



Incidence, mortality and receptor status of breast cancer in African Caribbean women: Data from the cancer registry of Guadeloupe



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ABSTRACT

Background: Geographical disparities in breast cancer incidence and outcomes are reported worldwide. Women of African descent show lower incidence, higher mortality rates and earlier age of onset. We analyzed data from the cancer registry of Guadeloupe for the period 2008–2013.

Methods: We describe breast cancer characteristics by molecular subtype, as well as estimated observed and net survival. We used Cox proportional hazard models to determine associations between cancer subtypes and death rate, adjusted for variables of interest.

Results: Overall, 1275 cases were recorded with a mean age at diagnosis of 57(±14) years. World standardized incidence and mortality were respectively 71.9/100,000 and 14.1/100,000 person-years. Age-specific incidence rates were comparable to European and US populations below the age of 45, and higher in Guadeloupean women aged between 45 and 55 years. Overall, 65.1% of patients were hormone receptor (HR)+ and 20.1% were HR-. Triple negative breast cancers (TNBC) accounted for 14% of all cases, and were more frequent in patients under 40 (21.6% vs. 13.4%, $p=0.02$). Five-year net survival was 84.9% [81.4–88.6]. It was higher for HR+/Her2+ and HR+/Her2- subtypes, and lower for HR-/Her2+ and TNBC patients.

Conclusion: We found high age-specific incidence rates of breast cancer in women aged 45 to 55 years, which warrants further investigation in our population. However, this population of mainly African descent had good overall survival rates, and data according to subtypes are consistent with those reported internationally. These results may suggest that poorer survival in other African descent populations may not be an inherent feature of the disease but may be amenable to improvement.

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1. Introduction

Breast cancer ranks first among all cancers in women, and shows geographical disparities in outcomes, incidence and mortality. In 2012, age-standardized incidences rates per 100,000 person-years were highest in Western Europe and North America (96/100000), and lowest in African countries, while the Caribbean region had an intermediate rate (46/100 000) [1]. Breast cancer is the second cause of death in women in more developed regions, and the primary cause of death in less developed regions,

but the differences in mortality rates are of lesser magnitude than those observed for incidence over the last decade.

Guadeloupe is a Caribbean archipelago with a population of about 404,000 inhabitants with a mean age of 37 years in 2009. This young country is facing a rapidly accelerating transition from a young towards an ageing population over the coming years. It is commonly acknowledged that over 80% of Guadeloupe's population is of African descent, while Indian descent and Europeans represent approximately 15 and 5 percent of the population respectively. As a French Department, one would expect socio-economic conditions and healthcare delivery to be similar to that of mainland France, yet the demographics of medical services, and the quality of some healthcare facilities do not reach the national standards.

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The French national screening program for breast cancer targets women between 50 years and 74 years old, and was introduced in Guadeloupe in 2004, with a participation rate of 50.9% in 2013 [2]. In a study conducted over the period 1999 and 2006, before the implementation of the population-based cancer registry, Kadhel et al. reported higher expected cases of breast cancer in women between 45 and 54 years old [3]. These findings were consistent with the studies conducted on populations of African ancestry in both US and British studies [4–8].

It is well known that aggressive tumors and high mortality rates are found in young women, before the age of 40 years [8], and many studies report earlier and more aggressive breast cancer in African-American women [9–11]. In the Caribbean, a Trinidadian study also found a higher incidence among African-Caribbean women younger than fifty years [7]. Among the prognostic factors, histological and overall biological characterizations are increasingly important in breast cancer because of their prognostic and predictive value, and their impact on survival. Determination of hormone receptor (HR) status, including estrogen (ER) and progesterone receptor (PR), and human epidermal growth factor receptor 2 (Her2) status has been accepted as a routine procedure in the management of breast cancer. HR positivity is associated with better prognosis [12] and predicts responsiveness to endocrine therapy. Similarly, Her2 positivity is associated with poorer prognosis than Her2 negative tumors [13]. However, detecting overexpression of Her2 enables the selection of patients who will yield the greatest benefit from targeted therapy.

In this context, the aims of this study, performed from a population-based cancer registry, were to describe breast cancer hormonal receptors subtypes and their association with patient and tumor characteristics, and to estimate survival according to cancer subtype, in an Afro-Caribbean population.

