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Are breast cancer patients treated with radiotherapy younger now than ten years ago?

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ABSTRACT

Aim: The aim of the present study was to analyze the age of breast cancer patients managed with curative approach at the time of treatment with radiotherapy.
Background: Breast cancer is the most frequent neoplasm in women. Little is known with regard to the age of patients at diagnosis, and some authors have suggested that breast cancer is now affecting women who are younger than before.
Materials and methods: We performed a descriptive study of our series of breast cancer patients from 1998 to 2011. The age of patients, city of residence, year of treatment and uni- or bilateral location were extracted from the administrative database of the Radiation Oncology Department. The demographical and reference populational data were extracted from the Catalan Institute of Statistics.
Results: 3382 patients were obtained. The mean age was 57.79 years. No statistical differences were observed in the mean age during the period of study ($p > 0.05$), nor in patients with bilateral neoplasias with regard to unilateral tumours ($p > 0.5$). Patients aged less than 30, 40, 50 and 65 years were 0.3%, 6.3%, 27.0% and 69.1%, respectively. The proportion of patients aged less, equal or more than 40 and 50 years was not statistically different.
Conclusions: Breast cancer patients treated with adjuvant radiotherapy after radical surgery have not experienced significant changes in their mean age at treatment. The subgroups

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of patients that remain out of the mammographic screening programmes were unchanged as well. The observed differences can be explained by demographical disparities and by a probable increase in the indications for adjuvant radiotherapy.

1. Background

Breast cancer is the most frequent neoplasm in women. It represents 28% of female cancer cases in Catalonia (Spain) with an incidence of 97.3 and 99.3 new cases per 100 000 women, according to the population registries of Tarragona and Girona, respectively (data from 1998 to 2002). In 2002 the estimated incidence was of 3829 cases which is expected to rise to 6482 new cases in 2019.[1] Fortunately, breast cancer deaths declined by 3% per year in Catalonia between 1993 and 2007.[2] A recent analysis of 2023 women with incident invasive breast cancer collected from 1992 to 2005 in an institutional cancer registry in Barcelona (Catalonia, Spain), showed that the 5-year disease-specific survival rate increased from 73.5% to 86.4% (log rank, $p < 0.001$).[3]

However, there is a lack of recent data in describing possible age variations at diagnosis of breast cancer patients. To our knowledge, the only previous study was conducted by the Geneva Cancer Registry (Switzerland), motivated by the feeling of some health professionals that breast cancer incidence was increasing in younger patients. The study showed an 8.7% annual increase in breast cancer incidence for women aged less than 40 years in the period from 2002 to 2004.[4]

While the "Vallès Occidental" region holds the second highest rates of population density in Catalonia, the area lacks a population cancer registry. Cancer incidence estimates in Catalonia come from the population registries of Tarragona and Girona that cover approximately 20% of the whole Catalan population. It is well known that adjuvant radiation therapy (ART) for breast cancer can reduce by half the risk of recurrence and by a sixth the probability of death.[5,6] In addition, ART in breast cancer patients is advisable for approximately 83% of all surgically treated patients.[7] So, as matter of the high percentage of breast cancer patients that receive radiotherapy, the objective of this study was to describe the age distribution of breast cancer patients treated with ART with the aim of defining the possible variations in the age at treatment of breast cancer patients during the last 10 years.

2. Materials and methods

This is a descriptive epidemiological study of a series of breast cancer patients treated with adjuvant radiation therapy in the region of the *Vallès Occidental* (*Catalonia, Spain*) that has a population of about 900 000 inhabitants. The study included patients coming from the following municipalities in the region: *Badia del Vallès*, *Barberà del Vallès*, *Castellar del Vallès*, *Castellbisbal*, *Cerdanyola del Vallès*, *Matadepera*, *Palau-solità i Plegamans*, *Polinyà*, *Ripollet*, *Rubí*, *Sabadell*, *Sant Cugat de Vallès*, *Sant Llorenç de Savall*, *Sant Quirze del Vallès*, *Santa Perpètua de Mogoda*, *Sentmenat*, *Terrassa*, *Ullastrell*, *Vacarisses* and *Viladecavalls*. We extracted the administrative data of the correlative patients treated from 1st January 1998 to 31st December 2011 at the Radiation Oncology Department of the *Institut Oncològic del Vallès*, at *Sant Cugat* headquarters. The patients come referred from the main hospitals in the region: *Corporació Sanitària Parc Taulí* (Sabadell, Barcelona), the *Consorci Sanitari de Terrassa* and *Mutua de Terrassa* (Terrassa, Barcelona). Population accounts were extracted from the Catalonian Statistics Institute website.[8] Due to logistic reasons, some patients meeting the inclusion criteria (135) were referred for treatment to the RT Department of the Parc de Salut Mar (Barcelona). Those patients were counted when calculating the rates of RT treatments performed during the last 10 years.

2.1. Participants, procedures, variables, and measures

We obtained a sample of 3382 patients during 10 years. Due to the administrative nature of the extracted data, neither clinical nor private information was obtained from clinical reports.

Inclusion criteria were: (1) female sex, and (2) first treatment with radiotherapy to the breast or chest wall. Exclusion criteria were: (1) male sex, and (2) palliative approach.

Study variables were: (1) the age of patients when the radiotherapy treatment began, (2) the year of RT administration, (3) laterality (unilateral or bilateral, in spite of a synchronic or metachronic diagnosis), (4) city of residence, and (5) inhabitants per city.

Data were stratified by age groups at thresholds of 40, 50 and 65 years.

2.2. Data analysis

We began with descriptive analyses to characterize the study population. The obtained sample easily led us to obtain a wide 3% of accuracy (e) for an error alpha of 0.05, based on the probability of being diagnosed with breast cancer at an age under 45 years (12.1%[9]). The qualitative variables were characterized by proportions and an interval of confidence (IC) of 95%. Quantitative variables were characterized by means and standard deviation (DE).

Statistical differences were analyzed by the t-Student test, χ^2 or by ANOVA with a signification degree (p) of less than 0.05.

The statistical analysis was performed with the software Stata v10.1[10] and OpenEpi.[11]