Towards Active Use of Palliative Radiotherapy

in cancer treatment

Recommendations

Japanese Society for Radiation Oncology
Alliance for Cancer Treatment

Recommendations

Towards active use of palliative radiotherapy in cancer treatment

[Abstract]

Palliative radiotherapy, a type of cancer radiation therapy, aims to maintain and improve patient's QOL, including ① relieving cancer-specific pain and ② reducing the various symptoms that cancer causes.

・Palliative radiotherapy is effective in reducing and alleviating various symptoms associated with the progression of cancer, such as pain associated with bone metastasis, and it is desirable to spread and establish it not only from the viewpoint of improving the patient's QOL, but also from the viewpoint of effective utilization of medical resources. However, in our country, it is not sufficiently utilized compared with western countries, and the number of palliative radiotherapy cases is also small.

・Major factors why palliative radiotherapy is not prevalent include: ① inadequate coordination between medical institutions for diagnosis and treatment of bone metastases in the community; ② lack of a multi-professional coordination system for diagnosis and treatment of bone metastases in the hospital; ③ inadequate knowledge of palliative radiotherapy by general physicians involved in cancer treatment; ④ low number of radiation oncologists (specialists); and ⑤ poor opportunities for the public to obtain correct information on palliative radiotherapy.

・ In this paper, several measures are proposed so that palliative radiotherapy can be used more actively in the future. The three main areas are as follows:
(1)Strengthening collaboration among healthcare professionals (①strengthening collaboration in regional healthcare system and ② setting up a cancer board specializing in bone metastases).
(2)Training medical personnel such as physicians (improvement of awareness and understanding of medical professionals regarding palliative radiotherapy.)
(3)Proactive public enlightenment (educating the public in hospitals, providing information through the media and patient groups, school education)

・ We would like the stakeholders to refer to these specific measures and actively cooperate in order to utilize palliative radiotherapy further in our country.

(Introduction)

Radiotherapy has become one of the major treatments for cancer as well as surgery and anticancer drug therapy.[1] However, in our country, it is not sufficiently utilized in comparison with western countries.[2] In particular, palliative radiotherapy, which is used to relieve symptoms such as pain, has a very low level of awareness among not only patients but also healthcare professionals.

Palliative radiotherapy can be expected to improve patient's quality of life, including relieving pain caused by bone metastases and improving dyspnea caused by lung cancer. This also improves patient's activities of daily living (ADL) and reduces family burden. Thus, if palliative radiotherapy is actively utilized, it will not only be beneficial for patients and families, but will also help to reduce the increase in healthcare expenditures throughout the country and contribute to the efficient use of healthcare resources.[3] [4]

For this reason, in this paper, specific measures for the active utilization of palliative radiotherapy will be proposed, with particular emphasis on palliative radiotherapy for pain associated with bone metastasis, in order to summarize the current status and challenges of palliative radiotherapy.[5]

1. What is Palliative Radiotherapy -The Purpose and Extent of Therapy

Radiotherapy, one of the three major treatments for cancer, can be classified for its therapeutic purposes into two major types: (a) radical radiotherapy and (b) palliative

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[1] In recent years, new therapies, such as molecular targeted agents, have also emerged, and the strategies involved in cancer treatment have changed significantly, but radiotherapy, surgical therapy, and anticancer drug therapy have remained the key pillars of cancer treatment.

[2] The utilization rate of radiotherapy is considered to be 50-60% in Europe and the United States, whereas it is only half that in Japan, which is less than 30%. And the growth of the patient number of the radiotherapy utilization is low, when it is compared with the increase rate of the whole cancer patient in our country in recent years.

[3] Bone metastases, which can occur in any type of cancer, markedly reduce the patient's QOL, including causing pain and symptoms such as fractures, paralysis, and hypercalcemia.

[4] Abbreviation of Activities of Daily Living. It refers to basic activities essential for daily life, such as eating, dressing, transferring, excreting, and bathing.

[5] Although significant progress has been made in the treatment of cancer in the field of radical irradiation in recent years with high-precision radiotherapy, palliative irradiation, which is addressed in this paper, has also been able to contribute significantly to reducing distress and improving QOL in cancer patients, and further expansion is expected in the future.

radiotherapy.

