



Breast cancer incidence and survival in elderly women during the 1989–2012 period: A population-based study in a French area

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ABSTRACT

Introduction: The incidence trend, characteristics and prognosis of breast cancer could differ by age group. The main objective was to describe the evolution of breast cancer incidence in women aged ≥ 75 years and to estimate survival rates

Methods: A cohort study was set-up using data from a population-based cancer registry. Standardized incidence rates were computed during the 1989–2012 period. Ten-year net survival rates were estimated using cases diagnosed.

Results: A total of 3,523 breast cancers were diagnosed. The average annual increase of incidence rates was 7.9% (95% CI: 4.8–11.1%) and 1.1% (95% CI: 0.6–1.6%) for in situ and invasive breast cancers, respectively. Ten-year net survival rate was lower for women aged ≥ 75 years (67% (95% CI: 61–74%)) compared to women aged 50–74 years (82% (95% CI: 81–83%)).

Conclusion: A greater disease severity at the time of diagnosis, and less effective treatments given to elderly patients are the most plausible explanations for lower survival.

1. Introduction

Breast cancer is the most frequent of all cancer in women. In France, 48,763 news cases were diagnosed in 2012 [1], including 11,619 cases among women aged over 75 years. Breast cancer remains the leading cause of cancer death in France for women [2]. Incidence rates increases with age and the number of elderly people living after being diagnosed a breast cancer has increased due to longer life expectancy [3]. However, this age group remains underrepresented in clinical trials [4]. This age group is probably undertreated. The study of the incidence of breast cancer in elderly women would suggest a reflection on current screening strategies. The main objective of our study was to describe the evolution of breast cancer incidence during the 1989–2012 period in elderly women, i.e. women aged ≥ 75 years, in Isère, and to estimate survival rates in this population. The secondary objectives included the comparison of incidence trend and survival between women aged ≥ 75 years and women aged 50–74.

2. Material and method

2.1. Study design and setting

We analyzed the original data from an ongoing population-based cancer registry in Isère, a French administrative entity with nearly 1.2 million inhabitants.

2.2. Study population

The present study included all women aged ≥ 50 years diagnosed with an incident primary in situ or invasive breast cancer between January 1, 1989 and December 31, 2012.

2.3. Data collection

The data were collected by the Cancer Registry of Isère. Sarcomas and lymphomas of the breast were excluded from this study. Stage at

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diagnosis was classified according to the Standards and guidelines for cancer registration in Europe published by the European Network of Cancer Registries and tumors not treated by surgery were considered as stage 4. An active search for the vital status at June 30, 2013 was carried out for all cases included in the study.

2.4. Statistical analysis

First, annual age-standardized incidence rates were computed for each calendar year from 1989 to 2012. A standardized incidence rate is the summary rate that would have been observed, given the age-specific rates observed in Isère, in a population with the age composition of some reference population, called the standard. The aim is to provide a single summary statistic that is independent of the effects of age. Age-standardized rates were computed by applying age-specific rates observed in Isère to the world standard population. We then applied the joinpoint regression model [5] to identify breakpoints in the trend of age-standardized incidence rates and to estimate average rates of change. Basically, the joinpoint model finds the best-fit line through several years of data using an algorithm that tests whether a multi-segmented line is a significantly better fit than a straight or less-segmented line. The program starts with the minimum number of joinpoint (0 joinpoint, which is a straight line) and tests whether more joinpoints are statistically significant and must be added to the model.

Second, we restricted the description of the characteristics of breast cancers for cases diagnosed during the 2008–2012 period considering a higher proportion of missing values for these variables before 2008. A comparison of the characteristics among the 2 age groups was realized using a chi-square test.

Third, we conducted a survival analysis by computing overall and net survival rates for invasive breast cancers diagnosed during the 1989–2004 period considering a 10-year follow-up period and June 30th 2013 as the date of the end of follow-up. Overall survival rates were defined as the percentage of women who were alive 10 years after their diagnosis of cancer, whereas net survival rates referred to survival rates that would have been observed if breast cancer was the only possible cause of death. Overall survival was obtained from the Kaplan-Meier method [6]. Net survival was estimated using a method based on the assumption that mortality rates from other causes of death than breast cancer was approximated by mortality rates observed in the general population. Consequently, the cause of death was not necessary to estimate net survival. More precisely, net survival estimates were obtained from the Perm-Pohar method which included a correction for the bias related to informative censoring [7].

