

Utilization of radiotherapy services by a palliative care unit: pattern and implication

Mohammad Zafir Al-Shahri, MD,¹ Ameen Al-Omair, MD,²
Mohammad Al-Shabanah, MD,² and Medhat El-Sebaei, MD²

¹Palliative Care Medicine and ²Radiation Oncology, Oncology Centre, King Faisal Specialist Hospital and Research Center, Riyadh, Saudi Arabia

Background The role of radiotherapy in palliation is well recognized. Analyzing referrals from an inpatient palliative care unit (PCU) to the radiation oncology (RO) service may help in planning palliative care (PC) services and educational programs.

Objective To determine the pattern and rate of referrals from a PCU to the RO service at a tertiary oncology facility in Saudi Arabia.

Methods Referrals from the PCU to the RO service were prospectively identified over the period beginning November 27, 2007 and ending March 9, 2011. The appropriateness of referrals was determined by 2 radiation oncologists.

Results Of the 635 cancer admissions to the PCU, 25 (3.9%) referrals to RO were made, and 32 sites were irradiated. All patients had a poor performance status (ECOG \geq 3). The most common areas irradiated were vertebrae (40.6%), pelvis (18.7%) and other bony structures (28.1%). Pain control was the most frequent reason for referral (87.5%). Only one referral was regarded by the RO service as inappropriate, indicating that 96% of the referrals were appropriate. The mean time lapse between referral and starting radiation was 4 ± 3.6 days. A total of 75% of the patients died in the PCU within a median of 30 days post radiotherapy.

Conclusion The small minority of patients in the PCU referred for radiotherapy were deemed appropriate referrals by the radiation oncologists despite their poor performance status and limited time remaining. When planning a PCU with similar admission criteria, the availability of a radiotherapy facility in close proximity may not be a priority.

The purpose of palliative care (PC) is to improve the quality of life (QOL) for patients and families facing the multifaceted problems associated with life-threatening conditions. PC relieves various aspects of suffering (ie, physical, psychosocial and spiritual).¹ The modern PC movement began with the inception of St Christopher's hospice in 1967, after which various models of PC have evolved.²⁻³ One model gaining increasing popularity is the inpatient palliative care unit (PCU) to meet the needs of ter-

minally ill patients in hospitals and oncology centers.⁴⁻⁶

In Saudi Arabia (SA), there are more than 27 million people, of whom more than 30% are expatriates.⁷ Very few patients are diagnosed in the early stages of cancer; in fact, most often they are diagnosed as having advanced disease with regional or distant extension. The 2007 crude and age standardized cancer incidence rates were 52.3 and 82.1 per 100,000 people; respectively. The 5 most common cancers in men in descending order are: colorectal, non-Hodgkin lymphoma, leukemia, lung, and liver; and in women, the 5 most common cancers in descending order are: breast, thyroid, colorectal, non-Hodgkin lymphoma and leukemia.⁸ About 65% of cancer patients treated at the King Faisal Specialist Hospital and Research Center, Riyadh (KFSHRC-R) are referred from outside the city of Riyadh.⁹

Few large cities in SA have hospital-based PC programs. However, as of the publication of this research, hospices do not exist in any part of the

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Correspondence Mohammad Zafir Al-Shahri, MD, Consultant, Palliative Care Medicine, Oncology Centre, King Faisal Specialist Hospital & Research Center, P. O. Box 365636, Riyadh 11393, Saudi Arabia (malshahri@kfshrc.edu.sa).

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country. The PC program at KFSHRC-R was established 20 years ago as the first of its kind in SA and in neighboring Arab countries. The program involves inpatient, outpatient and home-care components. It also provides structured postgraduate training for physicians pursuing a subspecialty in palliative medicine. Although non-malignant referrals are welcomed by the PC team, the vast majority of referrals to PC are patients with advanced cancer. Admission to the inpatient PCU is limited to patients with advanced, incurable, and life-threatening conditions for which there are no disease-modifying therapies available including surgery, chemotherapy and/or radiotherapy. As a prerequisite to PCU admission, patients should have "do not resuscitate" (DNR) orders.¹⁰ Very few patients admitted to our PCU are discharged to either their home or a local hospital, whereas the great majority (86%) die in the PCU with an average length of stay of 25 days.¹¹

The radiation oncology (RO) service at KFSHRC-R was established many years prior to the existence of the PCU in this institution. A state-of-the-art full-spectrum radiotherapy facility is currently an integral component of the tertiary Oncology Centre at KFSHRC-R. Although many patients are not yet covered by the evolving health insurance system in SA, patients treated at KFSHRC-R are fully covered for health-related expenses through governmental and non-governmental channels.

