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The characteristics, management and outcomes of older women with breast cancer in New Zealand

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ABSTRACT

The aim of this study was to understand the characteristics of older women with breast cancer and to describe the current patterns of treatment and outcomes. The study included data from the combined Auckland and Waikato breast cancer registers, which hold information for 12, 372 women diagnosed with stage I–IV breast cancer between June 2000 and May 2013. Of these women, 2671 (21.6%) were over 70 years of age. Patient characteristics, treatment type and survival were compared across four-year age groups (70–74, 75–79, 80–84, 85+) and hormone receptor status. Of the women aged over 70 years, 2485 (93.0%) had stage I–III disease. Increasing age was significantly associated with decreasing use of surgery, adjuvant radiotherapy, endocrine therapy and chemotherapy, even after adjustment for stage and level of co-morbidity. Nine hundred and one women (33.7%) had co-morbidities at the time of diagnosis. The 5-year breast cancer-specific survival rate for women aged 70–74 and that for women aged 75–79 were similar, but was worse in women aged over 80. Generally, older women are treated as per guidelines, although chemotherapy may be under-used. However, age is a significant factor influencing whether women are treated or not.

1. Introduction

Breast cancer is the second most common cancer worldwide [1], and the likelihood of being diagnosed increases with age [2]. In New Zealand (NZ), over 3000 new breast cancers were registered in 2015, with just over 800 (24.0%) of those occurring in women aged over 70 [3]. As populations age, the number of older women requiring treatment will increase [4,5].

Management of breast cancer in the elderly faces a number of issues. Historically, women over 70 have been consistently excluded from clinical trials [6–12], and with limited data demonstrating the effectiveness of standard treatments in the older population [13–15], current treatment strategies are founded on clinical evidence derived from younger women [16]. However, older women represent a different population, have a more heterogeneous level of fitness [17] and commonly present with a higher level of co-morbidity [18] and tumours that differ in their biology [19]; all factors which impact on treatment. In addition, in NZ, inclusion in a free mammographic screening programme ceases for those aged 70 years or more [20,21]. This is one reason why older women on average present with larger tumours that are at a more advanced stage [22,23]. Competing health risks contribute to considerable variation in adherence to existing treatment guidelines in older women [24], and in some cases, this results in older women not receiving treatment according to recommendations [11,25]. For all the reasons above, it has been well demonstrated that older women on average have worse outcomes from breast cancer. Therefore, specific management guidelines may be needed for the older population [26].

NZ's population is ethnically diverse, and access to breast cancer treatment varies by ethnicity [27], urban/rural status [28] and primary treatment provider (private vs. public) [29]. The NZ guidelines on the management of breast cancer do not specify age as a factor that should be included when deciding on care. We aimed to assess the impact of age on the management and outcomes for women in NZ with newly diagnosed breast cancer and what influences this might have on the need for specific guidelines for older women.

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2. Methodology

The study was a retrospective analysis of a prospectively collected cohort. Data were extracted from the combined Waikato and Auckland Breast Cancer Registers, which hold the clinical details of women diagnosed with breast cancer. The study period was from June 2000 to May 2013. Each register includes information on 1) patient characteristics: age, ethnicity, domicile and diagnosis date; 2) tumour biology: size, grade, hormone and human epidermal growth factor receptor 2 (HER2) receptor status, lymph node involvement and staging, 3) treatment: chemotherapy, endocrine therapy, radiotherapy and surgery. Outcomes included all-cause and breast cancer-specific mortality.

Only women who were 70 years or older with newly diagnosed, invasive (stage I–IV) breast cancer were included in this study (N = 2,671). Women were split into four-year age groups (70–74, 75–79, 80–84 and 85+) for analysis. Firstly we established the characteristics of older women with breast cancer including demographics (age, ethnicity, region, urban/rural status); their tumour characteristics (stage, grade, size, hormone receptor and HER2 status); and factors associated with their management (mode of detection, public or private care and the presence of co-morbidities). Co-morbidity information was obtained from the National Minimum Dataset (NMDS) and patients were characterised as either having zero co-morbidities (C0), one co-morbidity (C1) or two or more co-morbidities (2+) using the C3 co-morbidity index [29,30].We then linked these variables to patient treatment, including surgery in women with localised disease (breast conserving surgery (BCS), mastectomy or no surgery), endocrine therapy in those who were oestrogen (ER) and/or progesterone (PR) positive; radiotherapy in those who received BCS and finally the use of chemotherapy and HER2 targeted therapies. A forward stepwise logistic regression model was carried out on these four treatment groups to see if age affects patient management (alpha level < 0.05). Finally, we assessed mortality by age group and by hormone receptor subtype. Hormone receptor subtype was categorised as Group 1 (ER+, PR+, HER2-), Group 2 (ER+, PR-, HER2-; ER-, PR+, HER2-), Group 3, (ER+, PR+, HER2+; ER+, PR-, HER2+; ER-, PR+, HER2+), Group 4 (ER-, PR-, HER2+) and Group 5 (Triple negative; ER-, PR-, HER2-) [31]. Patients were linked via the National Health Index (NHI) number with the National Mortality Collection to obtain mortality information. Kaplan-Meier survival was used to examine breast cancer-specific survival and all-cause survival.

