Conclusions: Low dose radiotherapy provides effective palliation of distressing symptoms resulting from cutaneous KS with acceptable toxicity.

A PRACTICAL ENERGY MODULATION TECHNIQUE TO AVOID ENCELULATION FOR ADVANCED PERIOCULAR CANCERS
Jon-Paul Voroney, Alana Hudson, Yannick Poirier, David Spencer, Ferenc Jacso, Kevin Martell
Tom Baker Cancer Centre and University of Calgary, Calgary, AB

Purpose: Consider a 2x2x1.5 cm basal cell cancer invading right medial canthus periorcular embryonic fusion plane. Usual techniques fail: an irregular PTV 4x4x2.5 cm deep, a concave surface, a deep tumour, and adjacent ocular structures. Oculoplastics/Mohs risk enucleation. Bump can use e- with a tungsten eye shield and ortho for maximal eye-sparing. With orbit invaded, morbidity follows. Radiotherapy may be the best eye-preserving option.

Methods and Materials: Central-axis dose calculation using measured % depth dose were compared with central and off-axis dose calcs using kVDoseCalc, a dose engine validated in kV cone-beam and ortho therapy; and Monte Carlo for e- off-axis dose calc. We compare conformal RT, arcs, and bump, for periorcular cancer cases. We compared central axis data for a 4x4 cm field with: 1) 9 MeV alone; 2) 9 MeV with 0.7 cm custom wax; 3) 9 MeV, 80% of dose, 100 kV DXR bump, SSD 10 cm, 20% of dose; 4) 9 MeV, 80% of dose, 200 kV DXR bump, SSD 50 cm, 20% of dose. Patients treated at our institution in 10 or 20 treatments received 8 or 16 electron treatments (prescribed to account for REB of electrons) and 2 or 4 photons treatments, for a total dose of 45 Gy in 10 fractions, or 50 Gy in 20 fractions.

Results: For the case above tables based on measured dose give:

Surface dose (1) 86%; (2) 90%; (3) 100%; (4) 94% Dmax (100%) (1) 2.0 cm; (2) 2.0 cm; (3) 2.0 cm; (4) 2.0 cm Dose @ 2.7 cm (1) 89%; (2) 58%; (3) 87%; (4) 91% Surface and depth refer to skin surface. Dose is normalized: 

Dmax = 100%. REB and geometry are not included. Comparing dynamic conformal ARCs, VMAT, electrons +/- bolus or tantalum mesh, and bump show the benefits of 9 MeV with 100-200 kV bump. Dose drop off is swift at ~40 cm beyond D90%. Dose spares eye. Low SSD, low kV bump results in best homogeneity and surface dose; high kV bump gives best dose at depth. Patients can be scanned with a 3D printer wax replica eye shield to reduce artifact and enable accurate dose calculation. Actual patient results are illustrated with isodose distributions; for three clinical cases, the dose above 80% to retina was 2.5 cc for conformal treatment, 1.0 cc for dynamic conformal arc and < 0.5 cc for bumps, demonstrating excellent shielding for the bump technique.

Conclusions: Energy modulation with ortho and electrons can result in improved dose distribution. Benefits include: increased treatment depth, improved dose homogeneity, no bolus, increased shield effectiveness, and reduced penumbra; important when treating near the eye.
Conclusions: 18F-FAZA PET scans provide a feasible non-invasive method to assess NSCLC tumour hypoxia. A hypoxic volume, as detected by 18F-FAZA PET, was present in the majority of NSCLC patients in our study. Ongoing trial accrual and follow up of our patient cohort will provide more information with regards to the imaging and clinical value of 18F-FAZA PET, and we hope to correlate these imaging metrics with clinical outcomes.

DEVELOPMENT OF PROVINCIAL PALLIATIVE RADIOTHERAPY GUIDELINES
Dennis Tilley1, Marc Kerba2, Xanthoula Kostaras1, Alysa Fairchild3
1Alberta Health Services, Calgary, AB
2University of Calgary, Calgary, AB
3University of Alberta, Edmonton, AB

Purpose: Radiotherapy (RT) practice variability in the palliative setting is well-documented. Clinical practice guidelines inform standardized, evidence-based, beneficial practice, while simultaneously discouraging unnecessary or potentially harmful practices. The process of creating provincial palliative RT clinical practice guidelines is associated with multiple challenges. We describe the unique approach required in aligning multidisciplinary goals as compared to traditional tumour site-specific guidelines.

