Annual use of WBRT decreased from 27.8% in 2010 to 23.5% in 2015, whereas annual use of SRS increased from 8.7% in 2010 to 17.9% in 2015. The most common WBRT dose-fractions were 30 Gy/10 fx (56.8%), 37.5 Gy/15 fx (15.5%), and 35 Gy/14 fx (11.0%). 1020 (4.2%), 22356 (92.1%), and 886 (3.7%) received SSBRT, SSSBRT, and ExSBRT, respectively. SSBRT was the most frequently used fractionation for all primary sites. There was a significant reduction in use of ExSBRT (slope = -22.4%/yr, R² = 0.97, p<0.01) between 2010-2015. No significant trends were identified for use of SSBRT or SSSBRT. On multivariate analysis, factors associated with significantly higher usage of SSBRT were no chemotherapy receipt (OR 3.5, 95% CI 3.1-4.1, p<0.01), Medicaid compared to private insurance (OR 1.4, 95% CI 1.1-1.8, p<0.01), and treatment at academic centers (OR 1.3, 95% CI 1.1-1.6, p<0.01). On multivariate analysis, factors associated with significantly higher usage of ExSBRT were chemotherapy receipt (OR 1.2, 95% CI 1.0-1.4, p=0.03) and treatment at comprehensive community cancer centers (OR 1.7, 95% CI 1.4-2.0, p<0.01).

**Conclusion:** WBRT utilization to treat BM at diagnosis in the U.S. has decreased, especially >15 fx regimens. Choosing Wisely’s recommendation in Sept 2014 to not add WBRT to SRS may have influenced the observed trends. WBRT in 10-15 fx was the most common regimen for all primary tumors analyzed. WBRT in <10 fx was used much more frequently in those who did not receive chemotherapy, likely due to poor performance status.


### 3333

**Assessment of National Patterns of Practice for Postoperative Radiation Therapy in Patients with Long Bone Metastases**

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**Purpose/Objective(s):** Although postoperative radiation therapy (RT) (PORT) for patients with long bone metastases has become common, reliable evidence is lacking. The optimal dose fractionation and irradiation field of PORT are unknown. This study aimed to characterize current patterns of practice regarding PORT and factors that affect dose fractionation.

### Materials/Methods:

Members of the Japanese Radiation Oncology Study Group (JROSG) completed an internet-based survey. The survey was composed of questions to determine the prescription of various dose fractions in each institution in 2017, describe dose fractionations in four hypothetical cases in which patients were treated with PORT for impending pathological fractures in a lower limb, and indicate irradiation fields each member would prefer. Case 1 was a patient with limited prognosis of non-small-cell lung cancer. Case 2 was a patient with a single oligometastasis. Case 3 was identical to case 1, except for the presence of a radio-resistant primary tumor, renal cell carcinoma. Case 4 was a patient with breast cancer with expected long-term prognosis. Radiation oncologists who recommended long-course RT in case 1 were asked to explain why they considered long-course RT over short-course RT (i.e., 8 Gy in 1 fraction or 20 Gy in 5 fractions).

**Results:** In total, 89 radiation oncologists from 68 institutions (50% of JROSG institutions) responded. Of the patients treated at these institutions, 151 were eligible for this study, except for 1 patient with an unknown prescribed dose fractionation. Among 22 different dose fractionations prescribed, the most common was 30 Gy in 10 fractions (n=75; 50%), followed by 20 Gy in 5 fractions (n=29; 19%). In all the hypothetical cases, the commonest prescribed regimen was 30 Gy in 10 fractions. For case 1, short-course RT (i.e., 8 Gy in 1 fraction or 20 Gy in 5 fractions) was preferred by 20% of the respondents (n=18). The following factors were most often cited as reasons for preferring long-course RT (i.e., >20 Gy in 5 fractions): “local control” (54%), “incidence of re-irradiation” (34%), and “time until first increase in pain” (19%). Zero percent of the respondents for case 2, 8% for case 3, and 5% for case 4 prescribed short-course RT. Fractionated dose regimens of >30 Gy in 10 fractions were preferred in patients with oligometastasis (53%) compared to those with radio-resistant tumors (34%) and those with expected long-term prognosis (25%). For the irradiation field, 74% (n=66) of respondents recommended involvement of “the entire orthopedic prosthesis” for PORT.

**Conclusion:** For PORT of long bone metastases, 30 Gy in 10 fractions for the entire orthopedic prosthesis is preferred currently in Japan. Higher dose regimens are preferred for patients with oligometastasis. Our results will guide the designing future clinical trials or research for bone metastases.


