

Surrey, BC, Canada, <sup>2</sup>University of British Columbia, BC Cancer Vancouver Centre, Vancouver, BC, Canada, <sup>3</sup>British Columbia Cancer Agency, Prince George Cancer Centre, Prince George, Vancouver, BC, Canada

**Purpose/Objective(s):** Stereotactic ablative radiotherapy (SABR) for the treatment of oligometastases is being investigated in ongoing prospective studies, with available phase II data suggesting favorable outcomes. However, there is little data regarding the use of SABR for oligometastatic lymph nodes (LNs). The objectives of the study are to report the demographics, toxicity and outcomes of all patients treated provincially with SABR to oligometastatic LNs.

**Materials/Methods:** We conducted an analysis of all patients who underwent SABR to oligometastatic LNs in our provincial program, from 2013 to 2017. Some of the patients were treated on clinical trials, and data was prospectively collected. For the remaining majority of the patients, baseline patient, tumor, treatment and clinical outcome data were collected through retrospective review. Local control (LC), progression-free survival (PFS) and overall survival (OS) were analyzed by Kaplan-Meier method. Cox regression analysis was used to identify predictors of outcomes.

**Results:** Twenty-four patients underwent SABR to 35 LNs (median 1 and mean 1.5 LNs per patient). The primary sites were colorectal 8 (22.9%), kidney 6 (17.1%), esophagus 4 (11.4%), gallbladder 4 (11.4%), stomach 3 (8.6%), lung 3 (8.6%), skin 2 (5.7%), pancreas 2 (5.7%), liver 1 (2.9%), duodenum 1 (2.9%), and unknown origin 1 (2.9%). Four (11.4%) LNs were in the neck / supraclavicular regions, 14 (40.0%) in the hilum / mediastinum and 17 (48.6%) in the abdomen / pelvis. All patients had treated and controlled primary sites at the time of SABR. The median follow-up post-SABR was 31.7 months. The SABR dose fractionation ranged between 30-60 Gy in 5-10 fractions, with median BED<sub>10</sub> of 72 Gy (range 41.3-105 Gy). All patients were treated with VMAT technique, with 4DCT and respiratory gating used for motion management in 19 (54.3%) cases. The 1- and 3-year LC were 85.4% and 62.7%. The median PFS was 7.6 months, with 1-year PFS at 25.7% and 3-year at 18.4%. The median OS was 45.0 months, with 1-year OS at 91.3% and 3-year at 55.7%. Thirteen (54.2%) patients initiated systemic therapy after SABR, at a median time for these patients of 10.0 months following completion of SABR. The median systemic therapy-free survival (STFS) for all patients after SABR was 17.8 months. There was no grade 3-5 toxicity as per CTCAE V5 criteria. On multivariate analysis, younger age (p=0.019) and female gender (p=0.046) were found to be factors predictive of improved OS.

**Conclusion:** SABR to oligometastatic LNs achieves meaningful STFS, without significant toxicity. While the treatment yields moderate rates of long-term LC, the PFS was limited in this cohort. Further evaluation of patient and tumor selection is warranted.

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### 3329

#### Acute Palliation of Intrathoracic Symptoms: No Improvement with Dose-Escalated Hypofractionated External Beam Radiotherapy



T. Fares, A. Machado, M.L.G. Silva, D.G. Castro, G.R.M. Gondim, T.M. Coelho, H. Ramos, R.C. Fogaroli, C. Pellizzon, and M.J. Chen;  
AC Camargo Cancer Center, Sao Paulo, Brazil

**Purpose/Objective(s):** Primary or metastatic malignant disease is a known cause of intrathoracic symptoms in oncologic patients and, frequently, obstruction of the bronchial tree may lead to dyspnea and/or hemoptysis. Local external beam radiotherapy (EBRT) can be an option to palliate such symptoms, even in spite of its low efficiency rate. We hypothesized that dose escalation could be safely delivered and further improve symptoms relief rates in patients who did not respond to an initial course of hypofractionated EBRT.