Palliative radiotherapy for patients with advanced cancer is cost effective and alleviates symptoms related to various areas affected with cancer, such as the skeletal region, central nervous system, genitourinary organs and aerodigestive systems.¹² Palliative radiotherapy for controlling pain in bony metastasis may take a few weeks to be affective. Several studies have suggested that patients in their last 3 months of life may still experience symptomatic benefit from radiotherapy and, therefore, should not be denied this palliative treatment when indicated.¹³⁻¹⁴ Exploring the pattern of referrals from a PCU to the RO service may help to guide educational plans for PC professionals and may also help in equipping planners with a better understanding of whether or not a radiotherapy service needs to be available in close proximity to a PCU. The objective of this study is to determine the pattern of referrals from the PCU to the RO service at KFSHRC-R.

Methods

We prospectively identified all PC inpatients referred to the RO service for palliative radiotherapy from November 27, 2007 to March 9, 2011. The collected data included patient demographics in addition to other variables related to the type of cancer, disease extent, aim of referral, and radiotherapy plan. The appropriateness of the referral and the treat-

ment plan was determined by 2 radiation oncologists, each having more than 10 years of experience. Both of the radiation oncologists had to agree in order to label a referral as appropriate, ie, indicated. There were 2-3 PC consultants during the study period. The performance status of patients was determined according to the Eastern Cooperative Oncology Group (ECOG) scale.¹⁵ The hospital research ethics committee reviewed and approved the study proposal. The statistical analysis was carried out using the Statistical Package for Social Science, version 17.0 (SPSS). Means are expressed \pm one standard deviation and were compared between groups using the Student's t-test. The statistical significance was set at a *P* value of less than .05.

Results

Only 4 patients who did not have cancer were admitted to the PCU during the study period. Of the 635 cancer admissions during the same period, there were 25 referrals (3.9%) to the RO service. The median age of referred patients was 54 years (range, 29 - 74). No gender preponderance was observed and all patients had a poor performance status of ECOG \geq 3 (Table 1). A total of 75% (18/24) of patients who received radiotherapy died in the PCU with a median survival of 30 days post radiotherapy (range, 2 - 186 days).

Of the 32 sites irradiated, 40.6% were vertebrae, followed by the pelvis (18.7%). The most common indication for palliative radiotherapy was to control pain resulting from bony metastases (87.5%) and the remaining indications were equally divided between bleeding control and palliation of brain metastasis (2; 6.3%). Table 2 shows the details of the sites irradiated and indications for radiotherapy. Planning was 2-dimensional in all patients and the most-used dose-delivery pattern (41.7%) was 20 Gy over 5 fractions as shown in Table 3. The median radiation dose was 18 Gy (ranging from 5-20 Gy). The median number of fractions was 3 (ranging from 1 - 5 fractions).

The median time lapse between referral and evaluation by the RO service was 1 day, with a mean of 1.4 ± 1.6 days. The median time lapse between referral and starting radiation was 3.5 days, with a mean of 4 ± 3.6 days. One patient (4%) did not receive palliative radiotherapy because the area was previously irradiated to the maximum tolerable dose.

Discussion

The median age of the patients is 54 years and matches the median age of our PC population. The PC population in SA is generally younger than the median age (70 years) of PC patients in Western countries.^{10-11,16-17} Previous international reports have suggested that the referral of cancer patients by non-oncologists for palliative radiotherapy is suboptimal.¹⁸⁻²⁰ In the United States, an estimated 3% of hospice patients received radiotherapy in

TABLE 1 Patients' characteristics (n = 25)

Age (years)		
Mean	53.2	
Standard Deviation	12.3	
Median	54	
Range	29-74	
Primary cancer	n	%
Gastrointestinal	7	28
Breast	5	20
Head & neck	4	16
Genitourinary	3	12
Others	6	24
Total	25	100
Sex		
Male	13	52
Female	12	48
Total	25	100
Performance status		
ECOG*		
3	12	48
4	13	52
Total	25	100

* ECOG: Eastern Cooperative Oncology Group performance status (ranging from 0 = fully active to 5 = deceased).

TABLE 2 Indication of radiotherapy according to the sites irradiated

Site	Indication	n	%
Bone			
Lumbar spine	Pain (one patient had SCC*)	6	18.7
Thoracic spine	Pain	5	15.6
Cervical spine	Pain	2	6.3
Pelvis	Pain	6	18.7
Other bones	Pain	9	28.1
Brain	Brain metastasis	2	6.3
Others			
Oral cavity	Bleeding	2	6.3
	Total	32	100

* SCC: Spinal cord compression.

