in Ontario (ONT) and to develop recommendations to ensure all patients have equitable access to MR-guided brachytherapy (MRgBT) for cervical cancer.

**Methods:** A qualitative phone interview was designed by the GYN CoP working group to survey the current state of cCBT in the province. Questions were developed to inquire about the current use of image-guided cCBT and the associated referral processes, the usage of MR imaging in cCBT and the current use of image-guided interstitial GYN BT. All ONT cancer centres offering radiation treatments to GYN cancers were included. Two group members conducted and audio recorded the telephone interviews from May to November 2015 and analyzed all recordings and summarized the data.

**Results:** Thirteen (n = 13) ONT cancer centres were interviewed. Of these, three centres do not offer cCBT, five centres offer CT-guided cCBT, four centres offer a combination of CT-MR-guided cCBT and one centre offers strictly MR-guided cCBT. The three centres that do not offer cCBT have established referral processes with three tertiary cancer centres in ONT respectively. However, there is no standardized referral process, referral timing, or method of communication. Other practices vary throughout the centres. Three of 13 centres suggested developing a fixed local to standardize and facilitate the sharing of external beam and BT plans, distributions and images. All CT-guided cCBT centres except one have plans to develop MRgBT. The tertiary centres mentioned above are also the only centres that offer interstitial GYN BT. They are located in the southwestern part of the province. Of these, one centre offers CT-guided and two centres offer MR-guided interstitial GYN BT. There is currently no standardized guideline to identify patient candidates for interstitial GYN BT.

**Conclusions:** This study demonstrated that models of shared care exist and are functioning in ONT. While referral processes are functioning well, some areas represent opportunities for improvement. Future work is needed by the GYN CoP to improve referral processes and to develop consensus on indications for interstitial brachytherapy. This will ensure all patients in ONT have access to this high quality brachytherapy.

**Conclusion:**

**115 PROPOSAL FOR A PERMANENT BREAST SEED IMPLANT (PBSI) TRAINING PROGRAM**

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**Purpose:** To propose an effective training program for radiation therapy teams starting to implement PBSI brachytherapy for early stage breast cancer.

**Methods and Materials:** A PBSI program requires a multidisciplinary team including physicians, physicists, dosimetrists, radiation therapists, operating room nurses, anesthetists, machinists and administrative personnel. A PBSI program was launched in 2013. Multiple CT and ultrasound compatible gel phantoms that mimicked breast tissue with embedded seromas, were designed and constructed. Physicians practiced ultrasound guided needle placement into numerous phantoms, with seromas in various locations, to simulate actual patient implants. Post-implant CT scans of phantoms were used to assess implant accuracy. Observations recorded prospectively during the practice implants on phantoms and mock PBSI deliveries were used to guide process development, improve quality and refine training, education, and experience.

**Results:** Based on our development research, results, and experience, we suggest that a centre starting a PBSI program should have an onsite training course that includes the following modules:

1) PBSI theory: including background, patient eligibility, patient assessments and suitability, process from assessment to treatment and patient education;
2) Treatment planning session: including dosimetric goals and objectives, hands on clinical case examples with comparison to benchmark plans and guided physician evaluation;
3) Participant observation of a PBSI operating room procedure;
4) Active involvement of the participants in practice sessions with phantoms and realistic operating room scenarios;
5) Wrap up session: opportunity to share experiences and feedback.

**Conclusions:** Effective training with hands on experience followed by support after centre implementation will improve the learning curve, increase confidence, and assist radiation therapy teams to set up a breast brachytherapy program in their department.

**116 FIGHTING PROSTATE CANCER WITH OUR EYES OPEN: IMPACT OF MRI STAGING ON RISK ASSESSMENT AND RADIATION THERAPY**

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**Purpose:** The risk of tumour progression and recurrence is an important consideration when treating prostate cancer. Risk assessment includes clinical staging through physical...
examination and transrectal ultrasound, CT and/or bone scan imaging. Increasingly, multiparametric magnetic resonance imaging (mpMRI) is being used to identify the presence, size and location of dominant intraprostatic lesions (DIL) for novel treatment approaches, such as MR-dose painted brachytherapy. This study was done to determine how frequently risk assessment was changed after mpMRI and to summarize the dosimetric data of DIL coverage for MR-dose painted brachytherapy.

Methods and Materials: This study was conducted as a retrospective chart audit. Staging information, dosimetric data and demographics were collected from the electronic patient record for prostate cancer patients who had mpMRI staging prior to radiotherapy. Pre- and post-mpMRI risk assessment and dosimetric data were analyzed using descriptive statistics. Univariate analyses of demographic and staging information were done to identify factors associated with changes in risk assessment.

Results: In total, 100 patients underwent mpMRI staging. Before mpMRI, 12 patients were assessed with low-risk, 47 with intermediate- and 41 with high-risk disease. After mpMRI, 12 patients were assessed with low-risk, 47 with intermediate- and 41 with high-risk disease. Changes included six from intermediate-risk to low-risk, one from intermediate- to high-risk, and four from high-risk to intermediate-risk and one low- and six intermediate-risk and 41 with high-risk disease. After mpMRI, risk assessment changed after mpMRI and to summarize the dosimetric data were analyzed using descriptive statistics. Univariate analyses of demographic and staging information were done to identify factors associated with changes in risk assessment.