**Materials/Methods:** A prospective, single arm, uni-institutional study was conducted, and eligible patients were offered a course of local hypofractionated EBRT, with 2 weekly fractions of 8 Gy, and an additional fraction of 8 Gy, if there were no symptoms improvement, one week apart. Study primary endpoint was to assess the rate of acute palliation of intrathoracic symptoms

(hemoptysis resolution and/or dyspnea improvement, measured by the Modified Medical Research Council [mMRC] Dyspnea Scale). Secondary endpoints included the assessment of any possible treatment side-effects and late symptom improvement. Patients were clinically evaluated before every EBRT session, and if there was no clinical improvement after the second and immediately before the third session, the patient was recommended to continue the proposed treatment, to a total dose of 24 Gy. After that, follow-up was performed on a regular basis, to evaluate any possible treatment sub-acute or late side-effects or symptom improvement.

**Results:** After ERB approval, on September 2017, 8 eligible patients (5 males and 3 females) were initially enrolled, until interim analyses, on August 2018, when investigators decided to close accrual due to poor response to the treatment protocol. Median age of the patients was 51.5 years (39 - 72), all of them with metastatic disease and 5 of them (62.5 %) with a non-pulmonary primary malignancy. All of the patients presented with dyspnea, and 2 (25 %) of them also with hemoptysis, and, according to mMRC Dyspnea Scale, 6 patients (75 %) had a grade 3 or higher dyspnea symptom. Overall, 5 of the patients demanded a third session, but one patient died from disease progression before the second and one before the third session. After the completion of the treatment protocol, 4 patients had any acute dyspnea improvement and both the patients who presented with hemoptysis had symptom resolution (one after the second session, and therefore was not submitted to the third one). However, none evolved with significant dyspnea palliation after the third session. Except for one patient, that was still alive 12 months after the EBRT, all the other patients died within 4 months after the completion of the treatment. Two out of 3 patients who completed the 3 sessions also developed symptomatic actinic esophagitis.

**Conclusion:** Dose-escalated hypofractionated EBRT didn't provide acute palliation of intrathoracic symptoms in this small cohort of patients, despite any dyspnea improvement in 5 out of 8 patients.

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### 3330

#### Practice Pattern Treatment Recommendations for the Treatment of Bone Metastases: A Statewide Survey



L.A. Gharzai,<sup>1</sup> J.A. Hayman,<sup>1</sup> B.R. Mancini, Jr,<sup>2</sup> W.H. Beeler,<sup>1</sup> L.J. Pierce,<sup>1</sup> J.M. Moran,<sup>1</sup> M.M. Dominello,<sup>3</sup> T.P. Boike,<sup>4</sup> K. Griffith,<sup>5</sup> S. Jolly,<sup>1</sup> and D.E. Spratt<sup>1</sup>; <sup>1</sup>Department of Radiation Oncology, University of Michigan, Ann Arbor, MI, <sup>2</sup>West Michigan Cancer Center, Kalamazoo, MI, <sup>3</sup>Department of Radiation Oncology, Barbara Ann Karmanos Cancer Institute, Wayne State University School of Medicine, Detroit, MI, <sup>4</sup>McLaren Northern Michigan, Petoskey, MI, <sup>5</sup>Department of Biostatistics, University of Michigan, Ann Arbor, MI

**Purpose/Objective(s):** Single fraction (SF) radiation therapy (defined as 8 Gy in one fraction) is effective and convenient for patients with painful non-complex bone metastases. A 2009 survey demonstrated low uptake for the use of SF radiation therapy. We sought to assess contemporary treatment recommendations for the management of bone metastases across a diverse statewide consortium.

**Materials/Methods:** Members of the Michigan Radiation Oncology Quality Consortium (MROQC) were surveyed from April to May of 2017. Providers were asked to rank the importance of 31 variables on their choice of dose fractionation. The survey also covered seven patient case scenarios with varying tumor type, history of prior radiation therapy, anatomic location, and presence of pain.

