**Oral abstract**

**ITALIAN REPORT ON IORT AS ANTICIPATED BOOST IN I AND II STAGE BREAST CANCER**

Ciabattoni A. 1, Mirri M. A. 1, Checchaglini F. 2, Bracarda E. 2, Al Sayad S. 2, Sceni G. 1, Tucci E. 2, Perillo F. 2, De Paula U. 2, Verna L. 1, Nardone L. 1, Terribile D. 1

1 S. Filippo Neri Hospital. Rome. 2 Città di Castello (PG).
1 Reggio Calabria. 2 Grosseto Fatebenefratelli S. Pietro Hospital. Rome. 3 Catholic University. Rome. Italy

**Purpose:** In last years IORT has been used in different ways for the treatment of breast cancer. Local control has always been very high and the toxicity related to the method very low. This encouraged the use of this technology in the multimodality treatment of breast cancer, but it is limited to a few Institutions. Furthermore, there are not many published data about this topic and it is not considered yet in high level evidence based medicine. Anyway the diffusion of the disease, the relative simplicity of the surgical techniques for breast cancer and the possibility of treating intraoperatively even with the standard accelerator located in the Radiotherapy Unit, as well as the use of dedicated mobile accelerators, increased the number of clinical experiences with IORT in breast neoplasms, particularly as boost.

**Materials and methods:** A report has been performed by 6 Italian Institutions about the use of IORT as anticipated boost in I and II stage breast cancer after breast-conserving surgery. From April 1999 to January 2008 a total of 338 patients were treated with an anticipated intraoperative boost after conservative surgery. At histology the most of them were IDC (86.4%). Tumour resection was performed with quadrantectomy or wide tumorectomy and surgical negative margins were assessed before IORT was made. Twelve patients underwent a R1 resection. A single electron dose in a range of 6 to 15 Gy was applied, mainly to the 85-90% reference isodose, with perspex or lead tubes of forty to eighty millimetres diameter and energies that ranged from 6 to 12 MeV. External radiotherapy was performed on the whole breast with a range of 40 Gy/20 fr to 44 Gy/16 fr to 50-50.4 Gy/25-28 fr. A mobile linear accelerator Novac7 was used in four of the Centers, one used a dedicated surgical room and the other the technique with patient transport.

**Results:** The median follow up was of 46.8 months (range 2-110 months). Only 3 local recurrences (one in breast-same quadrant, the second in breast-other quadrant, the last was a diffuse mastitis) were observed, with a local tumour control rate of 99.2%. 303 (86.7%) patients are alive with no evidence of disease. Twenty-three patients developed distant metastases and 10 patients died, three of them not for the disease 31 patients (9.2%) developed acute toxicity (16 post-surgical seromas, 10 wound healing problems, one post-surgical dehiscence and four liponecrosis) and no late severe complications associated with IORT were observed.
Conclusion: Our report shows that IORT as anticipated boost gives optimal dose delivery and good tolerability. Results in terms of local control are very encouraging but need to be confirmed by longer follow-up. Great attention should be given to the technique, doses and target volume to improve the results and minimize the related toxicity of therapy. In our analysis the main difficulties for employing IORT regard patients in which treatment involves transportation issues: these difficulties may be the reason why many eligible patients don’t receive intraoperative boost. However, the current EBM for IORT in breast cancer is poor, making the definitive assessment very difficult. A major number of well-controlled multi-institutional studies with homogeneous inclusive criteria are necessary for that.

Oral abstract
LONG FOLLOW UP RESULTS ON IORT AS ANTICIPATED BOOST IN I AND II STAGE BREAST CANCER AFTER BREAST CONSERVING SURGERY

Ciabattoni A.1, Petrucci A.2, Palloni T.1, Siniscalchi A.1, Vidiri F.1, Consorti R.2, Mangiacotti F.2, Drago S.2, Grassi G. B.2, Ciccone V.1
Units of 1Radiotherapy, 2Medical Physics, and 1General Surgery, Azienda Ospedaliera San Filippo Neri, Rome, Italy

Purpose: Breast-conserving surgery plus adjuvant radiotherapy is the standard in the treatment of early stage breast cancer. Many studies confirmed the utility of a boost of 10 to 16 Gy on the tumour bed, but no standard technique exists for that. External boost radiation can partially miss the tumour bed and therefore can result in local failure. IORT is a high precision boost that can prevent a “geographical miss” and it seems to be associated with an extremely low incidence of complications, leading to the hypothesis that this technique may be a good alternative to external electron boost. The aim of this study is to present the long term results on local control, aesthetic evaluation and toxicity of stage I and II breast cancer patients treated with IORT as anticipated boost after quadrantectomy, using a mobile linear accelerator (Novac7) at S. Filippo Neri Hospital, Rome.

Patients and methods: From April 1999 to January 2008 intraoperative radiotherapy given as boost after breast-conserving surgery in early breast cancer patients has been carried out at San Filippo Neri Hospital in Rome. A total of 183 patients up to 75 years (range 29-75), I and II stage breast cancer and ECOG performance status < 2, were treated with an anticipated intraoperative boost dose of 10 Gy to PTV (including tumour volume with a radial margin of 2 centimeters). All the patients received additional 50 Gy of external radiotherapy in 25 fractions to the whole breast. Surgical treatment included tumour resection with at least one centimetre macroscopic free margin. A mobile linear accelerator Novac7 was used as facility in surgical room.

Results: The median follow-up was 63.4 months (range 2-110 months). No local recurrences were observed in IORT patients. As acute toxicity 15 patients developed post-surgical seromas and 5 wound healing problems occurred. No late complications associated with IORT were observed, but two cases of liponecrosis in the treatment area (both of them requested surgical resection). In 5 patients, a secondary mastectomy was performed for tumour multicentricity or excessive intraductal component. Cosmetic result was very good and comparable to patients treated with external boost. The overall DFS was 82%, 15 patients developed distant metastasis and six died (four of them for disease). Three patients were lost at the follow up.

Conclusion: Our data suggest that IORT as anticipated boost after breast-conserving surgery is a reliable alternative to conventional postoperative fractionated boost. Further research is required to clarify several issues such as identification of the most appropriate subgroups of patients for IORT, comparison of the currently available mobile IORT technologies, establishing whether IORT is most appropriate as boost or replacement for all postoperative radiotherapy, the examination of differences in biology between the two treatment modalities and precisely determining where local recurrences originate with respect to the original tumour site.

Oral abstract
PRELIMINARY RESULTS OF ELECTRON INTRAOPERATIVE THERAPY BOOST AND HYPOFRACTIONATED EXTERNAL BEAM RADIOTHERAPY AFTER BREAST CONSERVING SURGERY IN PREMENOPAUSAL WOMEN

Ivaldi G. B.1, Leonardi M. C.2, Orecchia R.2, Zerini D.1, Galimberti V.2, Gatti G.2, Luini A.2, Veronesi P.1, Ciocca M.2, Sangalli C.1, Fodor C.1,1, Veronesi U.2

Department of Radiation Oncology, Division of Breast Surgery, Medical Physics Unit. European Institute of Oncology, Milan, Italy.

Purpose: To report acute and preliminary data on late toxicity of a single institution pilot study of anticipated boost with electron intraoperative therapy (ELECT) followed by an hypofractionated external beam radiotherapy (HEBRT) of the whole breast in the post breast conserving surgery setting.

Methods and materials: From June 2004 and March 2007, 211 premenopausal women with diagnosis of early