radiation oncology at Vanderbilt Medical Center opened the inpatient Palliative Radiation Oncology Service at Vanderbilt (inPROV). This service consists of a dedicated attending-resident-nurse team. The central vision is to improve the care, timing and delivery of palliative radiation to approximately 350 to 400 inpatient consultations annually. Prior to commencement, a single radiation oncologist

Continued on next page

with a strong interest in palliative care committed six months of inpatient training with the palliative care team. During that time, this individual received additional instruction in advanced symptoms management, communication strategies and care coordination across the cancer continuum. Multiple grand round-formatted lectures were given to the palliative and supportive care services highlighting the indications for palliative radiation and the prognostic insights radiation oncologists can provide.

Today, the inPROV service performs morning rounds on patients with evolving care plans and tenuous performance status. New consultations are seen daily during the afternoons, and treatment plans are developed in coordination with the primary oncology and palliative care services. The patients are seen on the hospital floor and the conversations occur at bedside.

The goal is to work alongside the palliative and oncology teams to provide an extra layer of support for symptoms management, prognostication and timely radiation delivery. Lastly, patients receiving palliative radiotherapy are routinely referred by inPROV to Vanderbilt's outpatient palliative care clinic, where they are assessed for physical and psychologic symptoms and then discuss advanced care planning.

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Palliative Care in Oncology Symposium

The topic of palliative care will be featured at an ASTRO co-sponsored meeting later this year. The third annual Palliative Care in Oncology Symposium will take place September 9-10, 2016, in San Francisco. The meeting will promote the discussion and integration of palliative care into the entire cancer care continuum, from early stage disease to supportive care elements incorporated into survivorship plans that address the late effects of cancer treatment and the increased use of palliative care at the end of life. The meeting is co-sponsored by ASTRO, the American Academy of Hospice and Palliative Medicine, the American Society of Clinical Oncology and the Multinational Association of Supportive Care in Cancer. For more information, visit pallonc.org.

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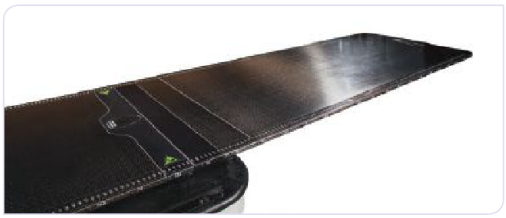

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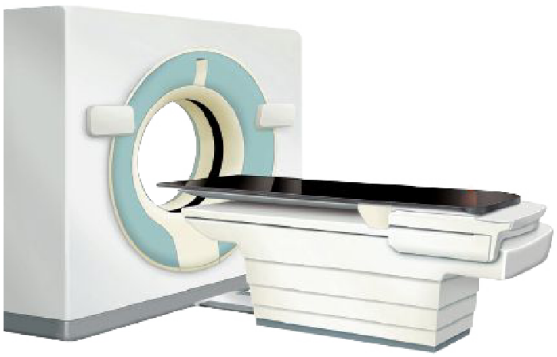

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1 AAPM Task Group 176, (2014). Dosimetric effects caused by couch tops and immobilization devices, Medical Physics, Vol. 41, No. 6.

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Enhancing value
through re-engineered team-based palliative care

BY PAUL W. READ, MD, PHD

Approximately 1.6 million Americans are diagnosed with cancer annually, with over a half million dying from cancer each year[1]. Patients with advanced cancer utilize tremendous end-of-life inpatient medical resources that escalate in the last few months of life[2]. They are frail and their well-being and symptom status can change rapidly. Healthcare systems lack simple and effective tools to monitor and accurately identify an outpatient's rapidly worsening condition and quickly respond before they require hospital admission for symptom management. Multiple studies have reported that the integration of palliative care into advanced cancer patient management improves quality of life and survival[3,4,5]. Based on this data, National Comprehensive Cancer Network (NCCN)[6] guidelines recommend incorporating palliative care into advanced cancer patient management.

"Approximately **1.6 million** Americans are diagnosed with cancer annually, with over a half million dying from cancer each year.[1]"

The care of end-of-life cancer patients can be re-optimized to better serve our patients. If we listen to our patients carefully, talk to them about their changing medical and emotional needs and develop rapid and coordinated treatment plans, we can improve their quality-of-life and reduce their need for hospitalization for symptom management at the end of life. Integrating patient surveys to collect patient-reported outcomes directly into electronic medical records and incorporating them into routine clinical care can be done in most hospital systems.