(a)Radical radiotherapy, like its name, aims to cure cancer (or long-term survival of patients) and often delivers large doses of radiation to the affected area to kill the cancer.

On the other hand, (b) palliative radiotherapy is mainly aimed at ① relieving pain caused by cancer itself and ② maintaining and improving patient' s QOL, such as reducing various symptoms caused by cancer (table below). These palliative treatments have also greatly helped to make patients more susceptible to continuing their primary cancer treatment (radical radiotherapy, anticancer drug administration, etc.) and have been widely utilized throughout the course of treatment.

	Therapeutic purposes
(a)Radical radiotherapy	Cure of cancer, long-term survival of patients
(b)Palliative radiotherapy	To maintain and improve QOL in reducing pain and other distress due to cancer progression

Specifically, palliative radiotherapy is used in a variety of ways to improve symptoms such as difficulties to breathe or swallow food, as well as to reduce pain and numbness (table below).

Main symptoms	Major causes and sites (e.g.,)
Pain and fracture	Bone metastasis
Numbness, paralysis, and difficulty walking	Spinal cord compression associated with bone metastases
Dyspnea	Airway stenosis and obstruction caused by lung cancer
Difficulty swallowing	Passage disturbance due to esophageal cancer
Visual acuity reduced	Optic nerve compression of periocular tumors
Headache, dizziness, nausea, etc.	Brain metastases
Superior vena cava syndrome	Lung cancer
Hemorrhage	Gastrointestinal cancer Cutaneous metastasis and invasion

Among the palliative treatments for cancer pain listed above, the most common is for pain associated with bone metastases (painful bone metastases). The outcome is about 70 percent for pain relief and about 30 percent for pain disappearance, and there is considerably

favorable results for painful bone metastases.[6]

Palliative radiotherapy delivers radiation that is minimally needed to reduce symptoms (rather than eradication of cancer). Therefore, compared with radical radiotherapy, it is characterized by shorter treatment duration and fewer side effects, and in some cases re-irradiation to the same site is possible.[7]

In recent years, attempts have also been made to use stereotactic body radiotherapy (SBRT), a highly accurate radiotherapy, for palliative therapy, and accumulation of future evidence is desirable.

2. Challenges for the Use of Palliative Radiotherapy

The effectiveness and usefulness of palliative radiotherapy are well known among radiotherapy specialists, but at present, palliative radiotherapy is not sufficiently utilized in the treatment of cancer, and the number of procedures is never large.

Various reasons for this lack of widespread use of palliative radiotherapy include: ① inadequate referral system among medical institutions for diagnosis and treatment of bone metastases, etc. in the region; ② lack of a multi-professional coordination system for diagnosis and treatment of bone metastases, etc. in the hospital; ③ insufficient knowledge of palliative radiotherapy by general physicians involved in cancer treatment; ④ low number of radiation oncologist (specialists); and ⑤ poor opportunities for the public to obtain correct information on palliative radiotherapy.[8] [9]

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[6] Rich SE, Chow R, Raman S, Liang Zeng K, Lutz S, Lam H, Silva MF, Chow E. Update of the systematic review of palliative radiation therapy fractionation for bone metastases. Radiother Oncol. 2018 Mar;126(3):547-557.

[7] In recent years, studies and considerations have been conducted to reduce the number of palliative radiotherapy to a greater extent, and the number of patients receiving only a single dose has also increased. For example, the World Health Organization (WHO) strongly recommends single-fraction radiation therapy for pain relief in bone metastases, but it has been reported that a single dose of 8Gy is equally effective compared with multiple doses of 10 doses of 3Gy (gray) (30Gy in total).

[8] In addition to the lack of knowledge of patients and physicians other than radiation oncologists, there are indications of lack of human resources and the uneven distribution of radiotherapy equipment.