**Results:** Eighteen of twenty centers queried responded to the survey, with 56 respondents. The majority of respondents were male (82%), with 34% having completed residency in 2010 or later. Twenty-three dose fractionation schedules were recommended across the seven cases. Principal factors considered when choosing a dose fractionation regimen were performance status, prognosis, spinal cord compression, and prior radiation. SF recommendation overall was low (16.1%), and on multivariable analysis, factors predictive of SF recommendation included employment in an academic practice (odds ratio (OR) 2.04, 95%CI 1.02-4.08, p=0.044)

and higher palliative case volume (OR 2.59, 95%CI 1.45-4.63,  $p=0.001$ ). Stereotactic body radiation therapy (SBRT) was recommended overall in 16.4% of cases, and on multivariable analysis, significant predictors for SBRT recommendation were employment by an academic institution (OR 2.99, 95%CI 1.39-6.44,  $p=0.005$ ), decreased time since residency completion (OR 4.37, 95%CI 1.26-15.17,  $p=0.02$ ), spine location (OR 12.54, 95%CI 3.96-39.68,  $p<0.001$ ), and prior radiation (OR 26.67, 95%CI 7.86-90.57,  $p<0.001$ ). SF recommendation rates were overall higher compared to a similar 2009 survey (16.1% vs 9.4%,  $p=0.0004$ ).

**Conclusion:** The recommendation of SF remains low, but appears to have increased since 2009, despite the presumed increased utilization of SBRT. We identify multiple key drivers in physician decision-making affecting SF recommendation that have not been addressed by prior level one evidence. We identify contemporary rates of recommendation of SBRT for treatment of bone metastases, and identify key drivers of SBRT recommendation. Further research with evidenced-based recommendations to clarify the role of SF and SBRT are needed, and may significantly impact practice.

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### 3331

#### Demographic Factors and Correlation with Length of Treatment Course and Survival in a Palliative Radiation Oncology Population



L.M. Hertan,<sup>1</sup> Y.H. Chen,<sup>2</sup> A. Nichipor,<sup>3</sup> C.S. Roldan,<sup>4</sup> Y. Khouj,<sup>3</sup> C. Zaslowski-Dude,<sup>2</sup> and M.S. Krishnan<sup>3</sup>; <sup>1</sup>Department of Radiation Oncology, Beth Israel Deaconess Medical Center, Boston, MA, <sup>2</sup>Dana-Farber Cancer Institute, Boston, MA, <sup>3</sup>Dana-Farber/Brigham and Women's Cancer Center, Boston, MA, <sup>4</sup>Department of Radiation Oncology, Brigham and Women's Hospital/Dana-Farber Cancer Institute, Boston, MA

**Purpose/Objective(s):** Radiation therapy (RT) can palliate symptoms in patients (pts) with advanced cancer. The number of fractions (fx) used can vary significantly from a single fx (SF) to a multi week course. The aim of this project is to investigate the association of demographic factors with survival, likelihood of SF use in pts receiving RT for bone metastases (BM), and likelihood of hypofractionation (HF) ( $\leq 5$  fx) in pts being treated for any palliative reason, excluding those receiving partial brain RT (PBRT). We hypothesized that demographic factors will have an impact on the length of a palliative RT course and pt survival after palliative RT.

**Materials/Methods:** We retrospectively reviewed charts of pts treated with palliative RT between 1/2015 – 5/2017 at 2 tertiary centers and 4 community practices. Univariate analysis (UVA) and multivariable analysis (MVA) for overall survival (OS) were done using Cox regression. Factors associated with use of SF in BM or HF among palliative non-PBRT pts were analyzed using a logistic regression model (both UVA and MVA). All variables with  $p<0.1$  on UVA were used in MVA.

**Results:** 928 pts were included in the OS analysis, 377 pts were included in the BM analysis, and 745 were included in the HF analysis. In pts treated for BM, on MVA, inpatient consults were more likely to get SF (OR = 2.07 [95% CI 1.04-4.11],  $p=.04$ ), with no other factors being significant. In the HF analysis, income (less than or equal to v. greater than median US income) and consult location (tertiary v. community) were significant on MVA. Pts living in higher income areas were more likely to get HF (OR 1.69 [95% CI: 0.999 – 2.86]  $p=.05$ ), whereas pts treated in the community were less likely to get HF (OR 0.39 [95% CI: 0.26 – 0.58]  $p<.0001$ ). Multiple demographic factors were associated with OS on MVA, including: gender ( $p=.02$ ), marital status ( $p=.03$ ), language

spoken ( $p=.003$ ), distance from treating center ( $p=.03$ ), histology ( $p=.0002$ ), and consult setting ( $p<.0001$ ), see Table 1.