To address the complex needs of our advanced cancer patients, we rapidly implemented three novel clinical programs and assessed their impact on better health, better health care, and reducing health care costs. The main aims of these programs were to improve outpatient management and reduce the need for hospitalization for symptom control in the last months of life. We began by constructing a clinical database that included a patient-reported outcomes (PRO) survey called **MyCourse** with a longitudinal dashboard display in the EPIC CARE® electronic medical record (EMR). MyCourse was created with alerting thresholds to closely monitor a patient's symptoms and needs, and to notify the team of increasing pain and worsening performance status via automated EMR emails and pop-up windows. The database is easily queried for patient-specific or aggregate patient data for real-time assessment of patient and health system outcomes. MyCourse was clinically implemented by a multi-disciplinary palliative care team called **CARE Track**, which coordinates palliative care for patients at a weekly Supportive Care Tumor Board comprised of palliative care physicians and nurses, radiation oncologists, pain anesthesiologists, psychologists, pharmacologists, registered dieticians, social workers and chaplains.

Finally, to radically improve palliative radiation for patients with bone metastases, we developed **STAT RAD**, which is a one-day radiation oncology simulation, planning and treatment process. STAT RAD required novel quality assurance software[7] and a re-engineered radiation oncology Scan-Plan-QA-Treat workflow[8] to rapidly plan and deliver high dose and highly conformal palliative radiation therapy in a patient-centric one day procedure. We are currently enrolling patients with bone metastases into a Phase I/II investigator-initiated institutional clinical trial with single fraction doses of 12.5-15 Gy.

The initial results of these pilot clinical programs were presented at ASTRO's 57th Annual Meeting and subsequently published[9-10]. Six hundred and forty-six patients were enrolled into the CARE Track program over a 30-month pilot study period. End-of-life data from 368 deceased CARE Track patients were compared with 198 patients in a cohort of matched deceased institutional controls. The 368 deceased CARE Track patients completed 967 patient-reported surveys. CARE Track patients had significantly fewer end-of-life hospitalizations than controls; 48.3 percent were hospitalized within the final three months of their life compared with 64 percent of the control arm (p=.0004). More CARE Track patients received hospice care (69.6 percent vs. 47 percent) and spent longer in hospice (median stay, 22 days vs. 13 days; p=.0004) than patients in the control group. This resulted in fewer hospital deaths for the CARE Track patients compared with controls (8.4 percent vs. 38.5 percent; p<.0001). Results of a cost analysis showed these reductions in hospitalizations and hospital deaths decreased the mean total cost of care per patient by $7,317 in the final 90 days of life (p=.0128). Mean inpatient costs in the final 90 days of life also were significantly smaller ($12,976 vs. $20,398; p=.0065). Total health care costs were reduced mainly through prevention of end-of-life hospitalization and intensive care unit admissions (85-90 percent) and also through reduced costs for palliative radiation therapy (10-15 percent).

In conclusion, radiation oncologists can serve as critical members of multidisciplinary palliative care teams whose goals are to improve outpatient care coordination and efficiency, communicate goals of care effectively and reduce the need for inpatient admission for symptom control.

Dr. Read is professor of radiation oncology, University of Virginia School of Medicine.

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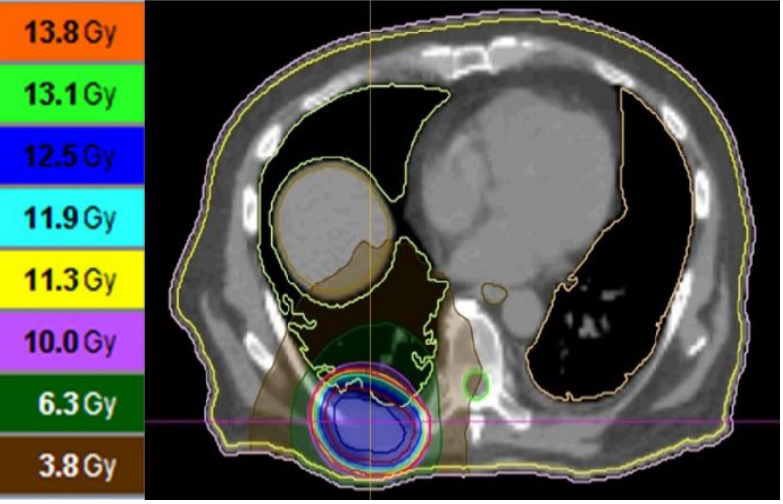

STAT RAD dosimetry image

Note: The project described was supported by Grant Number 1C1CMS331031 from the Department of Health and Human Services, Centers for Medicare and Medicaid Services. The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of the U.S. Department of Health and Human Services or any of its agencies. The research presented here was conducted by the awardee. Findings might or might not be consistent with or confirmed by the findings of the independent evaluation contractor.

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Commentary: Medical physics and quality assurance of palliative care

BY GEOFFREY S. IBBOTT, PHD

Paul W. Read, MD, PhD, succinctly and clearly describes the role of radiation therapy in palliative care of cancer patients in his article. The purpose of this commentary is to discuss the role of medical physicists and the philosophy of quality assurance (QA) procedures in the care of end-of-life cancer patients. This is not to suggest that patients receiving palliative care deserve a different level of quality care than curative patients. Instead, I think the question to be addressed is: How can physics contribute to cost-effective and patient-centric palliative care?

