Results: Of 939/1077 (87%) HPV tested OPC, LDH level was available in 611/678 (90%) HPV+ and 225/261 (86%) HPV-. Median follow up was 4.4 and 4.1 years for the HPV+ and HPV- cohorts, respectively. Among HPV+, LDH E (n = 223) versus NE (n = 388) cases comprised older age (median 60 versus 58 years, p = 0.02) and slightly larger primary tumour volume (GTV) (median 24 versus 21 cc, p = 0.08) but similar T (p = 0.27) and N-category (p = 0.34), smoking pack-years (SPY) (p = 0.27), and alcohol consumption (p = 0.25). A lower three-year OS (79% versus 87%, p = 0.01) and RFS (79% versus 89%, p < 0.01) were found in HPV+ LDH E versus NE. MVA for HPV+ patients confirmed that LDH-E increased risk of death [HR 1.5 (1.1-2.2), p = 0.03] and relapse [HR 1.8 (1.2-2.7), p < 0.01] after adjusting for SPY (OS: p = 0.01; RFS: p = 0.94), age (OS: p = 0.09; RFS: p = 0.63), T4 (OS: p < 0.01; RFS: p = 0.48), T3-N2c (OS: p = 0.08; RFS: p < 0.01), GTV T1 (OS: p < 0.01; RFS: p < 0.01) and chemotherapy (OS: p < 0.01; RFS: p = 0.02). The prognostic significance of LDH-E was confirmed by MVA within the subset of HPV+ patients with normal E (n = 86) and NE (n = 139) cases (three-year OS: 59% versus 52%, p < 0.01). No patients in the SSHT arm had exudate while 11% in the 3D-CRT arm had 0% versus 11% (p = 0.0014). Patients in the 3D-CRT arm had increased incidence of ≥ Grade 3 tenderness and discomfort of breast (tenderness: 54% versus 2%, p < 0.0001, discomfort: 9% versus 1%; p = 0.019), but ≥ Grade 3 itching, burning and pulling were not significantly different between the treatment arms. The independent prognostic factors that contributed significantly to acute toxicity in the multivariate analysis were large breast volume, adjuvant chemotherapy, and 3D-CRT.

Conclusions: SSHT significantly reduced the incidence of moist desquamation compared with 3D-CRT. Incidence of acute toxicity was correlated with large breast volume, adjuvant chemotherapy, and 3D-CRT. Combining an IMRT approach with explicit reduction in skin dose may further improve both acute and late skin toxicity for patients undergoing adjuvant breast radiotherapy.

Abstract withdrawn

102 THE ROLE OF STEREOTACTIC BODY RADIATION THERAPY (SBRT) IN GYNECOLOGICAL CANCERS: A SYSTEMATIC REVIEW

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Purpose: SBRT is an effective treatment that delivers highly conformal doses of radiation to target volumes, sparing normal organs. Despite the advancements in this technique for other disease sites, its role in gynecological cancers remains unclear. This systematic review aims to evaluate toxicity and outcomes of SBRT in gynecological malignancies.

Methods and Materials: In accordance to PRISMA guidelines, a systematic review of the literature was conducted on studies reporting SBRT in gynecological malignancies. EMBASE, MEDLINE and Cochrane databases were systematically searched for relevant studies until October 2015. All relevant studies evaluating the role of local-regional SBRT for gynecological malignancies (excluding CNS, extra-pelvic and extra-para-aortic lesions) were included. Relevant data regarding toxicities and outcomes were abstracted and analyzed.