Methods and Materials: Radiation oncologists from the provincial Palliative Care Tumour Team, along with guideline specialists from the Guideline Resource Unit, formed the primary guideline working group tasked with updating the Palliative RT guidelines. Tumour site specific representatives (e.g. Central Nervous System Tumour Team) were incorporated as needed, as well as experts in supportive care, on a guideline by guideline basis. For each guideline, a systematic literature review was conducted to identify relevant evidence. Recommendations were initially developed within the primary working group, then revised in collaboration with experts from other disciplines. Once working group consensus was reached, guideline recommendations were circulated to all radiation oncologists and Palliative Tumour Team members for input. After several rounds of feedback and modifications, provincial consensus was reached.

Results: Initially, one RT guideline had been created for all provincial palliative RT recommendations. These guidelines have since been split into smaller, more functional palliative RT guidelines: 1) Brain Metastases; 2) Bone Metastases and Spinal Cord Compression; 3) Bleeding and Gastrointestinal Obstruction; and 4) Superior Vena Cava Obstruction, Dyspnea, and Hemoptysis. The majority of recommendations were either modified or new due to advancements in research or changes in consensus based approaches. In total, 70 recommendations were approved. Recommendations were supported by a range of evidence from high (level one evidence) to low quality (level five evidence). This may suggest that tumours with a higher SUVmax (i.e. higher intensity of hypoxia) also have a larger proportional volume of hypoxia.

Conclusions: 18F-FAZA PET scans provide a feasible non-invasive method to assess NSCLC tumour hypoxia. A hypoxic volume, as detected by 18F-FAZA PET, was present in the majority of NSCLC patients in our study. Ongoing trial accrual and follow up of our patient cohort will provide more information with regards to the imaging and clinical value of 18F-FAZA PET, and we hope to correlate these imaging metrics with clinical outcomes.

SYSTEMATIC REVIEW OF PATIENT REPORTED QUALITY OF LIFE FOLLOWING STEREOTACTIC ABLATIVE BODY RADIOTHERAPY FOR PRIMARY AND METASTATIC LIVER CANCER
Adam Mutsaers, Jeffrey Greenspoon, Cindy Walker-Dilks, Anand Swaminath
McMaster University, Hamilton, ON

Purpose: Stereotactic ablative body radiotherapy (SABR) is an emerging modality in patients with liver cancer who are ineligible for other local therapies. It has been shown to be effective with respect to long-term tumour control with minimal toxicity. However SABR for liver cancer is not current standard of practice despite its potential promise. In order to validate increased offering of this promising therapy, objective systematic data regarding impact on quality of life (QOL) is required. No systematic reviews to date have been performed to analyze QOL for primary or metastatic liver cancers. QOL metrics are a critical part of therapy evaluation, particularly in disease states with short life expectancy. The purpose of this study was to conduct a systematic review of evidence surrounding QOL for liver SABR.

Methods and Materials: MEDLINE and EMBASE databases from 1996 to October 2015 were queried to obtain English language studies analysing QOL following SABR for liver cancers. Included studies involved patient-reported QOL as either a primary or secondary endpoint, along with analysis of QOL change over time. Studies were screened by three reviewers, while relevant data were abstracted and analyzed by a single reviewer.

Results: Of 2181 initially screened studies, five met all inclusion criteria and were analyzed. Extracted study dates ranged from 2008 to 2015, included a total of 388 eligible patients, and 4/5 studies were prospective in design. All were published studies, with the exception of one conference abstract. Studies included patients with hepatocellular carcinoma, liver metastases and intrahepatic cholangiocarcinoma. Extracted studies were heterogeneous in dose prescription used (11-70 Gy in 3-30 fractions), as well as in QOL metrics (EORTC QLQ C-15, EORTC QLQ C-15/PAL, EORTC QLQ C-15/Hep, EORTC QLQ C-15/Hep, EORTC QLQ C-15/LM-21, Euroqol 5D, FACT-Hep, FLIC) and final endpoints (range: six weeks to 12 months). Despite this there were few clinically or statistically significant declines in QOL scores following SABR. Four studies demonstrated increased fatigue transiently in the first 1-4 weeks, while two studies showed transient worsening of appetite at one month; both metrics returned to insignifiant difference from baseline by the final endpoints. All studies showed no significant decline in QOL at their respective endpoints. In studies with overlapping QOL tools, estimates of three-month post-SABR global QOL were similar.

Conclusions: Results of this systematic review demonstrate well-preserved post SABR QOL in patients with otherwise untreatable liver cancer, despite heterogeneity amongst the individual studies themselves. These findings merit further research to increase data collection, to validate QOL tools specific to SABR for liver cancers, and to support comparative effectiveness trials of SABR with other local modalities in liver cancer including surgery, chemoembolization and radiofrequency ablation, with a focus on QOL outcomes as an important endpoint.

A SYSTEMATIC REVIEW OF METHODOLOGIES, ENDPOINTS AND OUTCOME MEASURES IN PHASE III RANDOMIZED TRIALS OF INTERVENTIONS FOR RADIATION THERAPY-INDUCED NAUSEA AND VOMITING
Kristopher Dennis1, Rehana Jamani2, Leila Makhani3, Henry Lam4, Carlo De Angelis5, Patrick Ciesielski6, Natalie Coburn7, Shun Wong3, Edward Chow8
1University of Ottawa, Ottawa, ON
2Queen's University, Kingston, ON
3University of Toronto, Toronto, ON
4Sunnybrook Health Sciences Centre, Toronto, ON
5Jagiellonian University Medical College, Krakow, Poland

Purpose: To conduct a systematic review of radiation therapy-induced nausea and vomiting (RT-INV) randomized trials to evaluate the methods, endpoints, and outcome measures used to assess RT-INV. A systematic search of PUBMED and EMBASE was conducted using key terms related to RT-INV and trials. All studies included in this review utilized an active control group, were phase III randomized trials, and compared one or more radiation regimens to a non-radiation intervention. Data were extracted by two independent reviewers using a standardized data extraction form. The extracted data included study design, randomization, baseline characteristics, radiation regimens, intervention, and outcome measures. The included studies were subsequently analyzed and assessed for methodological quality using the Cochrane Collaboration tool for randomized trials.

Results: A total of 36 trials were included in this review. The median sample size was 96 participants per arm. The most common radiation regimen was high-dose rate brachytherapy (HDBT). The most common intervention was antiemetic prophylaxis. The most common outcome measures were nausea and vomiting episodes, total nausea and vomiting symptom severity scores, and quality of life (QOL) measures. The quality of the trials varied widely, with few trials using a double-blind design, and many trials not blinded to the radiation regimen. The most common methodological issues were related to randomization, baseline characteristics, and outcome measures. The majority of trials did not use a double-blind design, and many trials did not report on the quality of life measures.

Conclusions: This systematic review of radiation therapy-induced nausea and vomiting randomized trials identified a wide range of methods, endpoints, and outcome measures used to assess RT-INV. The most common radiation regimen was HDBT, and the most common intervention was antiemetic prophylaxis. The quality of the trials varied widely, with few trials using a double-blind design, and many trials not blinding to the radiation regimen. The most common methodological issues were related to randomization, baseline characteristics, and outcome measures. The majority of trials did not use a double-blind design, and many trials did not report on the quality of life measures.

A systematic review of the methods, endpoints, and outcome measures used in phase III randomized trials of interventions for radiation therapy-induced nausea and vomiting identified a wide range of methods, endpoints, and outcome measures used to assess RT-INV. The most common radiation regimen was high-dose rate brachytherapy (HDBT), and the most common intervention was antiemetic prophylaxis. The quality of the trials varied widely, with few trials using a double-blind design, and many trials not blinding to the radiation regimen. The most common methodological issues were related to randomization, baseline characteristics, and outcome measures. The majority of trials did not use a double-blind design, and many trials did not report on the quality of life measures.