Patient-specific intensity-modulated radiation therapy (IMRT) QA is generally performed prior to the patient's first treatment[1]. The benefits should be clear; any error in the plan preparation or transfer to the treatment machine should be detected and can be corrected before it can result in an incorrect treatment to the patient. But as Dr. Read explains, his team's goal in developing the STAT RAD program was to offer "high dose and highly conformal palliative radiation therapy in a patient-centric one day procedure." This is clearly a commendable goal, and their data demonstrate that the service adds value to cancer care for patients in the late stages of their disease.

However, an accelerated simulate-plan-treat program such as this does not permit physicists to conduct conventional measurement-based IMRT QA procedures. There has been discussion about the form that IMRT QA should take, and a number of arguments have been made in favor of calculation-based techniques[2]. Dr. Read's colleagues have implemented such a technique and have shown phantom measurements that demonstrate agreement[3]. This suggests that calculation-based procedures can be used with confidence, at least in the circumstances described. It might also contain indications for the future, as adaptive radiotherapy becomes more widely used, because of the requirement that QA be performed while the patient is being prepared for treatment[4].

Dr. Ibbott is professor and chairman, department of radiation physics, University of Texas MD Anderson Cancer Center. He is also an ASTROnews *editorial board member.*

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ASTRO offers course and patient brochure on palliative care

BY ERIN L. BOYLE, COMMUNICATIONS MANAGER

ASTRO's physician and patient offerings feature materials in the palliative care field, including a free web-based course and a "Radiation Therapy for Palliative Care" brochure. These materials help enhance and educate both physicians and patients about palliative care in radiation therapy.

PALLIATIVE COURSE FOR CME

ASTRO's web-based course on palliative care for physicians is designed for those interested in learning more about the benefits of radiation therapy for palliative care, the appropriate use of palliative radiation therapy, treatment options and side effects. The course's target audience is primary care physicians (PCP) and radiation oncologists. The hour and 15 minute course provides a half-hour overview of radiation oncology and a 45 minute in-depth look at palliative care.

Participants can receive 1.25 *AMA PRA Category 1 Credits*™ and fulfill one of their SA-CME requirements by viewing the course.

Feedback from those who have taken the course has been positive, with attendees thanking ASTRO for offering the course for free and saying it was "excellent," "great," "a nice summary" and provided useful information on the subject.

According to the course statement of need, palliative radiation treatment can reduce patient distress related to painful bone metastases, neurological compromise from spinal cord compression and brain metastases, dyspnea secondary to obstruction of the central airways, bleeding and other symptoms. The course statement emphasized that it is key for PCP's to understand palliative indications for radiotherapy.

Continued on next page

"PCP's that have knowledge regarding radiotherapy are more likely to refer patients for palliative treatment ... We therefore propose to develop a CME activity for PCP's covering the basics of palliative radiotherapy administration," according to the statement of need.

"Increasing PCP knowledge will help facilitate referrals when indicated, allows PCP's to educate their patients regarding radiotherapy, and helps PCP's identify clinical situations where patients would benefit from palliative radiotherapy."

The course objectives are:

- Identify basic indications for palliative radiotherapy;
- Understand how patients can symptomatically benefit from radiotherapy in a palliative setting and;
- Understand the clinical characteristics of spinal cord compressions, painful bone metastases, brain metastases and other diagnoses related to symptomatic progression of terminal cancer.

PATIENT CARE BROCHURE

ASTRO also offers a Radiation Therapy for Palliative Care brochure for patients and their caregivers to help them understand the role of palliative radiation therapy in alleviating symptoms from cancer and medical treatments. The brochure answers key patient questions about palliative care, including, "What is the goal of palliative care?" "If I am to receive palliative care, does that mean I am dying?" "How does palliative care differ from hospice care?" "How many daily radiation treatments do I need to reduce my pain?"

It also lists website resources for patients to learn more about pallative care, as well as information about www.rtanswers.org, ASTRO's patient resource, where patients can locate a radiation oncologist and learn more about radiation treatment.



ADDITIONAL PALLIATIVE RESOURCES

WEBSITES

Center to Advance Palliative Care™
Billing itself as the "hub for palliative care innovation, development and growth," the CAPC website is a leading resource in the area of palliative care.

The American Academy of Hospice and Palliative Medicine
The AAHPM provides news, information and education on the practice of palliative care.

Vitaltalk
The nonprofit's website offers tools for improved communication between clinician/patients, and includes "quick guides" for doctors to quickly access and use, including on "talking about dying" and "transitions/goals of care." Vitaltalk is also available as an app.

APP

Fast Facts
The Fast Facts app offers "concise, practical, peer-reviewed and evidence-based summaries on key palliative care topics important to clinicians and trainees caring for patients facing serious illness." It's available for iPhone and iPad by visiting the iTunes store and searching for Fast Facts and on the Android platform.