2002.²¹ Another North American study on a large group of Canadian patients who died with cancer had shown a significantly greater proportion of patients received palliative radiotherapy treatment (22.3%).²² Other researchers

TABLE 3 Dosage and fractionation pattern of radiotherapy

Radiotherapy dose (Gy)	Number of fractions	Number of patients	%
20	5	10	41.7
18	3	3	12.5
15	3	2	8.3
13	2-3	2	8.3
12	2	1	4.2
9	1	3	12.5
8	1	2	8.3
5	1	1	4.2
	Total	24	100

have reported on the rate of radiotherapy use in patients with specific cancers such as lung or colorectal.²³⁻²⁴

It is obviously difficult to compare referral rates of the various available reports due to the variations in methodologies and patient populations. Patients in their final few weeks of life, like those in our PCU, may be less expected to need a referral to radiotherapy in contrast to patients responding to therapy and whose life expectancy would probably be substantially longer. We did not come across any previous reports examining referral rates from a PCU to radiotherapy service located within the same health institution.

The literature suggests that underutilization of palliative radiotherapy in end-of-life care may be attributable to many factors including a lack of awareness among health professionals, financial constraints, waiting time, transportation difficulties and a short life expectancy.²⁵⁻²⁸ In our setting, we believe that PC health professionals are generally aware of the role of radiotherapy in palliation. In all, 96% of referrals (23/24) to RO were judged appropriate by RO specialists; although it may be validly argued that our data did not show evidence that all patients who may have benefited from radiotherapy were actually referred. Similarly, financial constraints, waiting time and transportation difficulties do not seem to explain the low referral rate, given that treatment in our setting is free of charge and that our radiotherapy facility and PCU are in the same institution. Referral to the RO service in our institution has generally been smooth and without significant delay in the process of consultation, planning, and treatment delivery. However, there seems to be a need for improvement, given a Canadian experience that had successfully demonstrated the feasibility of completing the whole process in the same day despite the fact that patients needed to receive radiotherapy outside the referring

hospital.²⁹ That being said, it is more likely that the short-life expectancy and poor performance status of patients in our PCU may possibly be the main reasons explaining our reported referral rate.

The RO service at KFSHRC-R has created its own filing system (separate from the hospital medical record) containing detailed radiation-treatment information for each patient as well as detailed demographic data including a photograph of the patient's face. The hospital medical record for a patient may or may not contain information on the radiotherapy delivered. This explains the fact that one referred patient in our sample did not receive radiation as the detailed RO record confirmed previous treatment to the same site using the maximum dosage. Although other researchers have reported that females and older persons who died with cancer were less likely to receive palliative radiotherapy, our small sample failed to show age or sex preponderance.²² Our findings are obviously in agreement with others who found that the most common indication for referral is painful bony metastasis.²¹

Conclusion

The small minority of patients in the PCU referred for radiotherapy were deemed appropriate by radiation oncologists despite their poor performance status and limited time remaining. In a PCU with similar admission criteria (ie, patients with advanced disease and all disease-modifying options have been exhausted), the availability of a radiotherapy facility in close proximity may be a privilege but not a necessity. This study has shown that PC physicians are very specific in their referrals to radiotherapy. Future research may need to determine whether the PC physicians are identifying and referring the majority of patients in the PCU who would benefit from a referral to the RO service. The list of educational seminars in our program for the coming academic year (2013) will include the role of radiotherapy in the palliation of symptoms.

