When Less is More: Single-Fraction Radiation Therapy

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Abstract

The risks and benefits associated with radiation therapy (RT) in the treatment and symptom management of malignant tumors are well documented in medical literature. A review of this literature suggests that single-fraction RT can be as useful for pain control and spare patients the physical burden and side effects associated with multiple-fraction RT, yet this treatment option is rarely utilized. The author suggests single-fraction RT to be superior to multiple-fraction RT for palliative radiation therapy for patients with advanced cancers using the literature and personal experience to support the argument.

Keywords: radiation therapy, radiotherapy, palliative care, single fraction, multiple fraction
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When discussing radiation therapy (RT), most people think of external beam radiation where high-energy x-rays are directed at malignant tumors. This is the type of RT which will be discussed in this paper. When RT is administered strictly in an effort to relieve the symptoms associated with the malignancy and not cure it, it is referred to as palliative RT. Palliative RT is usually given daily, Monday through Friday, for one or two weeks. Sometimes the treatment lasts up to three weeks. This course of treatments is referred to as multiple-fraction RT. Occasionally, palliative RT can be delivered in a single treatment. This is called single-fraction RT. RT does not hurt a patient when it is being administered, but it can cause a number of side effects, like skin irritation, nausea, vomiting, diarrhea, irritation of the mouth and throat, and fatigue (Tanner, 2011). In consideration of cost, treatment effect, and burden to the patient, single fraction RT may be a better alternative than multiple fraction RT for patients needing palliative RT.

Personal Experience

“Why is he like this?” the patient’s daughter asked. “He wasn’t like this a week ago” she said. The anger she felt came across clearly in her tone.

“It’s probably a combination of the disease process and the radiation treatment” the physician explained rather dryly.

The patient was a 65 year old male with metastatic lung cancer. I had taken care of him a few times at Lancaster General Hospital in the post-operative unit where I used to work. He had an access port for chemotherapy implanted and a couple of other minor procedures. He was gruff; a big, burly guy just a few months prior. He was a biker, and I remembered talking to him about his motorcycle. Now he was struggling to walk, barely avoiding the walls as we walked
down the hallway. He had become frail, no longer projecting the strong, commanding presence he once had. His affect was flat. I was not sure he even recognized me, yet he called me by my first name just the week prior when I saw him at his consultation visit.

“He’s fine. He doesn’t need your help.” the patient’s daughter blurted out as I reached out to him, offering a stabilizing arm. I knew he declined help in the past, but he clearly needed it this time. I led him to the exam room and offered him a seat. He refused to sit down. He also refused to allow me to weigh him or check his blood pressure. I wondered if he did not want to hear the numbers for fear of the reality, or if he was refusing simply because he had no idea what was even going on around him. He had lost a lot of weight. I tried to ask him the typical questions asked during the rooming process, but he offered little response. His wife and daughter chimed in with answers, but asked more questions than they were actually answering. His lung cancer had metastasized to his brain. He was getting palliative radiation. He had to come in for radiation treatments every day for a total of ten treatments. We saw him for nurse visits in the office twice that week because his family was concerned about his rapid decline. I understood their concern, feeling disturbed by it all myself. With only a couple of months of experience at radiation oncology, I had already seen this scenario a few times.

At the cancer center where I work, radiation therapy starts with an initial consultation visit with the radiation oncologist. This appointment takes anywhere from 30 minutes to an hour. The physician determines whether RT is appropriate, if it should be used in conjunction with chemotherapy, and if the intention is curative versus palliative therapy. After a treatment strategy is determined, a computed tomography (CT) scan is obtained, and the patient returns for a simulation study. At that point, the patient is either tattooed or a molded face mask is made to identify the exact treatment location. The patient returns for treatment on a daily basis, Monday
through Friday. The number of treatments required depends on a lot of variables—location of the tumor, extent of disease, symptom presentation of the patient, etc. Patients receiving RT have office visits scheduled weekly, and patients are seen more often in the clinic if they are considered high risk or become symptomatic. In short, this requires commitment not only from the patient but any family members or friends providing transportation or assistance to the patient.

I think of a wheelchair-bound, elderly woman in her eighties with lung cancer who uses Red Rose Transit to get her to and from her appointments every day. She lives close to the Pennsylvania-Delaware state line, and she does not have anyone available to drive her that distance on a daily basis. She gets in the bus around ten o’clock in the morning, arriving at the cancer center around noon to sit and wait for her two o’clock appointment. She gets back on the bus around three o’clock, with her oxygen tank in tow, not to arrive back home until about five o’clock in the evening. Her prognosis is poor, but she is doing RT to help improve her shortness of breath.