BOOK

Being Mortal: Medicine and What Happens in the End
By Atul Gawande, MD, MPH
The popular book presents an overview on elder care and palliative care.

BY PAUL E. WALLNER, DO, FASTRO AND LYNN D. WILSON, MD, MPH, FASTRO

PALLIATIVE CARE AND ABR RADIATION ONCOLOGY CERTIFICATION

Palliative care has always represented a significant element of oncology practice, but the broad spectrum of its components remains largely misunderstood and has been frequently equated with hospice care. Unlike hospice care, which is understood to be directed toward the care of patients with an anticipated survival of six months or less, palliative care is specifically aimed toward management of distressing physical symptoms and/or the social impact of any disease or physical condition, regardless of anticipated duration of survival[1, 2, 3, 4, 5]. Despite the fact that radiation oncologists have recognized for decades that we possess a potent tool for alleviating a myriad of cancer-related symptoms and that our colleagues routinely see patients for palliative care in the course of their daily practices, our training program curricula remain effectively silent on the universe of palliative care issues. Essentially, our programs require only that "residents must be able to provide patient care that is compassionate, appropriate and effective for the treatment of health problems and the promotion of health," and that they "must demonstrate competence in treating adult patients with conventionally fractionated external beam radiation therapy"[6].

The 24 member boards of the American Board of Medical Specialties (ABMS) have several means available for their initial certification (IC) candidates, as well as diplomates enrolled in Maintenance of Certification (MOC), to increase awareness, knowledge and skills and to attain and maintain interventions that they consider essential to the modern practice of medicine. The first and most obvious step available is simply to add content in IC and MOC examinations. Absent specific measurable requirements or milestones in palliative care established by the Accreditation Council for Graduate Medical Education (ACGME) radiation oncology Residency Review Committee (RRC), the American Board of Radiology (ABR) has begun to increase the number of questions related to all aspects of palliative care within its radiation oncology IC and MOC written examinations, and for the radiation oncology IC certifying (oral) examination. This content may relate to management of specific symptoms in various organ systems, e.g., seizures secondary to brain metastases and painful bone metastases, but also to general issues such as analgesic management, research and ethical considerations. Understandably, as it becomes apparent that questions regarding specific topics have been included in examinations, training programs and practicing diplomates begin to teach and learn that material.

When a body of available literature related to a particular intervention is deemed critical and sufficient, but is not adequately included in primary postgraduate training requirements, the second step available to the certifying boards is to encourage and assist in the development of ACGME-accredited fellowship programs. This was the case with an all-inclusive program in Hospice and Palliative Medicine (HPM)[7]. First approved by the ABMS in 2006, the subspecialty certificate in HPM is offered by 10 ABMS member boards, including the ABR, for diplomates holding their primary certificates. Prior to January 1, 2012, diplomates could be eligible for the subspecialty certificate based on practice experience, but after that date, a formal one-year ACGME-accredited fellowship became a requirement for board eligibility[8]. Consolidation of the HPM aspects of training was made in recognition of certain similarities and overlap in discipline processes and personnel.

Before the 2012 "grandfather" cut-off, more than 90 ABR diplomates received the HPM subspecialty certificate. Requirements to sit for the examination with "grandfathered" status included active participation in institutional or organizational HPM teams, commitment of greater than 20 percent of practice time to palliative care and active management of a specified number of adult and/or pediatric patients. Primary managerial functions of the HPM certification process, including examination development and biennial administration, are carried

Continued on next page

out by the American Board of Internal Medicine (ABIM)[9]. The 2012 examination administration was the last for which "grandfathered" diplomates could sit.

At this time, there are 111 ACGME-accredited HPM fellowship programs: Seventy-three reside in internal medicine cores, 28 in family medicine, six in pediatrics, one in psychiatry and one in anesthesia. Two radiation oncology departments are core program sites: The University of Texas MD Anderson Cancer Center and Memorial Sloan Kettering Cancer Center (MSKCC)[10]. See the in-depth story on these fellowships on pages 25-27. Regardless of the core departmental site, programs must maintain all ACGME-required clinical and non-clinical elements and may accept fellows with primary certification in any of the participating ABMS member boards. In 2012, 62 ABR diplomates took the examination, and 41 passed (66.1 percent). In 2014, only nine ABR diplomates sat for the examination, with five passing (55.5 percent)[11].

Registration data for the October 2016 subspecialty certification examination are not yet available, but population of the core programs does provide some presumptive insight[12]. In the years from 2012 to 2016, the MD Anderson program had seven positions available each year, with none taken by radiation oncology trainees (0/28)[13]. The MSKCC program is approved for six trainees each year, and between 2012 and 2016, the trainee complement included only one primary ABR certificate holder, a radiation oncologist[14].

