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Advanced Cancer Care: A Primer on Palliative Radiation Oncology

Benjamin Li

Vanderbilt University School of Medicine, benjamin.c.li@vanderbilt.edu

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Cover Page Footnote

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Advanced Cancer Care: A Primer on Palliative Radiation Oncology

Abstract:

Palliative radiation oncology is a new or foreign concept for many who deal with or are involved in the management of advanced cancer. This paper equips patients, medical students, residents, and physicians to understand the fundamentals of palliative radiation oncology. Given the growing burden of cancer and healthcare delivery challenges for patients nearing the end of life, it is important to understand the mechanism and implications of palliative radiation therapy, as well as the challenges in treatment. Advantages of treatment are carefully weighed with limitations and cost considerations, prognostic awareness, and adherence to goals of care. While treatment with palliative radiation may offer high potential value in certain scenarios, ultimately it is the role of the palliative radiation oncologist to decide when and when not to treat. Recent health system changes towards value-based care may promote a growing role for palliative radiation oncology in advanced cancer cases.

Keywords: Palliative radiation oncology. Value. Cancer treatment. Medical students. Patient education.

Introduction to Advanced Cancer

The lifetime risk of developing cancer is 42% for men and 38% for women [1]. Many medical professionals are able to recommend the latest treatments that optimize efficacy and tolerability to reach a cure. Cancer survivor networks are available to share valuable success stories and insights about their disease. Yet, for the patient with a terminal diagnosis, resources are sparse. When there is no possibility of a cure, doctors are left with unclear directives for disease management. Patient-ended perspective and feedback regarding near-end-of-life decisions are lacking, due to the severe morbidity and mortality associated with advanced disease. This leaves a hole in our system: a conundrum for how to deal with incurable cancer.

This is a challenge for patients, providers, and the healthcare system. When a doctor offers treatment to a patient, it is commonly perceived as a heroic effort to fight for survival. We accept the expense of treatment. But when cancer is incurable, we need to push for an honest examination: Is there still room for healing, or is this treatment an unnecessary or possibly even harmful expense?

There are many pressures that lead to overtreatment. Unfortunately, the financial toxicity of these treatments often puts patients and families into financial hardship, an unfortunate legacy before death. Largely unregulated, this area of healthcare has evolved into a problem which now must be addressed. Today, 30% of all healthcare dollars are spent on the 1% of the population with less than a year to live, a figure which cannot be sustained [2].

Palliative Radiation

Palliative radiation is a decision that many incurable cancer patients face near the end of life. The unique characteristics of this treatment make it difficult to compare other forms of therapy. First, palliative radiation is relatively easy to administer and tolerate. Second, a variable wait time exists before noticing benefits, as well as side effects. Third, the length of treatment, measured in days, is variable. Fourth, it is an outpatient procedure that can be made available to hospital inpatients. Lastly, it is a specialized treatment that is not discussed in standard medical education, nor is it widely available. The net result is a treatment whose benefits, intent, and implications are commonly misconceived by not only patients but also referring providers.

A helpful way to better understand palliative radiation is to distinguish it from general radiotherapy. Radiotherapy is one of the staples of modern cancer care and is used in over 60% of cancer cases. It is often combined with chemotherapy and surgery to treat aggressive disease or can be used by itself to cure early stages of disease or specific tumor types. It works at a molecular level to disrupt the DNA replication process by dividing cells, thereby interrupting growth and causing cell death. Cancer cells divide more often than normal cells. Thus, they are disproportionately affected by radiation. Depending on the condition, the effect takes two days to two weeks to begin generating clinical improvements.

The setup is very similar to receiving an X-ray, except the machines used for radiotherapy generate much higher-energy particles sufficient to cause DNA damage in the targeted cells. Like an X-ray, the treatment beams are neither visible nor painful. Any point in the body can be targeted. Hitting the cancer is easy; the hard part is avoiding damage to surrounding structures and impaired organ function. Treatment is delivered in "fractions," designed to spread the total radiation dose over a specified time period – usually to reduce toxic side effects. Fractions are typically delivered on a daily basis, ranging anywhere from 1 to 35 days, depending on the scenario.