[9] The "Basic Plan for the Promotion of Third Stage Cancer Control" was decided by the Cabinet Council on March 9, 2018 (https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000183313.html) to

(1) Inadequate referral system among medical institutions for diagnosis and treatment of bone metastases in the region

Even though curative treatments are delivered in the main department, the cancer may recur and metastasize many years later. Thus, it is of great importance to develop a referral system of local medical institutions for cancer treatment and palliative radiotherapy.[10] [11]

For example, it is desirable to be able to request timely from the primary care physician to designated cancer centers in the regions, when pain possibly caused by bone metastasis occurs. Especially, in the case of spinal cord compression by bone metastasis, early detection and early treatment are crucial, and there are not a few cases in which emergency irradiation is required.[12]

If medical institutions in the region have a good "face-to-face relations" with which they may gently consult on a day-to-day basis, it is easier to use radiotherapy equipment in the outpatients of other hospitals and so on, so radiotherapy including palliative radiotherapy can be performed in a flexible manner in the region.[13]

In order for such diagnosis and treatment including the palliative radiotherapy to be appropriately carried out in the region, it becomes important that the system where

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address issues such as the need for further dissemination of knowledge on palliative radiotherapy.

In addition, as one of the ″Comprehensive Research Project for the Promotion of Cancer Control″ based on the plan, ″Research for the Evaluation and Dissemination of Palliative Radiotherapy in Cancer Treatment″ (Japanese Society of Radiation Oncology・Shigematsu group, for 3 years since 2019) has been also conducted.
(https://www.mhlw.go.jp/seisakunitsuite/bunya/hokabunya/kenkyujigyou/hojokin-koubo-2020/gaiyo/05.html)).

[10] In terms of local healthcare delivery systems, there are wide variations in healthcare professionals, medical institutions and facilities. However, in recent years, various efforts have accelerated to develop regional healthcare concepts (measures for functional differentiation and referral system of hospital beds) and regional comprehensive care systems (cooperation to ensure comprehensive medical care, nursing care, prevention, housing, and living support in the daily life area).

[11] There has also been a movement toward strengthening regional cooperation regarding cancer treatment abroad. In the United Kingdom, for example, community family physicians have enhanced collaboration and improved quality of care by acting as contacts and mediators with cancer treatment specialists and institutions.

[12] In metropolitan areas, the primary medical area is assumed, and in non-metropolitan areas, the second medical area is assumed.

[13] In medical institutions in the same region, activities such as study groups and interaction groups provide valuable opportunities for collaboration. After the pandemic coronavirus has converged, it is hoped that such exchange opportunities will be increased again.

information is easily shared among the multi-professionals from the member medical institutions (① development of consultation and cooperation means, ② sharing of electronic medical record, ③ online medical care, and ④ securing of transfer means, etc.)

(2) There is no multi-professional coordination system in hospital for diagnosis and treatment of bone metastases, etc.

In the treatment of bone metastasis, appropriate consultation and operation in multiple medical departments are required, including original cancer treatment, surgery and administration of bone modifying drugs, and rehabilitation, including embolization and narcotic use. In addition, because the main department alone may not be able to be aware of the treatment options of palliative radiotherapy, it is desirable to decide the treatment plan through a "cancer board specializing in bone metastases" in which many departments and professions, such as radiologists, palliative care physicians, and orthopedic surgeons, participate. Then, it is necessary to extensively examine whether drug therapy, radiotherapy, surgical therapy are appropriate. The ability of radiation oncologists to engage in treatment decision making from an early stage through a cancer board allows them to provide palliative radiotherapy with more appropriate timing.

However, such a " cancer board specializing in bone metastases " is set up only about 10% even at the designated cancer control hospitals at present. The main reasons for not having a cancer board specializing in bone metastases in the hospital are; ① being busy in duty and lack of time and manpower, and ② less interest in bone metastasis.[14]

(3) Inadequate knowledge of palliative radiotherapy among general physicians involved in cancer treatment

It is also a challenge that general physicians (other than radiation oncologists) who treat cancer often do not have adequate expertise in radiation therapy, especially palliative radiotherapy.[15]

In our country, radiation oncologists are rarely the primary physicians of cancer patients, and according to the site (primary site) where the cancer is first detected, physicians belonging to medical departments (primary departments) such as internal medicine and

[14] Based on a questionnaire (2016) conducted for 332 designated cancer control hospitals, out of 407, where full-time radiation oncologists work. Of the 136 centers that responded, only 18 (13% of respondents) had a cancer board specializing in bone metastases.

[15] The medical professionals such as nurses are also educated mainly on the side effects rather than on the effects of radiotherapy.

surgery are usually the primary physicians.