In 2006, the ABMS approved development of a new subspecialty certificate in Pain Medicine, with five member boards participating: the American Boards of Anesthesiology, Psychiatry and Neurology, Emergency Medicine, Family Medicine and Physical Medicine and Rehabilitation. Direction of the program, including examination development and administration, is carried out by the American Board of Anesthesiology[15]. Pain management represents an important aspect of palliative care, and the program includes training in many emerging invasive procedures not felt to be sufficiently included in the HPM programs.

In 2016, the ABR will join the five other member boards in offering this subspecialty certificate[16]. The nature of the program suggests that within the spectrum of ABR diplomates, the highest level of interest may be within the cohort of interventional radiology/diagnostic radiology certificate holders.

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BY KSENIJA KAPETANOVIC, QUALITY IMPROVEMENT SPECIALIST

RO-ILS: RADIATION ONCOLOGY INCIDENT LEARNING SYSTEM® DATA ELEMENT REVISION AND INTER-RATER RELIABILITY STUDY

In mid-2015, one year after the launch of RO-ILS: Radiation Oncology Incident Learning System®, ASTRO began reviewing the data elements to promote reliable and complete data collection necessary to accurately inform the radiation oncology community about patient safety. The mission of RO-ILS, sponsored by ASTRO and the American Association of Physicists in Medicine (AAPM), is to facilitate safer and higher quality care in radiation oncology by providing a mechanism for shared learning in a secure and non-punitive environment. ASTRO has contracted with Clarity PSO, a federally listed Patient Safety Organization (PSO), to provide PSO services to RO-ILS participants.

The "Consensus Recommendations for Incident Learning Database Structures in Radiation Oncology," a product of AAPM's Work Group on the Prevention of Errors in Radiation Oncology, acted as the framework for the original RO-ILS data elements. The consensus recommendations include data elements found in external systems, including the International Atomic Energy Agency's Safety in Radiation Oncology (SAFRON) and the Conference for Radiation Control Program Directors (CRCPD) report form structure. During the initial RO-ILS beta testing, these elements were further refined.

The proposed changes to the data elements were based on user experience, expert opinion and an initial inter-rater reliability (IRR) study. In July 2015, 66 RO-ILS participants completed a user survey in which they were asked if each data element was clear, the answer options adequate and information helpful for internal analysis. Based on these results, the Radiation Oncology Healthcare Advisory Council (RO-HAC), the entity responsible for analyzing RO-ILS data and composing quarterly reports, carefully reviewed and revised the data elements. At the same time, Ajay Kapur, PhD, director of medical physics research and education at Northwell Health System, coordinated the first IRR study in which 19 volunteers entered 11 International Commission on Radiological Protection (ICRP) narratives into a standalone spreadsheet that emulated the current RO-ILS system. Results from this original study

Table 1: RO-ILS Inter-rater Reliability Test Cases

Test Case	Source
#1: Wrong vertebral body	i.treatsafely
#2: Incorrect volume	i.treatsafely
#3: Physics beam data management	i.treatsafely
#4: Home medication reconciliation	Original
#5 SBRT target drawn wrong side	Original
#6: Scheduling issue	Original
#7: Incorrect vaginal cylinder diameter	Original / new i.treatsafely video
#8: Unnoticed previous radiation	Original / new i.treatsafely video
#9: Poorly managed pain	Original
#10: Incorrect Iso marks	Original
#11: Beam output and calibration	ICRP
#12: Computer crash/loss data	ICRP

Continued on next page

acted as a basis from which to benchmark the new data elements. After multiple rounds of review by ASTRO committees and the RO-HAC, the final proposal included removing inconsistent and non-critical data elements, developing sophisticated branching logic to display only relevant questions and clarifying answer options.

Members of ASTRO's Multidisciplinary Quality Assurance (MDQA) Subcommittee and RO-HAC created a small task group to lead IRR testing on the new proposed data elements. In addition to three i.treatsafely videos and two ICRP narratives used in the original study, the group composed seven original narratives, two of which were made into new i.treatsafely videos (see Table 1). Events involved various steps in the treatment process, both within and outside the typical radiation therapy workflow and various event types (i.e., incident, near-miss, unsafe condition or process-improvement). Clarity PSO created unique user accounts for each volunteer in the RO-ILS test portal to simulate actual event reporting. Volunteers received a total of 12 test cases, with a mix of videos and written narratives, to review and enter using the new RO-ILS data elements.

"I found the selection of test cases to be a good representation of the diverse events we see in our clinics," said Sonja Dieterich, PhD, a volunteer. "This in turn motivated me to use these cases as teaching tools for my residents."