Palliative radiation is distinct in that it refers to radiotherapy that is administered with non-curative intent. Rather, this treatment aims to reduce the burden of disease and control symptoms. A stage IV cancer patient will remain stage IV after treatment but may experience less pain, better function, and improved quality of life during her remaining lifetime. While treatments are delivered in outpatient clinics, some clinics are connected to hospitals, allowing inpatients to be transported over for radiation treatments, which only take 10-15 minutes per fraction. Palliative radiation is not a new concept; it has been a relatively cost-effective, time-efficient treatment since the early 1900s [3].

Hidden Costs of Treatments

While the principles of treatment have remained the same, shifting payment structures, patient preferences, and complexities of the healthcare environment are impacting how treatment decisions are made. Fee-for-service structures reward physicians for delivering treatment, not for careful conversations with patients. Under this system, a thoughtful treatment that results in significant benefit is rewarded the same as a rushed treatment of questionable benefit.

Additionally, patients now come to doctors with high expectations, often prepared with personal research and requests for intensive or aggressive treatments. This type of behavior is facilitated by insurance plans with no limits on spending (e.g., Medicare) that the majority of terminal cancer patients hold. The costs are hidden, due to both a lack of transparency in the healthcare system and a lack of awareness.

As a result, patients are getting more aggressive treatment near the end of life, accumulating healthcare costs, and burdening their families with debt. Meanwhile, physicians are rewarded for their services, insurance companies raise their premiums to cover the cost of care, and healthcare spending spirals upwards. None of this is related to the actual efficacy of the treatment. In fact, treatment “effectiveness” is not even measured.

To control end-of-life resource utilization, it is important to define our values, align our goals with these values, and provide support for these goals. A value-centered approach counteracts overtreatment in fee-for-service models and more closely ties in patient preferences with treatment decisions. It invites thoughtful discussion about the obvious and less obvious implications of treatment.

Financial Aspects of Palliative Radiation

Doctors claim agency over the sick, vulnerable patients that they serve. This is an incredible responsibility, especially when the decisions have enduring consequences, whether they be physical, mental, financial, or all three. As healthcare costs have risen, the expense of end-of-life treatment has become a growing concern. The cost of palliative radiation can be similar to that of curative radiation. A typical course costs between \$10,000 – 40,000, depending on the length and type of treatment and the treatment center [4]. Patients are typically responsible for 20% coinsurance with Medicare and other insurance plans after deductibles have been met. This amounts to \$2,000 – 8,000 or greater out of pocket expenses, a sizeable amount on top of other medical expenses near the end of life. However, in most cases, the cost of treatment is not included in the discussion in the decision to treat.

In general, physicians are not comfortable discussing costs of treatment. This may be to prevent finances from interfering with deciding the best treatment option for the patient. Or physicians may not know the costs of treatments themselves, especially given the constant flux of therapies, prices, and medical policies. However, it is important to consider financial toxicity incurred on patients when planning cancer care.

Palliative radiation may be a cost-effective treatment option. A complete course of palliative radiation costs \$1,000 – 15,000, whereas commonly prescribed chemotherapy regimens cost \$30,000 per cycle [5]. Over weeks to months, this can amount to \$100,000 or more for a patient's full chemo-treatment. Costs vary case to case, but on average, palliative radiation is less expensive than chemotherapy. Also, palliative radiation can significantly reduce the number of days spent in the hospital [6]. Each day less in the hospital represents approximate savings of up to \$3,500 for a regular bed, or \$10,000 for an intensive care unit bed [7]. Still, the appropriate timing and use of palliative radiation require careful discussion.

When and When Not to Treat

Making smart, informed decisions involves not only knowing how best to treat, but also recognizing when best not to treat. This is done by taking into account both physiologic, prognostic, and psychologic considerations of care plans. If done correctly, we can both offset resource waste and realize better patient satisfaction and outcomes.

First, it is important to recognize the appropriate indications for palliative radiotherapy. For patients with metastatic disease, radiation is offered for symptom relief, not for a cure. The most common indications for palliative treatment are symptomatic brain metastasis, malignant spinal cord compression, airway obstruction, uncontrolled bleeding, and malignant bone pain. Radiation may be able to help where surgery and chemotherapy are

limited options since it can be targeted to any location in the body and is non-invasive. Depending on type and location, some tumors respond exquisitely to radiation, whereas others, such as slow-dividing nerve cell tumors, are less sensitive to radiation. If a patient does not have a lesion that is both symptomatic and amenable to radiation, then palliative radiation provides questionable utility and is not indicated.

