**Conclusions:** According to ICRU 83 report, to correctly evaluate PTV volumes extended outside the body surface, several methods have been proposed, for example by extending the beam intensity values from the breast periphery to the regions outside the body. By attributing a density value to PTV-SQG we were able to achieve this same goal even without the use of any inverse IMRT tools.

**EP-1047**

**VMT for accelerated partial breast irradiation (IPAS).** F. Fenoglietto1, F. Bousbair2, C. Lemanski1, M. Chartisoux1, C. Llaccer Moscardo1, N. Allières1, J.B. Dubois1, C. Bourgier1, D. Azria1

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**Objective:** Different techniques of accelerated partial breast irradiation have been described in the literature. Using a volumetric modulated arc therapy technique (VMTI) allow a better target coverage and better protection of critical organs compare to three-dimensional conformal radiotherapy (RC3D). We present here the dosimetric results of the first patients treated with CRLC Val d’Aurelle in Montpellier for an accelerated treatment (IPAS).

**Materials and Methods:** Between May 2011 and July 2012, ten patients were treated by IPAS for breast cancer using a VMAT technique. Dose was 40 Gy, 4 Gy per fraction twice fractions per day. Patients were treated by IPAS for breast cancer using a VMAT technique. Dose was 40 Gy, 4 Gy per fraction twice fractions per day. Patients were treated by IPAS for breast cancer using a VMAT technique.

**Results:** The average volume of the PTV was 99.9 cc [39.8 to 219.5] (mean and range). An average of 95% of the PTV received 99.7% of the prescribed dose [99.4 to 99.9]. Hotspots: $V_{100\%} \leq 3\%$, $V_{95\%} \geq 100\%$ of the prescribed dose. For the ipsilateral lung: $V_{20\%} <3\%$, $V_{10\%} <20\%$ and $V_{10\%} <3\%$. The average $V_{5\%}$ was 2.7% of the contralateral one. Concerning the eart for $V_{20\%} <1\%$, $V_{10\%} <70\%$. The average volume of the PTV was 99.9 cc [39.8 to 219.5] (mean and range). An average of 95% of the PTV received 99.7% of the prescribed dose [99.4 to 99.9]. Hotspots: $V_{100\%} \leq 3\%$, $V_{95\%} \geq 100\%$ of the prescribed dose. For the ipsilateral lung: $V_{20\%} <3\%$, $V_{10\%} <20\%$ and $V_{10\%} <3\%$. The average $V_{5\%}$ was 2.7% of the contralateral one. Concerning the eart for $V_{20\%} <1\%$, $V_{10\%} <70\%$.

**Conclusions:** IPAS by RapidArc provides excellent coverage of the PTV while preserving healthy tissue. Processing speed improves its quality because infratractions movements are reduced. We have not observed severe acute toxicities.

**EP-1048**

**Compliance to multi-modality cancer therapy in carcinoma of the breast.** A. Sharma1, R. Madan1, V. Raina1, B. Mohanty1, P. Shukla1, G. Rath1

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**Objective:** To evaluate compliance of patients with carcinoma breast to cancer directed therapy in multidisciplinary cancer care setting.

**Materials and Methods:** The study included a total of 117 patients. Patients were assessed as per patient, disease and treatment related factors. Surgery included modified radical mastectomy or breast conservation surgery. Chemotherapy comprised of 6 cycles of FEC based or 4 FEC/4Docetaxel in neoadjuvant & adjuvant setting respectively. Heretin therapy was offered to patients with HER/neu overexpression. Radiation therapy delivered was 50 Gy/25#/5 wks, a boost of 16Gy/8#/1.5 wks was delivered to the lumpectomy cavity for patients undergoing BCS. All patients were considered for tamoxifen/ aromatase Inhibitors depending upon receptor & menopausal status. For the purpose of study compliance was defined as all patients who were able to complete the stipulated treatment (excluding the hormone therapy) as intended at the primary multidisciplinary clinic. The key factors evaluated for compliance and overall treatment time were date of initiation of cancer directed therapy, surgery date, chemotherapy initiation & completion dates, radiation start & completion date. Overall treatment time was calculated from the day of initiation of cancer directed therapy to completion of therapy (before the initiation of hormone therapy).