2. Methods

We analyzed data from the population-based general cancer registry of Guadeloupe over the period 2008–2013. This registry is member of the French network of Cancer registries (Francim) and of the International Association of Cancer Registries. It routinely records all incident cases of cancer occurring in Guadeloupe since 2008. Potential cases are identified from multiples sources, namely: pathology and hospital discharge records, long-term illness registration by the national health insurance system, and medical files. The data collected include demographic data (date and place of birth, gender, place of residence), tumor characteristics (date of diagnosis, tumor size, histological type, staging and hormonal markers) and first treatment (date and type of treatment). We could not assess ethnicity, since current French legislation does not allow the recording of ethnic origin. Population data for each year of incidence were obtained from the French National Institute of Statistics and Economic Studies (INSEE) [14]. Data regarding deaths from breast cancer for patients residing in Guadeloupe were obtained from the French epidemiological center on medical causes of death from the French National Institute of Health and Medical Research (CépiDc, Inserm: <http://www.cepiddc.inserm.fr/site4/>). This institute is responsible for developing annual national statistics on the medical causes of death. For cohort follow-up and with the authorization of the French National authority for the protection of privacy and personal data (CNIL), data regarding the vital status of an individual are provided by the CépiDc.

We calculated age-specific incidence rates for the year 2012 to compare them with Globocan's data in different populations. Age-standardized incidence and mortality rates per 100,000 person-years [95% confidence intervals], were calculated over the period

2008–2013 using the direct method and the World standard population as proposed by Segi [15] and modified by Doll et al. [16]

We categorized patients according to hormone receptors status and Her2 gene expression. Luminal A or B classification could not be used because of missing data for KI67 status for the earliest years of the registry. Patients positive for both estrogen receptors (ER) and progesterone receptors (PR) were coded as hormone receptors positive (HR+) and were coded HR- when both receptors were negative. We considered four main groups of patients: HR+/HER2+, HR+/HER2-, HR-/HER2+ and triple negative breast cancer (TNBC). Patients not classified within these four groups (missing or discordant data) were considered as unknown. Because of missing data for TNM, we used the simplified cancer staging (localized/local spread, regional spread, metastatic/non resectable) from the European Network Cancer Registries (ENCR) [17]. This condensed staging is recommended by the ENCR when T, and/or N, and/or M have not been explicitly recorded in the clinical/pathological records for some cancer sites (breast, colon, rectal and cervical cancer). Cancer registries are invited to attempt to score extent of disease according to this condensed TNM scheme. For breast cancer, the conventional values of T that correspond to the ENCR "Localized" stage include T1 to T3, while T4 corresponds to the ENCR "Advanced" stage.

Tumor grading was classified with the modified Scarff and Bloom-Richardson (MSBR) grading system from pathology report (grades from 1 to 3). We also considered first line treatment, which is routinely recorded by the registry, as main variables. Missing data for tumor size, cancer staging, MSBR grade and first treatment were considered as an unknown group for the analyses.

Quantitative variables are reported as mean (standard deviation) and qualitative variables as number (percent). Descriptive analyses were performed according to breast cancer subtype using Anova or median test for quantitative variables and Pearson's Chi-square test for qualitative variables. Kaplan-Meier survival curves were estimated and mean overall survival time in months after diagnosis was compared with the logrank test for the main variables of interest, i.e. age groups, cancer subtype, cancer staging and first therapy. Net survival was estimated with the unbiased Pohar-Perme estimator method using expected mortality rates derived from the observed mortality rates available by sex, annual age, year of death and department of residence as recommended by Roche et al. for cancer registry data [18].

The endpoint date was set to December 31, 2015 which was the last update for patients' vital status. Patients lost to follow-up and not identified by CépiDc were censored at the date of their last visit (hospitalization or medical consultation recorded).

We examined the distribution of clinical characteristics by subtype of hormone receptors and Her2 status, and used Cox's proportional hazards model to determine hazard ratios with adjustment for age, cancer stage and first course of treatment. The assumption of proportional hazards for the Cox model was tested with Schoenfeld residuals. Hazard ratios for death are presented with the associated 95% Confidence interval (CI). All analyses were performed using Stata statistical software release 14.0 (Stata Corp LP, College Station, TX, USA) and a p value of 0.05 was considered statistically significant.

3. Results

From January 2008 to December 2013, 1275 women with histologically confirmed invasive breast carcinoma were recorded by the cancer registry. The mean age at diagnosis was 57 ± 14 years. Among the overall population, 33.3% of patients were diagnosed with breast cancer before the age of 50 years and 9.1% were under 40.

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