Second, the decision not to treat requires consideration of prognosis and nuanced clinical judgment. Due to the delayed physiologic response from treatment, some patients may not be likely to survive long enough to experience the benefit of treatment. However, determining prognosis is a two-sided challenge in practice, because it relies on an agreed understanding of estimated survival on both the side of the physician and the patient. The way a physician thinks, rooted in experience and clinical evidence, may not be the same as the patient, who is experiencing the actual disease. If a patient believes he has much longer to live than the physician does, or vice versa, then treatments may be biased towards over-prognostication, or over-estimation of remaining lifetime. This well-studied phenomenon contributes to over-treatment at the end of life [8].

Third, psychological considerations are important when asking whether the benefits offered by the treatment will be meaningful. Determining the value of treatment requires physicians to engage patients about goals of care. Identifying the patient's goal – and not the physician's or the family's – is challenging. In a room filled with intense emotions, pressured family involvement, and often surrogate decision-making, it is difficult to avoid bias. Feelings of love, and of guilt, are more likely to drive families to pursue every intervention possible [citation]. Moreover, the paternal role of the physician can go awry when he has limited encounter time with the patient and does not understand the full context of the situation. If the patient is unlikely to meet his goals of treatment, then treatment should be reconsidered. Unfortunately, this is a commonly neglected aspect of treatment.

The decision to treat is very different if the physician's goal is to shrink the tumor and restore maximal nerve function while the patient's goal is to spend meaningful time at home with family. The former might involve a variable increased length of hospital stay, which prevents the patient from achieving at-home time. Cases like this are common in oncologic care, perhaps due to a number of factors: the lack of physician training on advanced care planning, lack of provider confidence to approach these types of encounters, and poor incentives to do so. Discussions near the end of life are time-intensive, costly, and difficult [6].

Promoting Future Value in Cancer Care Near the End of Life

Evolving payment structures reflect the growing need to address this topic. In January 2016, the Centers for Medicare and Medicaid (CMS) agreed to reimburse physicians for advanced care planning discussions with Medicare beneficiaries [9]. The reimbursement amount is \$75 for the first half hour discussion, and then \$70 for every subsequent half hour [10]. Although these reimbursements are relatively small, there is no maximum time limit for discussions, and it is a step in the right direction for providing value-based care near the end of life.

CMS has also introduced the Oncology Care Model, a merit-based incentive payment system that seeks to reward oncologists for timely, quality, cost-efficient care. Qualifying centers can participate and receive stipends to improve cancer care for patients during 6-month episodes after the initiation of chemotherapy. Other innovative models are currently being developed to evolve modern care, and still, much room remains for improvement.

Moving forward, there is much value that the palliative radiation oncologist can provide. He can guide patient-centered discussions about goals of care with oncologic insight. Regarding disease burden, he can provide appropriate treatment options, as well as help provide realistic expectations for the degree that symptoms can be reduced. He can improve prognostic awareness, not just for the patient, but for other providers involved. Based on prognosis, he, providers, and the patient can share in deciding to treat or not and assess which treatments make the most sense. If the decision not to treat is made, it does not mean that care ends. Rather, patients can be referred to palliative care, which reduces suffering, focuses on preserving human dignity, and also often saves money. Finally, he can customize treatments to meet the patient's goals best.

Shortened courses of radiation, or hypo-fractionation schemes, are one potential option. The cost of radiation is directly proportional to the number of fractions delivered, therefore a hypo-fractionated treatment is much less expensive than traditional fractionation schedules. These treatments can be designed and delivered in as few as one to three days, compared to regimens of ten days or more. To achieve a total dose still sufficient to treat cancer, these treatments involve the administration of larger doses of radiation at a time. While this type of treatment is increasing the risk for long-term side effects years later, this is much less of an issue for patients near the end of life who are unlikely ever to experience late effects. This creates the capacity for palliative radiation to serve patients in a unique number of ways. This includes, but is not limited to, providing a rapid treatment option, reducing the duration and cost of a patient's hospital stay, and facilitating timely discharge from the hospital and appropriate transitions of care so that they can have meaningful time at the end of life.

Conclusion

The role of palliative radiation oncology in cancer care near the end of life is growing. Centers in the U.S. are gradually implementing new palliative radiation oncology services. Attitudes in healthcare are shifting to recognize that patient-centered oncologic care does not necessarily mean treatment-oriented care. Near the end of life, there are multiple transition points and trajectories of care to be considered. Having a provider who specializes in these difficult scenarios is a model that promotes high value during a high-stakes time which most cancer patients will eventually face.

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