Results: From 534 references, 23 articles from 2004 to 2015 were selected, comprising a total of 382 patients. Studies were classified into six categories: 1) Radical treatment with SBRT as local boost for cervix tumours: total of 34 patients were identified in seven studies. Treated PTV median volume (MV) ranged from 41 to 146 mL and local control (LC) from 0 to 100% in a median follow up time of 4 to 22 months. Gastro-intestinal (GI) G3/4 toxicity was ~12%. 2) Radical treatment with SBRT as a local boost for endometrial cancer: 13 patients found in three studies. Eighty-five percent of the patients were from one series receiving a 55% LC at 18 months. G3 GI toxicity was reported in one out of 13 patients. 3) SBRT to lymph node metastases: 197 patients were found in seven studies. Treated PTV-MV ranged from 16 to 42 mL and LC 60-100% in a range of median follow up time of 14-20 months. Long-term G3/4 GI and genito-urinary (GU) toxicity was 3% and 0.005%, respectively. 4) Pelvic recurrences treated with SBRT: Majority received a course of radiotherapy before, either as a previous treatment or as first course on salvage attempt. Seventy-two patients were found in 10 studies. Treated PTV-MV ranged from 20 to 154 mL and LC from 51% to 100% in a median follow up range of 4-22 months. Chronic G3/4 GI and GU toxicity were 22% and 1.5%, respectively. 5) Adjuvant treatment with SBRT to the vaginal vault after EBRT: 61 patients were found in three studies. LC was 91-92% (1-11 years) and G1 G3 toxicity was 3%. 6) Two studies included two
patients with vaginal cancer and three with vulva cancer who received SBRT, either with radical or palliative intention.

Conclusions: SBRT experience in gynecological tumours lacks homogeneity. Close to 400 patients treated with SBRT for locoregional disease were found in the literature and at least six different clinical scenarios were described. A high rate (> 20%) of late G3/4 GI toxicity was seen in patients with recurrent gynecological pelvic tumours when salvage was attempted with SBRT possibly due to multifactorial reasons.

103 APPROPRIATE TIMING FOR POST-IMPLANT DOSIMETRY IN PERMANENT BREAST SEED IMPLANT (PBSI) Elizabeth Watt, Amy Frederick, Michael Peacock, Michael Roumeliotis, Siraj Hashim, Tyler Meyer University of Calgary, Calgary, AB

Purpose: The ideal timing for post-implant dosimetry in permanent breast seed implant (PBSI) is yet unknown and is performed inconsistently across the country, limiting the ability to compare dosimetric indices among centres. The purpose of this study is to determine the most appropriate time to perform this post-implant analysis.

Methods and Materials: Patients underwent four post-implant CT scans: 0, 15, 30, and 60 days after their seed implant. Each post-implant scan was deformably registered to the planning scan to obtain the seroma contour, which was reviewed and adjusted as necessary by a radiation oncologist. An evaluation PTV was defined to be a 5 mm isotropic expansion of the adjusted CTV contour, trimmed to the chest wall muscle and skin. Standard post-plans using the TG-43 calculation formalism were completed on each scan, considering dosimetric parameters for the CTV (V100) and evaluation PTV (V90, V100, and V200). As a reference, accumulated dose was determined by deformingly summing the dose from all four time points to the day 0 post-implant scan, taking into account the decay of the seeds to weight the dosimetric contribution from each time point. Each time point was compared to the reference accumulated dose by sum-of-squared residuals and absolute differences for each dosimetric index.

Results: Five patients have completed all four post-implant CT scans. The PTV V200 showed the most significant disagreement between the accumulated dose and each individual postplan (median absolute disagreement: 7.3%, range: 0.7 – 16.8%), while the CTV V100 showed fairly consistent agreement for all time points (median absolute disagreement: 0.5%, range: 0.0 – 5.3%). The day 15 scan showed the smallest sum-of-squared residuals for both the CTV V100 and the PTV V200; 51% and 52% lower than the next best time point, respectively, when considering the entire cohort. Other time points, however, still showed similar CTV V100 values, while other dosimetric indices had more variation in both time and between individual patients.

Conclusions: For the five patients who have completed all four requisite scans, the PTV V200 showed the largest variation when compared to the reference accumulated dose, while the CTV V100 had fairly good agreement for all time points. The time point which best agrees with the reference accumulated dose is not unanimous for all patients; further patient accrual is ongoing and required to recommend the most appropriate time point for the population.

