4 MeV and 12 MeV (20%, 14% and 6% cases respectively) were used. In 54% cases applicator size was 5 cm in diameter. The smallest was 4 cm (15%) and the largest 7 cm (used only in 5% cases). Treatment applicators with 0°, 15° and 30° beveled tips were used (32%, 41% and 26% cases respectively). In 60% cases no bolus was needed; 0.5 cm bolus was used in 44 cases (29%). In all treatment procedures aluminium-lead shielding plates were used, 85% of which were 0.5 cm thick. The mean thickness of irradiated breast gland was 2.1 cm between 0.8 cm and 3 cm. PTV volume (volume of tissue encompassed by the 90% isodose line) was rather small, with average volume of 42.50 cc ranging from 15.00 cc to 92.10 cc.
Conclusions: Intraoperative radiotherapy is proved to be effective, tolerable and perspective treatment procedure. The external beam course afterwards was shortened by 1 week.

OC-0478
7 years follow-up among patients with early stage breast cancer treated with single fraction IORT
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Purpose/Objective: Long term follow-up (f/u) of patients (pts) undergoing accelerated partial breast irradiation (APBI) with single-fraction (SF) intraoperative radiotherapy (IORT) following breast conserving (BC) surgery is limited. We report our institutional experience with SF IORT in early stage breast cancer with respect to local control and toxicity.
Materials and Methods: Records were reviewed for 64 consecutive pts who received SF IORT from 2002 to 2014 at our institution. Of these, 47 pts were prospectively enrolled in an institutional IRB-approved phase I-II study between 2002 and 2008. Eligible pts were ≥40 years with stage 0, I or II breast cancer measuring ≤2.5 cm without nodal involvement and were all screened with breast MRI for multifocal (MF) or multicentric (MC) disease (both exclusion criteria) (EC). 8 of the 47 pts did not fully meet eligibility criteria and declined additional surgery or radiation. The remaining 17 patients were treated per protocol guidelines between 2009 and 2014. IORT was delivered using either a 200 kV orthovoltage source or electrons to 15-21 Gy prescribed to the 90% isodose line.
Results: The median age at treatment was 61 years (range: 40-84 years). Median f/u time was 88 months (range 1 – 144 months). Two pts had an ipsilateral breast tumor recurrence (IBTR), with one not meeting EC. A third patient with EIC and nodal micrometastasis later developed an axillary recurrence. All 3 patients had declined further surgery, radiation and/or systemic therapy. Overall, 52 of 64 pts (81%) received adjuvant systemic therapy consisting of endocrine therapy (n=49), chemotherapy (n=5) and/or trastuzumab (n=1). For patients who met original protocol guidelines, the IBTR rate was 1.6% at 6 years of f/u. On univariate analysis, the following factors emerged as significant predictors of IBTR: age <50 years (p<0.001), pathologic nodal involvement (p<0.001) and lack of any adjuvant systemic therapy (p=0.001). There were 2 cases of isolated distant relapses, which occurred in patients who had also declined adjuvant systemic therapy. Lack of systemic therapy was the only significant predictor of distant relapse (p=0.01). All 64 patients tolerated IORT well with no evidence of grade III or higher toxicity.
Conclusions: APBI using IORT is an inherently desirable option for BC therapy in appropriately selected pts. Our group has an IBTR rate of 1.6% at 7 years of f/u. We conclude that adherence to appropriate clinical guidelines for patient selection and strongly advising adherence to recommendations for additional surgery, radiation and systemic therapy are critical for successful use of APBI using SF IORT.

Poster Discussion: IORT in breast cancer: Where do we stand?

PD-0479
Intraoperative radiation therapy for breast cancer with INTRABEAMÆ: minimizing cost analysis
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Purpose/Objective: In selected patients, partial breast irradiation (PBI) could be a good option for delivering radiation therapy. Brachytherapy, conformal external radiation therapy (EBRT) and intraoperative radiation therapy (IORT) are the most common therapies as PBI. Using an Intrabeam® device as IORT has been considered expensive due to the initial cost of the equipment.
The purpose of this study is to elucidate the real cost of IORT with Intrabeam® in breast cancer, comparing with conventional EBRT.
Materials and Methods: Between Jan-2013 and Nov-2014, 75 breast cancer patients were treated with IORT during conserving surgery in our institution, delivering a dose of 20 Gy, with treating times adjusted to applicator diameter. Costs were estimated with time of surgery theatre occupation, radiation oncologist, physicist and technician, fungible material, applicators and total equipment cost distributed proportionately among patients. For EBRT costs calculations, there has been included institutional fares and price for distance travelled by patients daily. Also we calculated the waiting time that could influence QoL.
Results: - For the 75 IORT patients, treatment time was registered by the device software, with an average of 24.66min (15.97-49.07min), meaning an added cost of 327.46€ (212.04-651.6€). Equipment total cost proportion was 1600 €/patient. Adding staff time and fungibles, the average total cost of the procedure has been 2398.45€ (2283.03-2722.6€). For the whole series, the total estimated cost has been 201123.75€.
- The average 75 EBRT cost per patient was 3980.43€, with a total cost of 298532.25€ for the 75 patients. Considering daily patient routes twice a day, 25 days, total cost will be increased to 299376.45€, being a more realistic approach.
- For the 75 patients treated with Intrabeam®, 98252.70€ have been saved, comparing with equivalent EBRT.
Investigating daily waiting time during EBRT, we have compared the difference between the daily treatment appointment time and the real treatment time in 12 random patients of the previous year. We found an average daily delay of 15.9min/patient, that means a total waste of 6h and 37min/patient for the whole treatment and a total of 497h for the 75 patients. As personal cost, the whole group had employed more than 20 days waiting to be treated with EBRT.
Conclusions: Despite of the apparent high cost of equipment needed, IORT with an Intrabeam® device presents an

economical benefit compared to conventional standard EBRT, with a saving of 98252.70€ in 75 treated patients. It also associates a time profit that may improve QoL.