Then, the treatment and control for radical cure of cancer are mainly carried out by the attending physician, and the drug therapy is often carried out by the attending physician in the case of the metastasis to other organs. If bone metastases occur, the attending physician will see the patient. However, if the physician is not necessarily an expert in the field, it is uncommon to refer the patient at the stage where radiotherapy is required. It is not uncommon that by the time the patient comes to consult with the radiotherapy department, his/her stage is no longer indication for radiotherapy. [16] [17]

It is necessary for physicians in each department to increase their knowledge and understanding of bone metastases and palliative radiotherapy in the future so that analgesic drug treatment (opioids, etc.) and palliative radiotherapy are one of the first options for pain relief.

(4) Shortage of radiation oncologists (specialists)

In order to increase the utilization of palliative radiotherapy, it is necessary that there are many radiation oncologists with expertise and experience who can carry out it appropriately. However, there is a shortage of such specialists in Japan. There are approximately 850 radiotherapy facilities nationwide, but 1,334 are registered as radiation oncologists (1.06 per 0.1 million population), which is a small number for the number of hospitals (as of September 2020).[18]

Thus, there is a chronic shortage of radiation oncologists, and many institutions have only

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[16] Radiation oncologists usually provide treatment based on requests from other departments, making it difficult for radiation oncologists to make early suggestions about the patient's condition and the need for treatment. It is also said that there is considerable variation in the clinical practice guidelines for "radiotherapy for bone metastases" of each academic society, which raises the hurdle more than necessary for the main department to proceed with radiotherapy.

[17] Bone metastases are not painful (asymptomatic) at the time of initial diagnosis and are often followed up at the discretion of the attending physician. On the other hand, despite the appearance of symptoms such as pain due to spinal cord compression, there are many cases in which patients are not referred to the radiotherapy department and the appropriate timing of treatment is missed. Proper diagnosis and determination of indications for treatment by experts are very important for patients to obtain appropriate timing of palliative radiotherapy.

[18] Even in comparison with western developed countries, the number of radiotherapy specialists is considerably lower. e.g., 5338 in the United States (1.64 per 0.1 million) (https://www.sciencedirect.com/science/article/abs/pii/S1879850020301053)

one specialist (so-called "single physician head") in the radiation oncology departments at their hospital. There are also “blank zones” where no radiation oncologists are located at all in the region or neighborhood, such as east part of Hokkaido, or Okinawa, where there are many remote islands.[19]

(5) Poor opportunities for the public to obtain correct information about palliative radiotherapy

In cancer treatment, radiotherapy is often not informed as an option by the discretion of the attending physician because the attending physician (the department) decides on the treatment. However, it is important for patients to raise awareness in advance in order to be able to recognize the symptom of the bone marrow compression, etc. which is the indication for palliative radiotherapy and to seek medical examination.

The lack of opportunities for the public to obtain correct information about radiotherapy also hampers the widespread use of palliative radiotherapy. In Japan, in addition to the fact that patients tend to have a negative image of radiotherapy including palliative radiotherapy, due to the effects of the atomic bomb and nuclear power plant accident, the effectiveness of radiotherapy for cancer has not been touched on much even in schooling.

3. Recommendations-Toward active use of palliative radiotherapy

As previously mentioned, palliative radiotherapy is one of the effective and useful therapies for improving QOL in cancer patients, and it is desirable to be utilized more proactively.[20]

In the following, specific measures for the active use of future palliative radiotherapy will be presented as three important issues, including (1) strengthening collaboration among healthcare professionals, (2) developing medical personnel, (3) enlightening and publicizing the public, and (4) others.

We would like the stakeholders to refer to these specific measures and actively cooperate for the further prevalence of palliative radiotherapy .

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[19] In these areas, for example, in order to receive postoperative radiotherapy for breast-conserving therapy, patients have to visit hospitals in Tokyo or elsewhere far from their places.

[20] If palliative radiotherapy becomes more popular, healthcare costs and resources may be used more effectively and efficiently, such as reducing the use of analgesics such as opioids. In addition, if cooperation of medical institutions is advanced and palliative radiotherapy is provided in the region, the work environment of patients and families will improve, and thus the environment such as geriatric caring and child rearing will have a favorable effect.