**Results:** Seventy percent of the patients presented in loco-regionally advanced disease. Most of the patients (66%) were between 40-69 years of age group. Receptor status positivity for Estrogen and progesterone receptor were 43% & 36% respectively whereas Her-2/neu was over-expressed in 36% of the patients. Eighty nine percent of the patients were subjected to curative therapy whereas 11% of the patients were subjected to palliative treatment. Modified radical mastectomy was performed in 72% of the patients whereas only 14% of the patients underwent breast conservation therapy. Neoadjuvant chemotherapy was administered in 51%of the patients while 34% of the patients received adjuvant chemotherapy. Sixty eight per cent of the patients received 50Gy/25R/5 wks whereas 14% received further lumpectomy boost. Eighty six per cent of the patients were compliant to cancer directed therapy whereas fourteen per cent of the patients failed to comply to the stipulated treatment before the initiation of hormonal therapy. For compliant patients the median overall treatment time was 262 (92-335) days.

**Conclusions:** Eight six per cent of the patients were compliant to cancer directed therapy whereas fourteen per cent of the patients failed to comply to the stipulated treatment before the initiation of hormonal therapy. For compliant patients the median overall treatment time was 262 days.

**EP-1049**

**Application of artificial intelligence for breast cancer classification before adjuvant radiation therapy**

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**Objective:** Although electronic health records are currently more common place, not all the information can be used in automatic processes, mainly due to the use of free text structured to abstract certain values in a table related to the health records. The objective of this study is to test a simple natural language processor (NLP) for automatic identification of tumor size from the pathology report (PR) before adjuvant radiotherapy for breast cancer (BC).

**Materials and Methods:** Consecutive PRs were identified by searching a database of BC patients treated with surgery and adjuvant radiation therapy before January - April 2012. The inclusion criteria included: (1) patients having an unstructured free-text PR; (2) non-metastatic BC; (3) non simultaneous contralateral BC. Our approach starts with the detection and extraction of the tumor’s size characteristics in unstructured free text from an electronic health record source (PR) using a simple NLP. Second, based on the data extracted, we applied different classification trees from the java data-mining open source software: weka. Three data mining algorithms were used: J48 based on C4.5 algorithm, LADtree, and NaiveBayes. A classification algorithm not based on data-mining was also applied. The PRs were reviewed and annotated by a 3rd year radiation oncology resident according to the 7th edition TNM staging system. Finally, an expert senior radiation oncologist reviewed the divergent classification results found between the resident and the different algorithms.

**Results:** A total of 68 PRs (test set) met the inclusion criteria. The pathological tumor size classification is shown (Table). The median PR length was 88 words (range, 69-244). Compared to human classification (resident), the coinccidence rates with the non-data mining based algorithm and the J48, LADtree, and NaiveBayes algorithms were 86%, 83%, 82%, and 77%, respectively. After the expert revision, the coincidence rates between algorithms and human classification were: 96%, 93%, 87%, and 82%, respectively. There were only 3 errors when using the non-based on data mining algorithm, being 5, 9 and 12 when using J48, LADtree, and NaiveBayes algorithms, respectively. The errors in the classification by the algorithms were mainly due to lack of recognition of multifocal status and inflammatory disease. The resident’s classification errors mostly resulted from use of the clinical T stage when the PR revealed a complete response after neoadjuvant chemotherapy.
Conclusions: This system based on artificial intelligence automatically enables the classification of tumor size in BC. Among the data mining algorithms, the J48 algorithm had the highest percentage of correctly classified cases and allows changes (i.e., guideline updates). This tool would save time in the data collection, prevent errors, and improve tumor classification as well as the quality of the therapeutic decision.


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Purpose/Objective: Breast conserving surgery and post-operative whole breast radiotherapy (RT) have proved to reduce local recurrence and improve survival of early stage breast cancer patients. On the other hand, it has been demonstrated that long-term survivors have a significantly higher risk of lung complications and cardiac death as a consequence of heart and lung irradiation during tangential breast RT. Respiratory gating RT provides a chance to reduce heart and lung doses. This study evaluates the cardiopulmonary dose sparing of a prospective-gating RT for left breast cancer using a four-dimensional computed tomography (4DCT) technique.

Materials and Methods: Patients with early left breast cancer, referred for adjuvant radiotherapy to our Institution, were enrolled in this study. For each patient, two simulation CT-scans were acquired: the first during free breathing and the second on prospective gating during deep inspiration breath-hold. The scans were monitored by the Varian RPM™ respiratory gating system. Whole heart and pericardium were contoured starting superiorly just below the left pulmonary artery. For each patient, two treatment plans, based on the two CT studies, were performed with conformal tangential fields. Maximum lung distance (MLD) was measured on beams eye view. Mean heart dose (MHD), heart V25, ipsilateral lung V20 and V30 were evaluated. This system based on artificial intelligence automatically enables the classification of tumor size in BC. Among the data mining algorithms, the J48 algorithm had the highest percentage of correctly classified cases and allows changes (i.e., guideline updates). This tool would save time in the data collection, prevent errors, and improve tumor classification as well as the quality of the therapeutic decision.