Fourty-eight out of 67 volunteers (72 percent) completed all 12 test cases. Respondents represented the entire treatment team including: physicists (27 percent), therapists (21 percent), radiation oncologists (17 percent), trainees (15 percent), dosimetrists (12 percent), administrators (6 percent) and a nurse (2 percent). Reliability was measured using a free-marginal kappa analysis, which represents agreement over and above the possibility for spontaneous alignment. Kappa values can range from -1.0 to 1.0 where 0.0 indicates agreements equal to chance. While there is no set number, a rule of thumb is that a kappa of .70 or above indicates adequate inter-rater agreement.

Overall, the level of agreement was good and shows a positive trend relative to the original data elements and first study. The kappa score was high for event classification (.781) and low for likelihood-of-harm (.326). Kappa scores were higher for the videos and therefore show further opportunity to improve written narratives. The results of this secondary IRR testing have helped finalize the new RO-ILS data elements, set to go live this summer. We anticipate these new changes will result in more complete data collection, and in turn support more rigorous analysis and trending.

For more information on RO-ILS, visit www.astro.org/roils or email roils@astro.org. The current list of data elements can be found in the Participation Guide, free on the RO-ILS webpage.

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BY KENT W. MOUW, MD, PHD

NEXT-GENERATION SEQUENCING AND RADIATION ONCOLOGY: CHALLENGES AND OPPORTUNITIES

In the past decade we have witnessed an explosion in the application of new genomic techniques to study cancer. Researchers now have unprecedented access to an array of genome-scale tools, including exome and whole genome DNA sequencing, RNA- and protein-based analyses and a host of other similar studies. In many cases, these genomic technologies are being rapidly adapted and implemented into clinical oncology practice.

The advance that underlies many of these new genomic tools is the development of next-generation sequencing (NGS) techniques[1,2]. NGS has several advantages over first-generation (Sanger-based) sequencing, including the ability to perform millions of sequencing reactions in parallel and to directly detect and digitally quantify sequencing output. As a result, the cost, accuracy and time required to sequence a full genome has dropped precipitously in the past decade.

NGS can be performed using relatively small amounts of DNA isolated from a single core or section of fresh frozen or formalin-fixed paraffin-embedded tumor, and recent efforts have succeeded in sequencing the genomic material of single tumor cells[3]. Purified genomic DNA is fragmented via enzymatic or physical shearing to create a pool of oligonucleotides with an average length of several hundred base pairs. In most NGS systems, the DNA fragments are then fused to barcoded adaptor sequences that allow the fragments to be immobilized on a surface and clonally amplified via PCR. Immobilized single-stranded DNA oligonucleotides then serve as a template for DNA synthesis, with successive rounds of nucleotide incorporation monitored via optical or electrochemical readout. NGS is often termed as "massively parallel" because millions of fragments from multiple samples can be sequenced in a single run, resulting in gigabases of raw sequence output.

NGS data are analyzed by aligning the sequencing reads to a reference genome. A germline DNA sample (from peripheral blood or other non-tumor tissue) is often sequenced in parallel with the tumor sample and allows one to distinguish somatic (tumor) versus germline (non-tumor) events as well as to quantify copy number alterations (amplifications or deletions) in the tumor. Because each nucleotide position is represented in multiple sequencing reads, information regarding allele frequency and tumor purity can often be inferred. Numerous publicly available and commercial tools have been developed to interpret and visualize NGS data.

To date, NGS techniques have been used to sequence thousands of samples, representing dozens of tumor types in work performed by individual research laboratories and large consortia such as The Cancer Genome Atlas (TCGA) and the International Cancer Genome Consortium (ICGC). These efforts have characterized both known and novel genomic alterations and have helped to define the genomic landscape of cancer[4]. However, many of these studies were conducted on large, heterogeneous cohorts with limited accompanying clinical data, often making it challenging to leverage the genomic information to address relevant clinical questions.

In addition to its widespread use in the research community, NGS is also being implemented into routine clinical care at many cancer centers[5,6]. To date, most efforts have focused on targeted sequencing of dozens to several hundred known cancer genes in an attempt to identify therapeutically actionable alterations; however, projects are underway at some centers to incorporate whole exome sequencing as well as other NGS-based techniques (such as RNA sequencing) into the clinical pipeline[7].

The optimal role for NGS sequencing in routine oncology practice is still being defined. To date, no randomized trials have shown that the addition of NGS-based tumor testing results in improved clinical outcomes compared to standard of care. However, there are now numerous clinical settings in which genomic information can provide critical insight by

Continued on next page

identifying therapeutically actionable alterations. The NCI-MATCH (Molecular Analysis for Therapy Choice) Trial and other similar "basket" trials seek to enroll patients on trials of targeted agents based on tumor genomic features rather than merely the type of cancer that was detected (i.e., based on KRAS mutation rather than a ductal carcinoma in situ diagnosis). These efforts will likely continue to expand the role for NGS-based assays in clinical oncology[8].

Despite the emerging use of NGS techniques to inform clinical decision-making in the systemic therapy setting, there have been few studies to date that have investigated the clinical role of NGS in radiation oncology. Historically, reliable genomic predictors of radiation response have been challenging to identify, likely owing to the complex and multifaceted cellular response to ionizing radiation[9]. However, multiple tools to predict radiation response have recently been developed and validated using non-NGS platforms (such as gene expression arrays)[10, 11], and NGS-based studies are now also being used to identify associations between alterations and radiation response[12, 13].

Although the development of NGS techniques has improved the accessibility and cost-effectiveness of clinical sequencing, several challenges remain. Importantly, efforts must continue to focus on applying these technologies to address specific clinical problems for which genomic insights have the potential to alter management. In this context, the clinical utility of these technologies must be validated in a robust and rigorous manner. More broadly, research efforts must continue to focus on identifying new genomic biomarkers and therapeutic targets relevant to radiation oncology, as well as on developing clinical-grade assays to test the functional impact of novel variants on the tumor phenotype.

Advances in genomic techniques have the potential to greatly improve cancer care over the next decade, and radiation oncologists should strive to be at the forefront of these efforts. Currently, few formal training opportunities are available for radiation oncologists to learn the computational skills required to analyze large genomic data sets. To address this challenge, efforts should focus on providing support for cutting-edge genomics research and training programs within radiation oncology. More generally, we should strive to develop a general educational framework for all trainees and practitioners to learn the principles and best practices of genomic medicine. Given our position at the nexus of cancer care, the radiation oncology community has a unique opportunity to guide incorporation of existing NGS technologies into clinical practice and to explore roles for novel NGS-based techniques in the emerging framework of personalized oncology care.

Dr. Mouw is a clinical fellow at the department of radiation oncology, Brigham and Women's Hospital, Dana-Farber Cancer Institute, Harvard Institute of Medicine.

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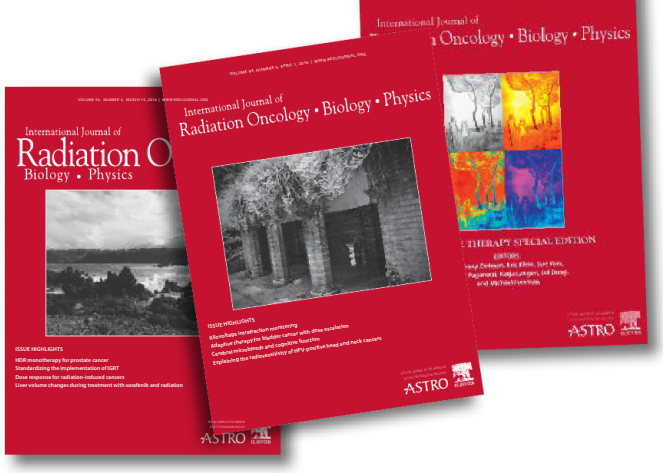
JOURNALS HIGHLIGHTS



HIGHLIGHTS FROM THE *INTERNATIONAL JOURNAL OF RADIATION ONCOLOGY • BIOLOGY • PHYSICS*

MARCH 15, 2016

Radiation Therapy for Diffuse Large B-cell Lymphoma: Indications, Outcomes and Controversies

By Pinnix

In this month's "Oncology Scan," Associate Editor Chelsea Pinnix reviews several recent papers on the management of diffuse large B-cell lymphomas, spotlighting the changing role of radiation therapy. In addition, she looks at the specific scenarios of skeletal involvement and lymphoma in the elderly.

IGRT Practice Patterns' Impact on Workflow and Treatment Planning: Results from a Survey of ASTRO Members

By Nabavizadeh et al

Authors surveyed the ASTRO membership regarding treatment site–specific protocols and opinions toward image-guided radiation therapy (IGRT). They report a high prevalence of IGRT use and of daily cone beam computed tomography. There was, however, no association between IGRT frequency and planning treatment volume (PTV) margins and generally poor resident involvement in IGRT. Consensus guidelines, further evidence-based approaches for PTV margin selection and greater resident involvement in IGRT practices will be needed to standardize this practice.

APRIL 1, 2016

Rethinking the Balance of Risk and Benefit of ADT for Intermediate-Risk Prostate Cancer

By Nguyen

Genitourinary Associate Editor Paul Nguyen looks at three recent reports that are helping us to recalibrate the role of androgen deprivation therapy (ADT) in intermediate-risk prostate cancer. One study reports a small but detectable decline in cognitive function on ADT, and a second chilling report implies a very small increase in absolute risk of Alzheimer's disease, although in relative terms it is quite large. The third study is a final, long-term report of a randomized trial comparing radiation alone with radiation plus ADT. Nguyen argues that the benefits of ADT may be too small to justify its use for those at the low end of the intermediate-risk spectrum.