(1) Strengthening collaboration among healthcare professionals

① Strengthening referral system in regional healthcare

The smooth referral with the radiotherapy facilities becomes especially important for the palliative radiotherapy to be actively utilized in regional medical treatment and home medical treatment. Appropriate visits and treatment should be made easier by reducing administrative costs for liaison and coordination among healthcare professionals and the physical, psychological, and financial burden on patients during transfers.[21]

[Recommendation 1-1] Additional reimbursement fee for Palliative Radiotherapy Patient's Referral

Considering the administrative burden of the referring medical institution, it is desirable that " Additional reimbursement fee for referral" is created. So patients can be transferred more smoothly or treated at other hospitals.[22]

Enhanced collaboration within these areas not only offers advantages to home doctors and facilities that do not have radiotherapy equipment, but also allows more patients from outside facilities for the facilities that have radiotherapy equipment, resulting in the effective use of medical devices such as radiotherapy equipment.

[Recommendation 1-2] Additional reimbursement fee of Palliative Radiotherapy for Pain Relief in Home-Based Palliative Care

Though " Clinic for Enhanced Home Palliative Care and Clinic and Hospital Additional fee" becomes very large incentive for the palliative care improvement, the current medical reimbursement is framed with "nursing care" and " pharmacotherapy" as pillars. For this reason, pharmacotherapy is mainly used to relieve pain. However, it is desirable to add items related to cooperation with radiotherapy and its outcome to the calculation requirement of "Clinic for Enhanced Home Palliative Care and Clinic and Hospital Additional fee" with a broader target for the point addition.

② Multidisciplinary collaboration within hospitals

[21] The introduction of a mechanism to resolve barriers to accessing radiotherapy facilities, such as① reducing cost burden during patient transfer, ② online consultation with referring medical institutions, ③ visiting practices by referring physicians, will lead to the promotion of appropriate visits.

[22] In case that there is no hospital bed of the radiation oncology department in the referring medical institution, and radiotherapy is carried out in the form that the radiation oncology department treat jointly by taking the hospitalization in the organ-specific medical department, the hurdle of the radiotherapy hospitalization gets higher.

For the active use of palliative radiotherapy in the hospital, the promotion of the cooperation between radiation oncologists and other medical doctors becomes important. It is effective to develop an environment where it is easy for hospitals to set up a cancer board specializing in bone metastases so that multi-professional cooperation on palliative radiotherapy can be advanced.

[Recommendation 1-3] Enlightenment to hospitals for the establishment of a cancer board specializing in bone metastases.

For the prevalence of a cancer board specializing in bone metastases, it is essential that academic societies, authorities, and medical professionals cooperate first to actively promote awareness-raising to hospitals.

[Recommendation 1-4] Additional reimbursement when cancer board specializing in bone metastases is placed in the hospital

Many designated cancer control hospitals have less cancer boards specializing in bone metastases, as previously described, for reasons of ① being busy in duty, lack of time and manpower, and ② less interest in bone metastases. It is desirable to incorporate "establishment and periodic holding of cancer boards specializing in bone metastases by multiple professionals" in the condition of the evaluation on the medical reimbursement, and to make clear incentives for the establishment in the hospital.

(2) Training of medical personnel

① Improve awareness and understanding of healthcare professionals regarding palliative radiotherapy

For physicians involved in cancer treatment, knowledge of radiotherapy is essential, regardless of the specialty department. Therefore, it is necessary to provide continuous training and information on palliative radiotherapy to clinicians first of all.

[Recommendation 2-1] Obligating the Item of Palliative Radiotherapy in Palliative Care Training Sessions

Since physicians involved in cancer treatment are required to participate in a palliative care training session at designated cancer control hospitals, making the subject of palliative radiotherapy essential in this training would be effective to improve awareness and understanding of palliative radiotherapy.

Recently, the basic lectures of the training are carried out in e-learning, and since the item is already prepared as a selection item, it is easy to add it as an essential subject, and early realization is also considered to be realistic.

[Recommendation 2-2] Reference to Single-Dose Delivery of Palliative Irradiation in Palliative Care Training Session

From the point of view of supporting both employment and treatment of cancer patients, it is desirable that single-fraction irradiation, which significantly reduces the number of hospital visits, becomes a more common therapy. Among the subjects of "palliative radiotherapy" in the above training session, it is desirable to address the significance and merit [23] of "single dose irradiation" in particular.