References

- Sepúlveda C, Marlin A, Yoshida T, et al. Palliative Care: the World Health Organization's global perspective. *J Pain Symptom Manage*. 2002;24(2):91-96.
- Saunders C. The evolution of palliative care. *J R Soc Med*. 2001; 94(9):430-432.
- Bruera E, Neumann CM, Gagnon B, et al. Edmonton Regional Palliative Care Program: impact on patterns of terminal cancer care. *CMAJ*. 1999;161(3):290-293.
- Higginson IJ, Finlay I, Goodwin DM, et al. Do hospital-based palliative teams improve care for patients or families at the end of life? *J Pain Symptom Manage*. 2002;23(2):96-106.
- Jack B, Hillier V, Williams A, et al. Hospital based palliative care teams improve the insight of cancer patients into their disease. *Palliat Med*. 2004;18(1):46-52.
- Morrison RS, Maroney-Galin C, Kralovec PD, et al. The growth of palliative care programs in United States hospitals. *J Palliat Med*. 2005;8(6):1127-1134.
- Central department of statistics and information. Key indicators. Available at: <http://www.cdsi.gov.sa/english/>. Accessed June 16, 2012.
- Ministry of Health. Cancer incidence and survival report, Saudi Arabia. Riyadh: Ministry of Health, National Cancer Registry; 2007. Available at: www.scr.org.sa/reports/SCR2007.pdf. Accessed June 16, 2012.
- Oncology Centre Research Unit, King Faisal Specialist Hospital & Research Centre. Tumor Registry Annual Report 2010. Available at: <http://www.kfshrc.edu.sa/KFCCC/AnnualReports/2010%20Tumor%20Registry%20Annual%20Report.pdf>. Published December 2011. Accessed September 21, 2012.
- Al-Shahri MZ, Sroor MY, Alsirafy SA. The impact of implementing referral criteria on the pattern of referrals and admissions to a palliative care program in Saudi Arabia. *J Support Oncol*. 2010;8(2):78-81.
- Alsirafy SA, Hassan AA, Al-Shhari MZ. Hospitalization pattern in a hospital-based palliative care program: an example from Saudi Arabia. *Am J Hosp Palliat Med*. 2009;26(1):52-56.
- Lutz S, Korytko T, Nguyen J, et al. Palliative radiotherapy: when is it worth it and when is it not? *Cancer J*. 2010;16(5):473-482.
- Dennis K, Wong K, Zhang L, et al. Palliative radiotherapy for bone metastases in the last 3 months of life: worthwhile or futile? *Clin Oncol (R Coll Radiol)*. 2011;23(10):709-715.
- Meeuse JJ, van der Linden YM, van Tienhoven G, et al. Efficacy of radiotherapy for painful bone metastases during the last 12 weeks of life: results from the Dutch Bone Metastasis Study. *Cancer*. 2010; 116(11):2716-2725.
- Oken MM, Creech RH, Tormey DC, et al. Toxicity and response criteria of the Eastern Cooperative Oncology Group. *Am J Clin Oncol*. 1982;5(6):649-655.
- Astradsson E, Granath L, Heedman PA, et al. Cancer patients hospitalised for palliative reasons. Symptoms and needs presented at a university hospital. *Support Care Cancer*. 2001;9(2):97-102.
- Kuuppelomäki M, Lauri S. Cancer patients' reported experiences of suffering. *Cancer Nurs*. 1998;21(5):364-369.
- Samant RS, Fitzgibbon E, Meng J, et al. Family physicians' perspectives regarding palliative radiotherapy. *Radiother Oncol*. 2006; 78(1):101-106.
- McCloskey SA, Tao ML, Rose CM, et al. National survey of perspectives of palliative radiation therapy: role, barriers, and needs. *Cancer J*. 2007;13(2):130-137.
- Fairchild A, Ghosh S, Baker J. Patterns of referral and knowledge of palliative radiotherapy in Alberta. *Can Fam Physician*. 2012;58(2):e113-e122.
- Lutz S, Spence C, Chow E, et al. Survey on use of palliative radiotherapy in hospice care. *J Clin Oncol*. 2004;22(17):3581-3586.
- Lavergne MR, Johnston GM, Gao J, et al. Variation in the use of palliative radiotherapy at end of life: examining demographic, clinical, health service, and geographic factors in a population-based study. *Palliat Med*. 2011;25(2):101-110.
- Foroudi F, Tyldesley S, Barbera L, et al. An evidence-based estimate of the appropriate radiotherapy utilization rate for colorectal cancer. *Int J Radiat Oncol Biol Phys*. 2003;56(5):1295-1307.
- Barbera L, Zhang-Salmons J, Huang J, et al. Defining the need for radiotherapy for lung cancer in the general population: a criterion-based, benchmarking approach. *Med Care*. 2003;41(9):1074-1085.
- Fine PG. Palliative radiation therapy in end-of-life care: evidence-based utilization. *Am J Hosp Palliat Care*. 2002;19(3):166-170.
- Barnes EA, Parliament M, Hanson J, et al. Palliative radiotherapy for patients with bone metastases: survey of primary care physicians. *Radiother Oncol*. 2003;67(2):221-223.
- Samant RS, Fitzgibbon E, Meng J, et al. Barriers to palliative radiotherapy referral: a Canadian perspective. *Acta Oncol*. 2007; 46(5):659-663.
- Martin J, Bowden P, Stephens R, et al. Managing waiting time for radiotherapy: a single machine unit experience. *Australas Radiol*. 2005;49(6):480-484.
- de Sa E, Sinclair E, Mitera G, et al. Continued success of the rapid response radiotherapy program: a review of 2004-2008. *Support Care Cancer*. 2009;17(7):757-762.