### 3334

**The Use of Complementary and Integrative Therapies as Adjunct Interventions During Radiotherapy for Patients with Cancer: A Systematic Review**

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**Purpose/Objective(s):** Integrative oncology encompasses the use of patient-centered, evidence-informed complementary and integrative medicine (CIM) therapies in combination with conventional cancer treatment. CIM therapies include interventions such as acupuncture, natural products, and mind-body therapies that are not part of standard medical practice. Patients are increasingly using CIM as an adjunct to treatment to prevent and/or alleviate radiotherapy-induced toxicities. However, little is known about the feasibility and efficacy of CIM administration in the clinical setting as concurrent interventions alongside radiotherapy. This study aims to review the available evidence on CIM used with radiotherapy in order to inform clinicians, identify gaps in the literature, and guide further research.

**Materials/Methods:** A review was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)
guidelines. Predefined search terms and Medical Subject Headings were used to search PubMed and in-press articles. References of relevant review articles were examined. Articles were included if they met the following criteria: the study was interventional, CIM therapy was for human patients with cancer, and CIM therapy was administered concurrently with radiotherapy. Studies were limited to those published in English on or after 12/1/1991.

Results: Of 2,337 articles identified on initial search, 172 met inclusion criteria. Articles published per year increased over time (p < 0.001). The most frequently identified therapies were biologically based therapies (natural products, diet-based therapies; 48.8%), mind-body therapies (meditation, mindfulness, yoga; 22.7%), alternative medical systems (acupuncture, traditional Chinese medicine; 14.0 %), sensory therapies (music, dance, and art therapy; 11.6 %), and manipulative/body based therapies (massage, reflexology; 2.3%). The most frequently identified disease sites for radiotherapy were breast (34.9%), head and neck (29.7%), gynecologic (19.2%), prostate (14.5%), and lung (14.0%). Of the 134 randomized controlled trials identified, 99 (73.4%) demonstrated a benefit with CIM as compared to control. No studies showed worsening outcomes. Commonly encountered outcomes and their respective rates of benefit include anxiety (n = 20, 55.0%), quality of life (n = 19, 73.7%), mucositis (n = 17, 82.4%), enteritis (n = 16, 68.8%), and dermatitis (n = 12, 41.7%).

Conclusion: Concurrent CIM implementation with radiotherapy is demonstrated to be feasible. Additionally, this review indicates that CIM may reduce radiotherapy-induced toxicities and improve overall quality of life, suggesting a role for physicians in discussing CIM with patients receiving radiotherapy. Many studies were of small size and lacked statistically significant findings, suggesting the need for further research on CIM and its role in conjunction with radiotherapy.


3336 Patterns of Palliative Care Consultation Among Patients with Brain Metastasis: An Opportunity for Radiation Oncologists to Facilitate Earlier Referral

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Purpose/Objective(s): Since 2012, early palliative care (PC) physician involvement alongside standard oncologic care has been recommended by ASCO guidelines for all advanced cancer patients with limited left expectancy less than 24 months. However, for many reasons adherence to these guidelines is variable. Although radiation oncologists (ROs) are usually less involved in the daily management of metastatic patients than are medical oncologists (MOs), ROs could facilitate early PC referral for patients treated with palliative radiation. This may be particularly valuable in patients with brain metastases (BRMs), which are often associated with short life expectancy and significant morbidity. Our hypothesis is that early PC is underutilized, and the primary objective of this study was to evaluate the circumstances of PC referral at our institution, in order to better understand the need for improved multidisciplinary approaches to facilitate it.

Materials/Methods: The charts of all patients diagnosed with BRMs from non-small cell lung cancer (NSCLC) from 2012 – 2018 whose primary RO and MO were at WVU were reviewed. The Kaplan-Meier method was used to determine time to PC consultation and survival. Subgroup analyses used the log-rank, Mann-Whitney U, and Chi-Squared tests.

Results: A total of 110 eligible patients treated by 6 MOs, 5 ROs, and 3 neurosurgeons were evaluated. Only 56 patients (51%) underwent a PC consultation in their lifetime, with the initial evaluation being as an outpatient for 22 (39%), inpatient for 34 (61%), and within 1 month of death for 16 (29%). Median survival from BRMs diagnosis was 8.7 (interquartile range [IQR] 3.7 - 22.4) months. The median time from BRMs diagnosis to initial PC consultation was 2.3 (IQR 0.5 - 8.9) months and from initial PC consultation to death was 1.8 (IQR 0.7 - 6.7) months. The 35 patients whose BRMs were initially treated with whole brain radiation had a significantly shorter median survival than the 75 patients initially treated with radiosurgery (4.6 vs. 9.6 months, respectively, p < 0.01), and similarly a shorter median time to initial PC consultation (1.2 vs. 4.3 months, respectively, p < 0.01). The 35 patients initially treated for BRMs from 2016 - 2018 were significantly more likely to have a PC consultation than the 75 patients of initially treated for BRMs from 2012 - 2015 (63% vs. 45%, respectively, p < 0.01), and also had a significantly shorter median time to initial PC consultation (0.9 vs. 6.0 months, respectively, p < 0.01).

Conclusion: Early PC referral for patients with BRMs at our institution is increasingly utilized, but still uncommon despite the involvement of multiple different providers and current ASCO consensus guidelines.