② Improving Radiotherapy Related Education for Medical Students and Residents

Further development of radiation oncologists is also mandatory for palliative radiotherapy to be widely utilized. Therefore, the review of the educational course in the medical school becomes also important.

As some physicians say, "When I was a student, I didn't know much about bone metastases, which I address a lot today," more clinically relevant education may also be needed to help physicians.

[Recommendation 2-3] Enhancement of Radiotherapy Course in Medical School Education

In the current medical schooling, the lecture and practical training on "radiotherapy" are not sufficient to meet clinical needs, so it is necessary to improve the education of the radiotherapy treatment.

[Recommendation 2-4] Increase in the Proportion of Radiotherapy Subjects in the Physician National Examination

Despite the fact that it has become a significant interest of the public to advance appropriate cancer treatment and radiotherapy in our country, the questions related to

[23] In addition to securing the patient's employment, the reduction of family burden associated with transportation and attendance, and the response to patients with a short life prognosis, etc.

radiotherapy accounts for only below 0.5% in the Physician National Examination. And the content of the questions is mainly on the side effect of radiotherapy, and it becomes that it does not meet clinical needs.

The number and content of national examinations affect student's interest. It is expected that increasing the ratio of RT-related questions will allow many medical students to learn better about the field of radiotherapy.

[Recommendation 2-5] Enhanced participation of residents in a cancer board specializing in bone metastases

Efforts are needed to incorporate the participation in a cancer board specializing in bone metastases into clinical residency curricula to enable residents to understand and increase their interest in the role of radiotherapy and radiation oncologists for bone metastases.

(3) Education and public relations for citizens

The public's understanding of the effectiveness and usefulness of radiotherapy and palliative radiotherapy is also not understood well yet. It is very important for the public to be familiar with radiotherapy, especially palliative radiotherapy, so that they can be accepted as one of the treatment options for cancer patients and their families.

[Recommendation 3-1] Enlightenment and publicity regarding radiotherapy and palliative radiotherapy in the hospital

For example, it is said that the importance of early treatment for spinal cord compression associated with bone metastases is not widely known even among cancer patients. To begin with, it is desirable to carry out the appropriate enlightenment for patients in the hospital.

Although some institutions are actively disseminating information, such as placing unique educational posters created on their own in the hospital, there are limitations in institution-based efforts, thus some nationwide actions are required. It is desirable to collaborate with academic societies and other organizations to develop favorable cases related to awareness and publicity nationwide in cooperation with local cancer councils and municipalities.

[Recommendation 3-2] Enlightenment and publicity regarding radiotherapy and palliative radiotherapy through the media

As the public's interest in healthcare-related articles, especially cancer-related articles is high, it will be fairly effective to continue proactive awareness and dissemination through the media (including the SNS.)

For this purpose, it is important to have major media, medical-specialty media, and medical journalists correctly understand the effectiveness and usefulness of radiotherapy and palliative radiotherapy through seminars and workshops.

[Recommendation 3-3] Enlightenment and publicity through patient and support organizations

In recent years, a large number of cancer patient organizations, support organizations, and joint organizations (such as the National Federation of Cancer Patient Associations and the NPO Cancer Support Community) have been established, and they are actively enlightening and disseminating information to patients. It is desirable that healthcare professionals involved in cancer treatment cooperate more with such organizations to actively raise awareness and disseminate information.

[Recommendation 3-4] Proactive enlightenment of radiotherapy in schooling

In elementary schools and junior high schools, efforts such as cancer education and education of life are becoming more common. In this context, the opportunity to touch on the correct knowledge about radiotherapy should be actively increased.

4. Conclusions

Palliative radiotherapy has a great significance from the viewpoint of effective utilization of medical resources, as well as reduction and relief of various symptoms associated with the progression of cancer, such as pain associated with bone metastasis, and improvement of the patient's QOL, and is desirable for further utilization and establishment.

However, it is not sufficiently utilized in our country. In addition to healthcare professionals and related societies, those involved, including administrative authorities and press agencies, should refer to the recommendations mentioned in this paper, including specific measures, and should actively cooperate with each other in order to further utilize palliative radiotherapy in our country.

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Towards active use of palliative radiation in cancer radiotherapy
Jan. 2022
Published by
Japanese Society for Radiation Oncology
Alliance for Cancer Treatment