3. Results

3.1. Characteristics of the population

A total of 1,673 in situ and 13,660 invasive breast cancers were diagnosed during the 1989–2012 period among women aged over 50, including 139 in situ and 3,384 invasive breast cancers among women aged ≥ 75 years. The characteristics of invasive cancers by age group are shown in Table 1. The data shown and their orders in Table 1 are those usually found in the histopathological report.

3.2. Incidence of breast cancer during the 1989–2012 period

The evolution of annual incidence rates during the 1989–2012 period is shown on Fig. 1. In 2012, the annual incidence rate of in situ and invasive cancers for women aged ≥ 75 years were.

21.0 and 317.0 per 100,000, respectively. Among these women, the average annual increase by the incidence between 1989 and 2012 was 7.9% (95% CI: 4.8–11.1%) and 1.1% (95% CI: 0.6–1.6%) for in situ and invasive breast cancers, respectively. Incidence trends among women aged 50–74 were not similar. An average annual increase by

Table 1

Characteristics of invasive breast cancers diagnosed during the 2008–2012 period in the Isère Department.

	Age group at diagnosis				p
	50–74 years (n=2,629)		≥ 75 years (n=1,003)		
Mode of diagnosis					
Screen detected (mammography)	1,313	42.3%	66	6.3%	< 0.001
Histological type					
Ductal adenocarcinoma	2,048	77.9%	706	70.4%	< 0.001
Lobular adenocarcinoma	413	15.7%	157	15.7%	
Malignant tumour, unclassified	0	0.0%	30	3.0%	
Other types	168	6.4%	110	11.0%	
Oestrogen receptor status					
Positive	2,136	81.2%	813	81.1%	0.653
Unknown	17	0.7%	4	0.4%	
Progesterone receptor status					
Positive	1,652	62.8%	621	61.9%	0.565
Unknown	17	0.7%	4	0.4%	
Her-2 status					
Overexpression	267	10.2%	77	7.7%	< 0.001
Unknown	214	8.1%	170	16.9%	
SBR grade					
1	680	25.9%	224	22.3%	< 0.001
2	1,298	49.4%	491	48.9%	
3	516	19.6%	174	17.4%	
Unknown	107	4.1%	107	10.7%	
Not tested	28	1.1%	7	0.7%	
Stage at diagnosis					
1	1,390	52.9%	292	29.1%	< 0.001
2	685	26.1%	243	24.2%	
3	152	5.8%	75	7.5%	
4	177	6.7%	286	28.5%	
Unknown	225	8.6%	107	10.7%	

7.0% (95% CI: 5.7–8.3%) was estimated during the 1989–2006 period for in situ cancers, followed by a non statistically significant decrease of incidence until 2012. For invasive cancers, a 1.5% (95% CI: 0.3–2.6%) annual decrease of incidence was estimated during the 2002–2012 period.

3.3. Survival

This analysis was based on women diagnosed with invasive breast cancers during the 1989–2004 period including 6,172 women aged 50–74 years and 1,893 women older than 75 years. 25% of women aged 50–74 died, and 1% were lost to follow-up. For women aged ≥ 75 years, 67% died and 2% were lost to follow-up. Overall and net survival rates by age group are shown in Table 2. Overall survival rates at 10 years differed by age group at diagnosis, with 31% (95% CI: 29–33%) and 74% (95% CI: 73–76%) for women older than 75 years and aged 50–74 years, respectively (Table 3).

Among the 1,893 women aged ≥ 75 years and diagnosed with an invasive cancer, 83.0% underwent surgery during the 1989–2004 period. Net survival rates for these women were 97% (95% CI: 98%) at 1 year, 86% (95% CI: 82–89%) at 5 years and 78% (95% CI: 70–85%) at 10 years versus 81% (95% CI: 69–92%), 52% (95% CI: 31–74%) and 42% (95% CI: 12–71%) at 1, 5 and 10 years respectively, for women who did not undergo surgery.

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