Methods and Materials: Between November 2013 and December 2015, 25 patients were treated with a permanent Palladium Seed Implant brachytherapy technique 14 to 16 weeks following breast conserving surgery for Stage 0-1 breast cancer. Prescribed dose was 90 Gy. Pre-op planning parameters were (PTV V100 > 95%, V200 < 40%, skin dose to 1 cm² was kept to < 90% of prescribed dose). Immediately following the implant (Day 0 CT) patients had a CT simulation performed to assess the implant quality. Images were transferred to the MIM Symphony treatment planning system and deformably registered to the pre-op plan to create a post op plan. The deformed seroma contour was modified by the treating physician where necessary, and doses to skin and PTV were evaluated. PTV V200 and CTV V100 were calculated. Skin dose to 0.2 cc was calculated and correlated with clinical signs and symptoms. Cosmetic outcomes were evaluated at 2, 4, 8, 16, 26 and 52 weeks post treatment using patient reports based on the Harvard Cosmetic Criteria.

Results: Mean post-op CTV V100 and PTV V200 were 93.2 Gy and 36.2 Gy with a range of 70.2 Gy to 100 Gy and 15.8 – 62.4 Gy, respectively. Mean dose to 0.2 cc of skin was 51.5 Gy with a range of 12.2 Gy to 137.2 Gy. At two and four weeks all but one patient had excellent cosmesis. At eight weeks, 17, two and one patients reported excellent, good, and fair cosmesis. The patient who reported fair continued to score fair until 52 weeks at which time she reported good. The two patients that scored “good” had Grade 1 reaction and by 16 weeks converted back to excellent. All patients who scored “excellent” at 16 weeks continued to report excellent on their subsequent visits. Only two patients had a skin 0.2 cc dose of > 100 Gy and both reported skin reactions (Grade 1 for SD 0.2 cc 137.2, and Grade 2 for SD 0.2cc of 108.1 Gy). One patient with a 0.2 cc skin dose of 34.8 Gy also developed a Grade 1 skin reaction.

Conclusions: Permanent Breast Seed implant brachytherapy delivered in a single fraction caused a low rate of early side effects and patient reported cosmetic results were good to excellent in this small group of patients. An SD 0.2cc of > 100 Gy appeared to predict skin reactions, as only one out of 23 reported Grade 1 reaction below this level and two out of two patients with a dose above this had skin reactions. Further follow up is ongoing to assess late effects and dosimetric factors that may predict favourable and less favourable outcomes. More data is needed to better predict these factors.

118 IMPACT OF INTERNAL MAMMARY NODE RADIATION ON SURVIVAL OF PATIENTS WITH BREAST CANCER: EXTENDED FOLLOW UP OF A POPULATION BASED ANALYSIS

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Purpose: To extend follow up of a published analysis examining the value of the intent to include the internal mammary nodes (IMN) in patients with breast cancer receiving adjuvant locoregional radiation therapy (RT) to the breast or chest wall plus axillary/supraclavicular nodes.

Methods and Materials: 2413 women with node-positive or T3/4/p40 breast cancer, treated with locoregional RT from 2001 to 2006, were identified using a prospectively maintained, population-based database. Intent to include IMN was determined by review of charts and RT plans. Kaplan-Meier distant relapse-free survival (DRFS), breast cancer specific survival (BCSS), and overall survival (OS) were compared between the IMN and no-IMN RT groups. Pre-specified subgroup analyses of patients with pN1 disease were performed. Proportionality scores were used to adjust for imbalances in patient, tumour, and treatment factors between the two groups.

Results: Median follow up time was 11.7 years. Forty-one percent of subjects received IMN RT. Twelve-year survival outcomes among the IMN and no-IMN groups were: DRFS 72.3% versus 72.3%, p = 0.83, BCSS 76.4% versus 72.5%, p = 0.41, and OS 69.6% versus 63.2%, p = 0.005. Corresponding survival comparisons restricted to the pN1 subgroup were: DRFS 83.3% versus 80%, p = 0.17, BCSS 86.2% versus 82.7%, p = 0.11, and OS 79.1% versus 70.5%, p = 0.0003. After adjusting for potential confounding factors, the IMN RT group did not have significantly different DRFS (hazard ratio [HR] 1.01 (95% confidence interval [CI], 0.85-1.19; p = 0.95), BCSS (HR 0.97 (95% CI, 0.81-1.17; p = 0.77), or OS (HR 0.95; 95% CI, 0.82-1.11; p = 0.53) compared to the no-IMN RT group. In the pN1 subgroup, IMN RT was associated with non-significant trends for improved survival: DRFS (HR 0.84; 95% CI, 0.63-1.11; p=0.22), BCSS (HR 0.84; 95% CI, 0.61 -1.14; p = 0.26), and OS (HR 0.80; 95% CI, 0.63-1.02; p = 0.08).

Conclusions: With extended 12-year follow up, the intent to include IMN was not associated with significant improvements in survival. The survival hazard ratios associated with IMN RT among the pN1 cohort, while not statistically significant, appeared comparable to those reported in randomized trials, suggesting that IMN RT may contribute to improved outcomes in this subgroup.