**Literature Review**

According to Fischberg et al. (2013), more than 17% of the United States’ gross domestic product (GDP) is spent on healthcare. Despite this, Americans have poorer health outcomes than citizens of other developed nations who spend far less on healthcare. It is estimated that nearly a third of our healthcare expenses are directed toward inappropriate procedures, therapies, and diagnostic tests (Fischberg et al., 2013). Approximately 50% of the Medicare costs associated with cancer patients are spent in their last two months of life, with palliative radiation treatment comprising a significant cost burden (Hess, Barley, Chung, Hill, & Fonseca, 2012). The American Board of Internal Medicine Foundation’s *Choosing Wisely* campaign aims to increase
awareness of inappropriate diagnostic testing and treatments which may contribute to patient harm, specifically in end of life care. The taskforce invited The American Academy of Hospice and Palliative Medicine (AAHPM) to attend the campaign and provide expert opinion. Five recommendations were made for physicians, patients, and caregivers to take into account when making decisions for those with life-threatening illness (Fischberg et al., 2013).

The fourth recommendation given by the taskforce is in reference to palliative radiation for painful bone metastasis. According to guidelines published by the American Society for Therapeutic Radiation Oncology (ASTRO), single fraction (SF) external beam radiotherapy (EBRT) allows for similar pain relief, fewer side effects, and more convenience for the patient than multiple fraction (MF) therapies. SF regimens are also less expensive than MF regimens (Fischberg et al., 2013).

Approximately 50% of Hospice patients are those with cancer diagnoses, yet only one percent of those are ever referred for palliative RT despite its reputation for being effective in symptom management. Reasons noted for lack of patient referral include a perception that radiation oncologists are hesitant to offer single-fraction RT, the expense of treatments, and the burden on patients to travel for treatments (Schuster et al., 2014). In fact, surveys of palliative care professionals have found that they are not likely to even consider radiation oncologists as part of their care team. Similar surveys note that palliative care professionals generally do not find radiation oncologists to be willing to offer single-fraction RT for palliative care. Improved collaboration is needed between palliative medicine and radiation oncology providers to enhance care for patients needing palliative care and/or radiation therapy (Lutz, Jones, & Chow, 2014). To complicate matters, when patients enroll in Hospice services they give up insurance coverage for both chemotherapy and radiation therapy (Schuster et al., 2014).
According to Schuster et al. (2014), single-fraction RT offers an effective treatment option for symptom management at a lower cost and with less burden to the patient than longer courses of treatment. In order to bridge this gap in care, the authors propose using a streamlined process for single fraction RT as part of palliative care in Hospice patients to enhance symptom management while also containing cost. A program was designed to offer a simplified process of initial “consultation, CT simulation, treatment planning, and delivery of treatment in a single visit”, (p.390) as opposed to multiple visits, in a clinic offering affordable radiotherapy (CART). With palliative RT typically being cost-prohibitive for Hospice patients, this CART was found to be an effective way to make palliative RT available for symptom management in this population (Schuster et al., 2014).

**Conclusion**

Many patients receiving palliative RT are elderly and have impaired functional capacity at baseline, making traveling to treatment centers difficult. Progression of illness, like bone and brain metastasis for example, can lead to impaired mental capacity and further reduction of functional capacity. Although the intent of palliative RT is to reduce symptoms, there is typically an acute phase of side effects that patients unfortunately experience (Dennis, Linden, Wong, & Chow, 2015). End-of-life care can be challenging for clinicians, patients, and caregivers. Radiation Oncology guidelines now emphasize the importance of tracking costs of expensive and intensive treatment regimens administered to terminally-ill patients, and describe the value of minimizing treatment burden and cost while maximizing quality of life for the patient (Kress et al., 2015). Review of the literature suggests that single-fraction RT can be as useful for pain control and spare patients the physical burden and side effects associated with multiple-fraction RT in patients needing palliative RT. It is also more cost effective. Choosing
treatments intended to relieve symptoms and improve quality of life, while considering costs, both physical and financial, should be a collaborative effort among all parties when determining palliative care options in patients with incurable malignancies.
References