Real-Time 3-D Image Guidance Using a Standard LINAC: First Prospective Clinical Trial of Kilovoltage Intrafraction Monitoring–Guided Gating for Prostate Cancer RT

by Keall et al

Intrafraction motion monitoring provides dosimetric advantages when compared to a single pretreatment image. Kilovoltage intrafraction monitoring (KIM) is a new real-time 3-dimensional image guidance method that uses a standard linear accelerator without additional expensive equipment. The first clinical trial of KIM is underway for prostate cancer radiation therapy, and these investigators report results from the first 200 prostate treatment fractions. They show that KIM-guided gating eliminates large prostate displacements during treatment delivery with an accuracy and precision well below 1 mm.

MAY 2016 Particle Therapy Special Edition

Tumor Cells Surviving Exposure to Proton or Photon Radiation Share a Common Immunogenic Modulation Signature, Rendering Them More Sensitive to T Cell–Mediated Killing

By Gameiro et al

Using cell lines of tumors frequently treated with proton radiation, the authors examined the effect of proton radiation on the viability and induction of immunogenic modulation in tumor cells by flow cytometric and immunofluorescent analysis of surface phenotype and the functional immune consequences. These findings offer a rationale for the use of proton radiation in combination with immunotherapy, including for patients who have failed radiation therapy alone or have limited treatment options.

Establishing Cost-Effective Allocation of Proton Therapy for Breast Irradiation

By Vega et al

Proton RT offers promise in limiting heart dose, but the modality is costly and access is limited. Using cost-effectiveness analysis, the authors provide a decision-making tool to help determine which breast cancer patients may benefit from proton RT referral.

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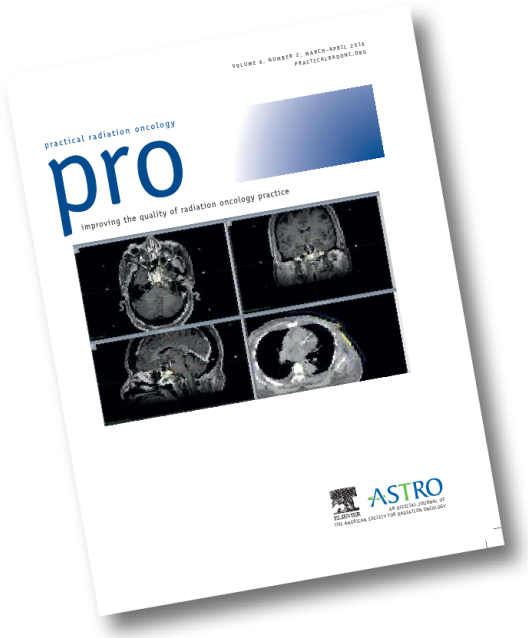

HIGHLIGHTS FROM *PRACTICAL RADIATION ONCOLOGY*

MARCH-APRIL 2016

Absence of Physiologic Breast Response to Pregnancy and Lactation after Radiation Therapy

By Mohamad et al

Younger women of childbearing age are being diagnosed and treated for breast cancer. Given the high prevalence of breast conservation, breast radiation has become a mainstay treatment for these women. Although breast radiation prevents local recurrences, it may have deleterious effects on lactation. The authors report a case of loss of physiologic breast tissue proliferation in pregnancy and absence of lactation in the irradiated breast.

Enhancing Safety and Quality through Preplanning Peer Review for Patients Undergoing Stereotactic Body Radiation Therapy

By Matuszak et al

Due to its high dose per fraction delivery, stereotactic body radiation therapy (SBRT) requires real-time process assurance to promote safe, high-quality treatments. In an effort to assure safety and first-time quality, the authors instituted a pilot, single-institution, SBRT peer-review process before treatment planning. They present a summary of the results of that process over a 26-month period. Preplanning peer-review by an independent physician, physicist and dosimetrist resulted in changes in nearly one-quarter of SBRT patients, potentially preventing suboptimal treatments.

HIGHLIGHTS FROM *ADVANCES IN RADIATION ONCOLOGY*

JANUARY-MARCH 2016

An Analysis of Appropriate Delivery of Postoperative Radiation Therapy for Endometrial Cancer Using the RAND/UCLA Appropriateness Method: Executive Summary

By Jones et al

This analysis showcases the results of ASTRO's analysis of appropriate delivery of postoperative radiation therapy for endometrial cancer using the RAND/University of California, Los Angeles Appropriateness Method. The authors outlined areas of convergence and divergence with the 2014 ASTRO endometrial guideline and highlighted where this analysis provides new information or perspective.

A Prospective Study of Quality of Life in Breast Cancer Patients Undergoing Radiation Therapy

By Xiao et al

The purpose of this study was to examine the impact of radiation therapy on quality of life of breast cancer patients during and until one year after radiation therapy treatment. The authors found that radiation therapy did not worsen QOL in breast cancer patients. However, preradiation therapy patient characteristics including body mass index and perceived stress may be used to identify women who may experience decreased physical and mental function during and up to one year after radiation therapy.



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