**Conclusion:** This analysis suggests that demographic factors may affect both OS and decision making regarding fractionation in pts receiving palliative RT. Further investigation into the reasons for these differences is needed.

**Abstract 3331; Table 1** MVA<sup>3</sup> Cox Regression Models for OS<sup>4</sup>

	HR	95% CI	p-value
Gender			0.02
Female	1.00	-	
Male	1.26	1.03-1.54	
Marital Status			0.03
Married/Life Partner	1.00	-	
Other <sup>1</sup>	1.23	1.02-1.48	
Language			0.003
English	1.00	-	
Other	0.92	0.64-1.34	
Missing/Unknown <sup>1</sup>	1.53	1.19-1.97	
Distance <sup>2</sup>			0.03
$\leq 10$ miles	1.00	-	
$> 10$ & $\leq 50$ miles	0.86	0.71-1.04	
$> 50$ & $\leq 200$ miles	0.60	0.42-0.85	
$> 200$ miles	0.87	0.57-1.33	
Cancer Histology			0.0002
Breast	1.00	-	
Prostate	0.70	0.43-1.14	
Lung	1.42	1.06-1.92	
Other <sup>1</sup>	1.48	1.10-1.99	
Consult Setting <sup>2</sup>			<.0001
Outpatient	1.00	-	
Inpatient	2.02	1.61-2.54	

1. Including missing/unknown
2. Missing/unknown excluded
3. Variables with  $p<0.1$  in UVA included in MVA except consult location
4. Age was included in MVA, but was not significant

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### 3332

#### Whole Brain Radiotherapy Practice Patterns in the Era of Stereotactic Radiosurgery



C.D. Jacobs,<sup>1</sup> A.B. Barbour,<sup>2</sup> G. Suneja,<sup>2</sup> H. Williamson,<sup>2</sup> S. Floyd,<sup>2</sup> J.A. Torok Jr,<sup>1</sup> and J.P. Kirkpatrick<sup>2</sup>; <sup>1</sup>Duke University Medical Center, Department of Radiation Oncology, Durham, NC, <sup>2</sup>Duke University Medical Center, Durham, NC

**Purpose/Objective(s):** Increased access to stereotactic radiosurgery (SRS) to treat brain metastases (BM) has prompted reassessment of whole brain radiotherapy (WBRT) indications. A patterns of care analysis of various WBRT dose-fractionations for the U.S. in the era of SRS was performed.

**Materials/Methods:** Adults in the National Cancer Database with BM at diagnosis of a lung, breast, skin, urogenital, gastrointestinal, or head/neck primary tumor between 2010-2015 and no prior malignancy were identified. WBRT was defined as 20-50 Gy to the brain in 4-44 fractions (fx) at 1.6-6 Gy/fx totaling 60-100 Gy<sub>2</sub> biologically equivalent dose, administered in  $\leq 60$  days using a non-SRS external beam modality. SRS was defined as radiosurgery modality, 12-24 Gy/1 fx, 18-30 Gy/2 fx, 21-36 Gy/3 fx, 21-36 Gy/4 fx, or 25-40 Gy/5 fx to the brain. Short (ShWBRT), standard (StWBRT), and extended (ExWBRT) courses were defined as  $<10$ , 10-15, and  $>15$  fx, respectively. Odds ratios (OR) of ShWBRT or ExWBRT receipt relative to StWBRT were calculated from multivariate logistic regression. Yearly utilization trends were analyzed with linear regression.

**Results:** 90388 subjects with BM at diagnosis were identified, the majority with primary lung cancer (83.0%). Of these, 24262 (26.8%) received WBRT and 11486 (12.7%) received SRS. 374 (0.4%) subjects received  $>10$  fx and were reported to have received a radiosurgery modality, potentially reflecting combination WBRT and SRS, and were excluded from WBRT analysis.