Results: Year-one priorities included three of the five areas of focus: radiation integrated wait times, development of a new funding model, and concentration on some safety/quality initiatives. The areas of focus were broken down into actionable deliverables, for example defining radiation integrated wait times in gynecological, lung, and head and neck cancers. This will include collecting detailed information from various cancer centres to understand the issues at a local level, analyzing preliminary data, and subsequently engaging clinical experts and administrators. These actions support the development of a measurement strategy, with the long-term goal of performance management to improve the wait time journey for patients between referral to radiation and receiving treatment.

Conclusions: The exercise translates the high-level theory of a strategic plan into actionable deliverables. This work has successfully advanced the areas of focus towards achieving the outcomes for the multi-year plan, to improve the quality of care for radiation treatment in Ontario.

192 MAGNETIC RESONANCE-GUIDED ADAPTIVE RADIOTHERAPY REDUCES THE NORMAL TISSUE COMPLICATION PROBABILITY OF ADRENAL STEREOTACTIC ABLATIVE RADIOTHERAPY
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Purpose: Adaptive radiotherapy using a magnetic resonance linear accelerator (MR-Linac) is a novel radiotherapy technique that can increase the therapeutic ratio of radiotherapy through daily visualization of the anatomy and adaptive re-planning. There is currently little data on the ability of the MR-Linac to achieve better organ-at-risk (OAR) sparing. The purpose of this study was to quantify the potential clinical benefit of the MR-Linac using real-world data from patients undergoing adrenal stereotactic MR-guided ablative radiotherapy (SMART).

Materials and Methods: All patients treated with adrenal SMART using an MR-Linac at a single institution up to December 2019 were included. Doses used were 50 Gy in 5 fractions, 60 Gy in 8 fractions or 24 Gy in 3 fractions, delivered every other day. Before each fraction, an MR scan was acquired, and the plan was re-optimized based on automatically deformed and manually re-adjusted contours. A physician was present to choose between the re-optimized plan and the original plan based on dosimetric parameters. Free-breathing treatment was then delivered using real-time MR-based auto-gating. For this study, all OARs were manually recontoured on the pre-treatment MR for each fraction and volumetric/dosimetric data were acquired from the MRIdian planning system (ViewRay Inc.). All doses were normalized to equivalent doses at 2 Gy. Lyman normal tissue complication probability (NTCP) models using published parameters were used to calculate the NTCP of upper abdominal OARs before and after daily adaptation. Differences in OAR NTCP were tested using paired t-tests.

Results: A total of 48 patients (246 total fractions) underwent SMART for 52 adrenal lesions (29 left-sided) between 2016 and 2019. Prescription dose was 50 Gy in 5 fractions in 75% of cases (range: 24 Gy in 3 fractions to 60 Gy in 8 fractions). Median spleen dose per fraction was 0.97 Gy (range: 0.10-4.53 Gy) and median CMD was 1.86 Gy (0.12-17.85 Gy). Mean SV prior to the first and last treatments were 228.9 cc and 205.8 cc, respectively (Wilcoxon signed-rank test p<0.001). CMD ranged from 0 Gy to 22.0 Gy. There were strong associations between the relative SVC and the CMD (r=0.96; p<0.001) and the CMD (r=0.96; p<0.001). V10 (1.9% per 10% increase in V10 (EQD2), p=0.003) and V20 (-3.9% per 10% increase in V20 (EQD2), p=0.002). Two patients who were subsequently treated for contralateral adrenal lesions had persistent 5V reductions at three and 11 months after initial SABR. Logistic regression was used for preliminary splenic dose thresholds. C-statistics were used for logistic regression goodness-of-fit. All dosimetric parameters were converted to equivalent doses at 2 Gy (EQD2).

Conclusions: SMART using daily re-optimization significantly decreased the OAR NTCP for left-sided adrenal lesions. Further study with longer follow up is required to ascertain the observed toxicity rates of adrenal SMART.
function and ultimate tumour control.

194 CARDIAC TOXICITY IN CENTRAL NON-SMALL CELL LUNG TUMOURS TREATED WITH STEREOTACTIC BODY RADIATION THERAPY (SBRT) - IS THERE A “NO-FLUTTER ZONE”?
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Purpose: Cardiac toxicity has been well-described following conventional radiotherapy to the thorax, however the long-term cardiac effects of ablative stereotactic body radiotherapy (SBRT) doses are unknown. Furthermore, appropriate dose constraints to the heart to minimize long-term cardiac toxicity have not been well characterized, nor has the potential effect of pre-existing cardiac disease on toxicity risk.

Materials and Methods: We conducted an institutional database review to assess cardiac events in patients treated with SBRT for central early-stage lung cancer or metastasis within 5cm of the heart, prior to the year 2017 to allow sufficient follow up. Descriptive statistics were used to report patient and treatment information, and cardiac events. Linear regression was used to assess the relationship between cardiac events and age, gender, cardiac history, smoking history, tumour size, and cardiac dose (mean, maximum, volume receiving, 5Gy, 10Gy and 30Gy).

