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Original research article

Radiation techniques used in patients with breast cancer: Results of a survey in Spain

Manuel Algara, Meritxell Arenas, Dolores De las Peñas Eloisa Bayo, Julia Muñoz, José Antonio Carceller, Juan Salinas, Ferran Moreno, Francisco Martínez, Ezequiel González, Ángel Montero*

Breast Cancer Radiation Oncology Spanish Group (GEORM), Spain

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ABSTRACT

Aim: To evaluate the resources and techniques used in the irradiation of patients with breast cancer after lumpectomy or mastectomy and the status of implementation of new techniques and therapeutic schedules in our country.

Background: The demand for cancer care has increased among the Spanish population, as long as cancer treatment innovations have proliferated. Radiation therapy in breast cancer has evolved exponentially in recent years with the implementation of three-dimensional conformal radiotherapy, intensity modulated radiotherapy, image guided radiotherapy and hypofractionation.

Material and Methods: An original survey questionnaire was sent to institutions participating in the SEOR-Mama group (GEORM). In total, the standards of practice in 969 patients with breast cancer after surgery were evaluated.

Results: The response rate was 70% (28/40 centers). In 98.5% of cases 3D conformal treatment was used. All the institutions employed CT-based planning treatment. Boost was performed in 56.4% of patients: electrons in 59.8%, photons in 23.7% and HDR brachytherapy in 8.8%. Fractionation was standard in 93.1% of patients. Supine position was the most frequent. Only 3 centers used prone position. The common organs of risk delimited were: homolateral lung (80.8%) and heart (80.8%). In 84% histograms were used. An 80.8% of the centers used isocentric technique. In 62.5% asymmetric fields were employed. CTV was delimited in 46.2%, PTV in 65% and both in 38.5%. A 65% of the centers checked with portal films. IMRT and hypofractionation were used in 1% and in 5.5% respectively.

Conclusion: In most of centers, 3D conformal treatment and CT-based planning treatment were used. IMRT and hypofractionation are currently poorly implemented in Spain.

* *Corresponding author at*: Radiation Oncology Department, Hospital de la Esperanza, San Jose de la Montana, 12, 08024 Barcelona, Spain. Tel.: +34 933674144; fax: +34 933674271.

E-mail address: malgara@parcdesalutmar.cat (M. Algara).

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1. Background

Breast cancer is the most common non-cutaneous cancer arising in women, accounting for nearly one-third of cancers diagnosed in females. Most cases are diagnosed in postmenopausal women, with an average age around 60 years. Early detection, when the tumor has not been extended or changed, raise the cure rate up to almost 90%. This has also increased the percentage of breast conservative treatment.[1] Currently, in Spain, 15.000 new breast cancer cases are diagnosed each year, indicating that one in sixteen to eighteen Spanish women will have breast cancer.[2]

Adjuvant radiotherapy to the breast is now considered part of the standard care in breast conserving therapy. An increasing number of women with early breast cancer in Spain and other countries are treated with breast-conserving therapy, based on the results of trials showing similar efficacy between these techniques and mastectomy.[3–5] In two meta-analyses, radiotherapy after breast-conserving therapy was shown to improve both locoregional control and survival of patients with breast cancer.[6] The role of radiotherapy in terms of reducing local recurrence and increasing survival after conservative surgery and after a mastectomy has been demonstrated in several randomized trials. A meta-analysis published by the group of the Early Breast Cancer Trialists' Collaborative Group showed that radiation therapy in postoperative loco-regional breast cancer increases breast cancer survival and overall survival of patients.[7]

The demand for cancer care has increased among the Spanish population, as cancer treatment innovations have proliferated. Radiation therapy in breast cancer has evolved exponentially in recent years with the implementation of three-dimensional conformal radiotherapy (3D-CRT), intensity modulated radiotherapy (IMRT), image guided radiotherapy (IGRT) and hypofractionation. While 3D-CRT has been considered as standard of care, IMRT, IGRT and hypofractionation still need further assessment. To evaluate the state of the implementation of these new techniques, it is essential to define the needs for new units and their characteristics since breast cancer represents 25–30% of patients treated in most radiotherapy departments in our country.[2] Moreover this study is needed prior to the design of multicenter clinical protocols. There are only a few studies designed to evaluate the radiation therapy technique used in a daily clinical practice cancer care in a country, and in Spain there are no studies on this subject.

A prospective study was proposed by the Breast Cancer Radiation Oncology Spanish Group (GEORM) with the aim to evaluate the resources and techniques used in the irradiation of patients with breast cancer after lumpectomy or mastectomy and the status of implementation of the new techniques and therapeutic schedules in our country.

2. Materials and methods

The objective of the present study was to collect data from treatments between February and March 2009, to learn about the technique and fractionation schedule of radiotherapy in Spain. For the study to be representative, it was intended to collect data from 1000 cases in over 28 centers and more than 10 regions of Spain. We designed two tools: a database and a questionnaire. There was no financial support for the present study.

2.1. Database

A computerized database was developed which included 51 variables (v) allocated into five groups: demographics (6 v); characteristics of patients (6 v) and tumors (15 v); other treatments (8 v) and radiotherapy (16 v). Most of these questions were closed questions, including quantitative and multiple choice questions. Then, it was sent to departments responsible for breast disease in 40 centers of 12 regions in January 2009. The results were submitted in May 2009. Response was obtained from 28 centers (70%) of 12 regions of Spain (100%).

2.2. Questionnaire

A questionnaire was designed including 46 v questions about techniques and aspects related to the positioning of treatment, immobilizing supports (breastboard, braisserie, etc.), skin references, simulation systems, radiation technique, definition and delineation of GTV and critical organs, dosimetry, histograms and the control system used in the treatment. The questions in this survey were designed to learn about radiation techniques used in breast cancer patients and hence representing the current Spanish practice. This questionnaire was first tested by 3 experts in the field of breast cancer and then adjusted based on their comments. This questionnaire was sent to 28 participants, of which 26 (92.9%) responded.

2.3. Statistics

Quantitative and some categorical variables were considered. Likert scale (categorical variable: never, rarely, sometimes, very often and always) is a psychometric scale commonly used in research using surveys. The statistical analysis included a description of all variables. Intensity factors were calculated as an average of the responses with the following numerical categories: (1) never, (2) rarely, (3) sometimes, (4) very often, and (5) always. The techniques and fractionation schedules were compared on the basis of previous surgeries, i.e., lumpectomy and mastectomy.

3. Results

3.1. Patient and tumor characteristics

This study included 969 patients recruited from 28 centers distributed throughout 12 regions of Spain. The 28 radiation departments completed a database corresponding to a 70% response rate and 100% of autonomous communities on the mailing list. 31.8% of patients came from a screening program. In total, 25.4% were premenopausal, 7.2% perimenopausal and 66.8% postmenopausal. Patients' age was 57.8 ± 12.5 years. Surgical procedures were: 79.3% breast-conserving surgery (C group) including 52.7% lumpectomy and 26.5%