PD-0480

Single dose IORT for early-stage breast cancer in elderly women: tolerance and results

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Purpose/Objective: Rationale of accelerated partial breast irradiation (APBI) is the prevention of local relapse in breast area with the highest probability of recurrences in strictly selected patients. Intraoperative Radiotherapy (IORT) is one of the most promising techniques of APBI. The aim of this study is the preliminary evaluation of toxicity, cosmetic effect and 5-years rate of ipsilateral breast recurrences in patients treated with exclusive single dose IORT with electrons after quadrantectomy (QUAD) for early stage-breast cancer.

Materials and Methods: Between January 2008 and June 2014 thirty-one women were treated with single dose IORT in our Institution. Thirteen were enrolled into a multi-centric randomized trial (coordinated by Regina Elena Institute of Rome) and eighteen were treated with single dose for age and co-morbidities, that contraindicate external beam radiotherapy (EBRT). Patients underwent QUAD with sentinel lymph node biopsy. All of them were older than 60 years or in post-menopausal status, with a single tumour sized 2 cm or less, histological proven invasive ductal or lobular carcinoma and clinically N0. IORT was delivered with a mobile Linear Accelerator (NOVAC7 by SIT) with a total dose of 21 Gy. An electron energy 7 to 9 MeV was used. A perspex shield was placed under the mammary gland, to reduce dose to the chest wall, heart and ipsilateral lung. Acute and late toxicities were evaluated one month after the treatment, then every three months for two years and every six months up to 5 years, according to RTOG scale while cosmetic outcomes was assessed by Harvard criteria.

Results: The median follow-up was 54,6 months (range 5 to 78). Mean age of the patients was 72,5 years (range: 62-80). Pathologic findings identified twenty-six patients as infiltrating ductal carcinoma and 5 as infiltrating lobular carcinoma. Patients presented N0 or N1mic status, except for two cases with N1a, and negative surgical margins. Average diameter of applicators was 60 mm (range 40-80). Treatment was successfully completed in all patients with an average lengthening of the operative time of about 20 minutes. At the long follow-up only one woman presented local relapse after 55 months from IORT; she underwent re-excision followed by EBRT. Acute toxicity was G0 in 19 patients, G1 in 8 cases and G2 in 4 patients. No G3/G4 toxicities occurred. As early side effects 6 patients experienced seromas and one patient complained wound healing difficulties. G1/G2 late toxicity occurred in 6 patients. No lung or heart toxicities were observed. Cosmetic valuation was excellent/good in 25 patients; 6 cases were scored as fairy/poor.

Conclusions: IORT with a single dose in early breast cancer is feasible and well tolerated technique. In our experience it resulted in a significant shortening of radiotherapy time and gain in quality of life in elderly patients. In eligible cases (according to age and clinical staging) it seems a valid treatment option for adjuvant radiotherapy.

PD-0481

Local control and cosmetic outcome on 100 early breast cancer treated with exclusive IORT

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Purpose/Objective: To evaluate local control and cosmetic outcome of intra-operative radiation therapy (IORT) as an exclusive treatment of early stage breast cancer in patients with criteria as GEC-ESTRO (good candidates).

Materials and Methods: From October 2008 to December 2013, 100 patients underwent wide breast cancer excision or quadrantectomy followed by IORT on tumor bed with accelerated electrons (Novac 7 NRT) at the dose of 21Gy. Patients were aging at least 50 years with unicentric, unifocal, pT1-2

Results: The average age was 63.89 (range 50–89) with an average follow up of 33 months (range 6–65). The pathologic stage of the lesions resulted pT1 in 82 cases (82%), in particular: 5 cases pT1a (6,1% on 82 cases), 38 pT1b (46,3%) and 39 pT1c (47,6%); 11 cases (11%) was pT2 with a diameter of 2,5 cm.

The Grading was G1 in 21 cases (21%), G2 in 59 cases (59%) and G3 in 13 cases (13%). The toxicity, evaluated according to the EORTC-RTOG criteria, was G0 (37%) in 37 cases, G1 (48%) in 48 cases, G2 in 6 case (6%); only 2 was G3 (2%). We observed 9 case of lymphocele (9%); there were no infections of the surgical wound nor any mastitis, neither in the treated quadrant nor in the other ones.

We observed a light fibrosis in 14 cases (14%), moderate in 9 (9%) and liponecrosis in 10 cases (10%). As regards local control, there was 2 (2%) local relapse and 1 second tumor. The global survival was 100%.

Cosmetic outcome, evaluated in four levels (Danoff and co.), was excellent in 17 cases (17%), good in 63 (63%), sufficient in 11 cases (11%), never insufficient.

Conclusions: The IORT in early breast cancer, at the doses used in this study on patients according to GEC-ESTRO criteria, provided itself as a secure technique, repeatable, with good local control and cosmetic outcome.

PD-0482

Early breast cancer treated with an electronic IORT system: report of the first patients treated in Portugal

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Purpose/Objective: To describe the initial experience of the first institution in Portugal in treating early breast cancer with intraoperative radiotherapy (IORT) with an electronic brachytherapy system.

Materials and Methods: We retrospectively analyzed the data of 30 women who underwent intraoperative irradiation during breast conserving surgery between April 2012 and November 2014. Treatment was performed in a single