Results: Forty-seven patients met criteria, 39 patients with primary NSCLC, and eight with central lung metastasis. Median follow up time after SBRT was 21.5 months (range 2.1-61). Mean tumour diameter was 4.3cm (range 2.5-7.4). Seventeen (36.2%) patients had a pre-existing cardiac history, most commonly ischemia or MI. Median distance from the tumour to heart in all included patients was 1.8cm (range 0.0-4.9). Eight of 47 patients (12.1%) had a cardiac event following SBRT (two de novo, six in patients with cardiac history), at a median time of 30 months (range 17-34). Six of the eight patients had tumours located within cm of the heart. Maximum heart doses ranged from 20.8Gy to 61.7Gy (median 51 Gy), while MHD ranged from 2.3-7.8Gy (median 5.6Gy). Only one cardiac death attributed to atrial fibrillation causing stroke occurred, in a patient with a prior history of atrial fibrillation. On univariate analysis, previous history of cardiac disease (OR 4.4; p=0.03) was with an increased risk of cardiac events. On multivariate analysis, there was a trend towards association between cardiac history and cardiac events, however this was not statistically significant (OR 5.2, p=0.1). Mean and maximum heart dose, V5, V10, V30, were not significantly associated with cardiac disease.

Conclusions: Overall, current SBRT dose constraints for the heart appear to be safe with low risk of cardiac events, and our findings do not support previous reports of an association between cardiac events, death and SBRT dose. Cardiac history was the main predictor of cardiac event post-SBRT, and this should be considered when treating patients with SBRT for central tumours in close proximity to the heart.

195 CAN POLYMETASTATIC DISEASE BE ARRESTED USING SABR? A DOSIMETRIC ANALYSIS TO INFORM DEVELOPMENT OF A PHASE 1 TRIAL
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Purpose: Phase II randomized trials suggest that stereotactic ablative radiotherapy (SABR) improves progression-free and overall survival in patients with oligometastatic cancer, with phase III trials currently testing SABR in up to 10 metastases. Whether SABR could provide similar benefits in polymetastatic disease (>10 metastases) is unknown. A critical first step is to determine the feasibility of planning SABR for a large number of metastases throughout the body while maintaining acceptable organ-at-risk (OAR) doses. Therefore, we sought to evaluate the dosimetric feasibility of using SABR in polymetastatic disease (>10 sites) while adhering to OAR constraints to be used in a phase I trial (ARREST).

Materials and Methods: Five craniospinal CT simulations were utilized to retrospectively contour 24 (n=2), 30 (n=2) and 50 (n=1) tumour targets not present on the initial scan. Standard PTV margins were added based on institutional immobilization practices. OAR constraints from published clinical trial protocols were used. Radiotherapy plans for the highest dose level in our planned phase I trial (30Gy in 5 fractions) were created utilizing a minimum number of isocentres. Plans were created using Raystation (RaySearch Laboratories, Stockholm, Sweden) for delivery on linear accelerators using volumetric modulated arc therapy.

Results: The gross tumour volumes (GTVs) ranged from 134.8-184.2cm^3 in our five test cases. The first two cases with 24 GTVs have been planned and were deemed to be clinically acceptable. PTV volumes were 483.0cm^3 and 417.4cm^3, utilizing five and six isocentres for treatment respectively. Median PTV D95 was 29.7Gy and 29.0Gy, whole body V10 was 21.2% and 17.4%, and V5 was 41.8% and 44.8%. All OAR goals were met, though low-dose conformity was less than traditional SABR treatment plans (R100 of 1.04 and 0.93; R50 of 9.90 and 6.98, respectively). The remainder of the test cases will be presented.

Conclusions: In our test cases, planning SABR in polymetastatic disease appears dosimetrically feasible. Our Phase I clinical trial (ARREST) is under development, which will evaluate the feasibility and toxicity of delivering SABR in polymetastatic disease in a 3+3 dose escalation study. The starting dose level will be 12Gy in 2 weekly fractions, escalating the dose by adding 6Gy weekly until our target dose of 30Gy in 5 weekly fractions. Our study population will include >10 sites of disease, all tumour types, and patients must have exhausted standard lines of systemic therapy.

196 OLIGO-TERMINOLOGIES OF OLIGOMETASTATIC DISEASE - CONSISTENCY OF NEW CONSENSUS DEFINITIONS WITHIN CURRENT SABR TRIALS
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Purpose: Oligometastatic disease (OMD) is a rapidly growing area of oncology research. Consensus statements have recently been developed by ESTRO/ASTRO and ESTRO/EORTC in an effort to harmonize terminology describing OMD. The purpose of this study was to assess patient populations eligible for ongoing clinical trials evaluating stereotactic ablative radiotherapy (SABR) in OMD, in the context of key definitions from both statements.

Materials and Methods: Definitions of key terms from both ESTRO/ASTRO and ESTRO/EORTC consensus statements for OMD were summarized. Using the clinicaltrials.gov database, a search of ongoing OMD clinical trials evaluating the use of SABR was performed from inception to January 2020, using the keywords “oligometastasis”, “stereotactic radiotherapy”, and related terms. Results were independently reviewed by two investigators (GJL and AJA), with discrepancies settled by a third (AVL). Information from these trials including study design, population criteria, and