Data were analysed using IBM SPSS Statistics 23 (New York, United States). If a patient had missing data they were recorded as 'unknown' and included in analyses (unless where specified). Ethical approval for the study was granted through the Northern A Health and Disability Ethics Committee, reference: 12/NTA/42/AM01.

3. Results

3.1. Patient and tumour characteristics

There were 12, 372 invasive breast cancers registered in the Auckland and Waikato regions between 2000 and 2013, of which, 2671 (21.6%) were diagnosed in women over 70 years of age. The majority of women were NZ European (2276, 85.2%) (see Table 1), with a mean age of 78.8 years (range 70–104 years). Fifteen percent were detected through mammographic screening. Most women had zero co-morbidities (1427, 53.4%), but 33.7% (901) presented with a high level of co-morbidity (i.e., 2+ co-morbid conditions) at time of diagnosis. The majority of women (2, 485, 93.0%) had localised (stage I–III) cancer, and 186 (7.0%) women had stage IV cancer. Five hundred and seventy-eight women (21.6%) had a tumour grading of 3, and 225 women (8.4%) had a tumour size over 50 mm (i.e., T3 disease).

The proportion of older women with their hormone receptor subtype is presented in Table 2. Of the total cohort, 910 women (34.1%) did not have complete information on their receptor status and so were not categorised. ER positive cases are found in Groups 1–3, while Group 5 (usually designated triple negative), are the most likely to receive chemotherapy. Hormone receptor status was more likely to be ER positive (2109, 79.0%) and PR positive (1653, 61.9%). Women in Groups 1–3 were more likely to receive endocrine therapy; 750 (70.3%) in Group 1, 195 (67.7%) in Group 2 and 87 (79.1%) in Group 3.

3.2. Surgery

Of the 2485 (93.0%) women with stage I–III cancer, 2131 (85.8%) received surgery. Of these, 1264 (59.3%) had a mastectomy and 867 (40.7%) had breast conserving surgery (BCS). With the exception of those aged 80–84, women with stage I cancer were more likely to have BCS, whereas women with stage II–III cancer were more likely to have mastectomy, irrespective of age. In a stepwise logistic regression, a number of factors were associated with the probability of having surgery. The likelihood of receiving surgery decreased with increasing age. Māori patients were significantly less likely to receive surgical treatment, even after adjustment for the presence of co-morbidities. Women with more advanced stage disease were less likely to be treated surgically, as were women with subtype Group 5 cancer.

3.3. Chemotherapy

Very few women were treated with chemotherapy. Of those who were stage I–III, only 101 (4.1%) were treated with chemotherapy. Again age was a significant factor, with older women being less likely to receive treatment. Waikato women were twice as likely to be treated with chemotherapy than older women in Auckland. Of those with metastatic breast cancer, only 7 (3.8%) had chemotherapy and all of them were in the Waikato. One hundred and eighty-four women (6.9%) were found to be HER2 positive, but only 24 (13.0%) of these women received Trastuzumab.

3.4. Radiotherapy

Of the 872 women in total who were treated with BCS, 637 (73.1%) received radiotherapy. Age was a significant factor again in the use of radiotherapy, as was the presence of multiple co-morbidities. After adjusting for age and co-morbidities, no difference in the use of radiotherapy was found in Māori, but Pacific women were less likely to be treated. The main influence on whether these women were treated was whether they were treated publicly or privately or whether they were in Waikato.

3.5. Endocrine therapy

Analysing use of endocrine therapy by subtype, 1,465 women (54.8%) were categorised as Group 1–3. Of these, 1032 (70.4%) received endocrine therapy. Women were significantly less likely to receive endocrine therapy as age increased. Older Māori women were more likely to receive endocrine therapy, as were women in the Waikato, and those receiving treatment in the public sector (see Table 3).

3.6. Survival

Five year survival across age groups was analysed using the Kaplan-Meier method (Fig. 1). There was a significant difference in breast cancer-specific and all-cause survival across age groups, with 80–84 and 85+ year olds having worse breast cancer specific and all-cause survival than women aged 70–74 and 75–79. Five-year breast cancer-specific survival was worst for 85+ year olds (76.0%), followed by 80–84 year olds (80.1%), 75–79 year olds (84.8%) and was best for 70–74 year olds (86.1%). Similar proportions of women aged 70–79 died from breast cancer and from other causes. For women 80 and over,