104 MONITORING PROCEDURE TIMES FOR REAL-TIME ULTRASOUND-GUIDED PROSTATE HDR: HOW DOES EXPERIENCE AFFECT TIMES FOR DIFFERENT PARTS OF THE PROCESS Kristin Marchant, April Fay, Joyce Warren Allan Blair Cancer Centre, Regina, SK

Purpose: At the Allan Blair Cancer Centre, we began real-time ultrasound-guided prostate HDR on May 13, 2015. Starting with our third case, we began monitoring various time points during the procedure to see how long different parts took and whether there was reduction in times as the number of cases increased.

Methods and Materials: Several time points were recorded for each case including the "Time Out" before anaesthetic induction, TRUS insertion, placement of first needle, start of contouring, start of needle reconstruction, start of plan QA, start of treatment and start of needle removal. The experience in number of cases performed by each team member was also monitored. Members involved over the period of study included three physicists, four radiation therapists, three radiation oncologists and five radiation therapy nurses as well as a number of anaesthesiologists from the health region. Treatment planning was performed by two physicists and two radiation therapists.

Results: For cases 3 to 27, the average overall time from "Time Out" to catheter removal was 3 hours 45 minutes. The longest part of the process was for needle reconstruction and treatment planning, with an average time of 1 hour 9 minutes. Using a linear fit to the data for these 25 consecutive cases, the overall time decreased by 21 minutes, or about 9%. This is primarily due to a decrease of 17 minutes in needle reconstruction and planning time and a decrease of seven minutes in anesthetic induction time. The trends for other times varied by less than four minutes.

Discussion: We observed a significant decrease in the time for needle reconstruction and treatment planning with the number of cases performed. This is likely due to increased familiarity with the planning system and looking at ultrasound images as well as improved needle placement preventing shadowing of one needle by another. The reason for the decrease in anesthetic induction time is likely better preparation (making sure the carts are functioning and stocked and calling for an endotracheal scope early in cases that might require one). These are important factors when doing anesthetic procedures outside the OR with many different anesthesiologists.

Conclusions: Over 25 consecutive cases, we saw a decrease in total time for real-time ultrasound-guided prostate HDR of 9%, with the largest factor being a decrease in the time for needle reconstruction and treatment planning. We will continue to monitor our process and will also look at correlating times with the experience levels of individual team members.

105 Abstract withdrawn

106 BIOCHEMICAL CONTROL RATES AND TOXICITY OF 3 REGIMENS OF HDR BRACHYTHERAPY BOOST FOR LOCALIZED PROSTATE CANCER.

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Purpose: To evaluate biochemical disease-free survival rates and toxicity in patients treated with combined EBRT and HDR brachytherapy boost.

Methods and Materials: We reviewed data for men with prostate cancer treated with EBRT and brachytherapy boost from 2010 to 2014 in one centre. From 2010-2012 patients were treated with 50 Gy in 20 fractions of EBRT with a 10 Gy HDR boost. From 2012-2014 patients were treated with 44 Gy in 22 fractions of EBRT and 15 Gy EBRT boost. From 2014 onwards 37.5 Gy in 15 fractions combined with 15 Gy brachytherapy boost was used.

Results: One hundred and sixty-five consecutive patients treated from 2010 to 2014 were evaluated. Median age was 67. 4% (n = 6) had low-risk prostate cancer, 76% (n = 125) had intermediate- and high-risk (n=34) had high-risk disease. Twenty-seven percent (n=44) received 50 Gy+10 Gy boost, 49% (n=81) received 44 Gy + 15 Gy boost and 24% (n=40) received 37.5 Gy + 15 Gy boost. Fifty percent had brachytherapy prior to EBRT and the other 50% had brachytherapy after EBRT. Thirty-five percent received androgen deprivation therapy. Actuarial Biochemical Disease-Free Survival (Phoenix definition) was 89% at five years (100%, 87% and 100% respectively for low-, intermediate- and high-risk).