From January to November 2012, 71 patients were enrolled. Median age was 50 years (range 30-76), the mean breathing period was 4.3 s (range 2-12.9), and the mean 4DCT scanning time was 12.2 s (range 5-19). Overall patients’ compliance was good. The average MHD was 3.2 Gy (range 0.90-8.70) in the 4D plans and 1.8 Gy (range 0.50-4.70) in the 3D plans (p<0.0001). The mean heart V25 was 2.2% (range 0.12-60.60) and 0.14% (range 0.34-0.340) for 3D and 4D plans, respectively (p<0.0001). The average MLD was 2.17 cm (range 0.97-3.74) on 3D plans and 2.43 cm (range 1.25-4.0) on the 4D plans (p<0.0001). The mean lung V20 and V30 were 11.28% (range 1.70-27.50) and 9.37% (range 1.10-24.80) for 3D plans, and 9.25% (range 3.50-20.60) and 7.89% (range 2.40-30.40) for 4D plans (p<0.0001 and p=0.0035, respectively). Conclusions: Prospective gating tangential RT to left breast allows the delivery of a significantly lower dose to heart. The MLD was significantly higher on 4D plans, but the ipsilateral lung received an overall smaller dose of RT, as demonstrated by the significantly lower V20 and V30.


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Purpose/Objective: The aim of this prospective study is to evaluate feasibility, early and late skin toxicity in women treated with hypofractionated whole breast irradiation schedule for breast cancer.

Materials and Methods: Between 2/ 2008 and 4/ 2011, 40 women with invasive early breast cancer were treated with conservative surgery followed by sentinel-node biopsy in 47.5% and axillary dissection in 40%. No axillary node surgery was performed in 12.5% of cases. The median age was 72 years (range 56-85). Hystology was as follows: infiltrating ductal carcinoma 30/40 pts, infiltrating lobular carcinoma 6/40 pts, CDI and CLI 1/40 pt, others 3/40 pts. Stage was as follows: pT1 in 33 pts (82.5%), pT2 in 7 pts (17.5%). The axillary lymph nodes were negative in 77.5% and positive (pT1a) in 12.5%. Thirty-five pts received adjuvant hormone therapy and 3 pts received adjuvant systemic therapy respectively. Radiation therapy was delivered by means of two opposed tangential fields. Using the original planning computer tomography scans the entire breast and OARs were delineated. The DVH histograms were accepted just if PTV was included in ICRU constraints. All pts were treated with 6-15 MV x-rays. Median whole-breast irradiation dose prescribed was 40.05Gy (range 40-42.5 Gy) administered in 15-16 fractions of 2.5-3.6Gy (15 fractions/week). Boost irradiation to the tumor bed with the doses of 2 to 3 Gy/ fraction was performed in 4 cases. No attempt was made to treat the axilla or the supraclavicular or internal mammary nodes.

Results: All pts completed the schedule. The median follow-up was 18 months (range 16-54 months). All pts were routinely evaluated to register acute side effects and late skin toxicity according to RTOG criteria. At the end of treatment 50% presented grade 0 acute skin toxicity, 35% had grade 1, 15% had grade 2. At 6 months there were 30% cases of grade 1 skin toxicity and 7.5% of grade 2. At 12 months 45% and 5% of pts presented with clinical grade 1 and grade 2 fibrosis respectively and 3% presented hyperpigmentation. At 24 months, with 21 patients evaluated, just 1 pt showed grade 2 late fibrosis. The remaining pts were free of side effects. No pts experienced local relapse, nor distant metastasis.

Conclusions: Our data showed a good feasibility of the hypofractionated schedule in terms of acute and late skin toxicity. The hypofractionated schedule shortens the overall treatment time and represents a biologically acceptable alternative to the traditional 6 weeks regime.


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Purpose/Objective: Functional imaging is known as accurate tool for evaluation of chemotherapy (CT) efficacy in patients (pts) with breast cancer (BC). We determine the group of patients with excellent functional response to neoadjuvant chemotherapy as a potential candidates for breast irradiation instead of mastectomy.

Materials and Methods: 50 primary pts with advanced BC (T3-4, N1-2) were included in this study. Breast scintigraphy (BS) was done before the start of CT and after 2-6 cycles of treatment with taxane-doxorubicin based regimens ± trastuzumab. BS was performed 10-15 min after i/v injection of 740 MBq of 99mTc-MIBI. Qualitative and semiquantitative scores were used to qualify dynamic of tracer uptake.

Results: