

The Management and Mortality of Breast Cancer in the Elderly in Auckland, New Zealand, between 2000-2018



– A descriptive, retrospective study

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Introduction

Breast cancer is the second most common cancer worldwide and is associated with a significant burden of morbidity and mortality. As New Zealand's (NZ) population ages and life expectancy improves, the risk of breast cancer increases. The NZ breast cancer screening program ceases at age 69 and without regular mammograms, the breast cancers in elderly patients are often more advanced at the time of diagnosis.

Due to the underrepresentation of elderly patients in clinical studies pertaining to breast cancer management, there is no appropriate standard of care. Several studies suggest that the management of breast cancer in elderly patients is less aggressive than in younger patients. There are many factors which may impact treatment options for elderly patients including pre-existing comorbidities, pre-morbid quality of life, tumour biology, patient preference, physician preference or bias and the desire to maintain independence.

Aim

The aim is to describe breast cancer management in the elderly in Auckland and to evaluate their mortality. Our study defined "elderly" as patients over 69 years old, as the NZ health system stops breast cancer screening at this age.

Methods

This descriptive, retrospective study analysed prospectively collected data from Auckland, Waitematā and Counties Manukau District Health Boards, by the Auckland Breast Cancer Study Group registry, from 2000–2018. The data included age, ethnicity, tumour size + grade, lymph node involvement, management (surgery, chemotherapy, radiotherapy, hormone therapy), date of diagnosis, date of death and cause of death. All cases of breast cancer in patients over 69 years old that reported to the registry during the study period were included (N=2560). The patients were split into 5-year age groups to analyse trends.

Chi-square test assessed the associations between management and age, ethnicity, tumour size, tumour grade and nodal involvement. Analysis of variance (ANOVA) was used to compare continuous variable across the groups. Overall survival was defined as the time, in years, from the date of diagnosis to the date of death from any cause. Log-rank tests were used to calculate differences in survival rates of breast cancer across the groups. Kaplan-Meier survival curves were used to derive overall survival at 1, 5 and 10 years from the date of diagnosis across the groups.

Results

The highest rate of breast cancer was in 75-79 years old (29.6%). Most patients were NZ or other European (83.5%); 3.8% were Māori and 4.6% were Pacific Islanders. The median tumour size was 22mm. 1608 patients presented with a grade 2 or 3 tumour (76.5%). 88.6% of the cases had positive lymph nodes.

82% of elderly patients received breast cancer surgery, with the rates of surgery decreasing with age ($p < 0.001$). Māori and Pacific patients had lower rates of surgery compared to other races ($p = 0.011$). The rate of adjuvant medical therapy reduced as patients aged ($p < 0.0001$). Māori patients were more likely to receive hormone therapy than any other ethnicity ($p = 0.003$). Patients with positive lymph nodes were more likely to have adjuvant medical therapy ($p < 0.0001$). Grade 2 and 3 tumours had higher rates of chemotherapy and hormone therapy ($p < 0.0001$).

At 1, 5 and 10 years, the survival rates of elderly breast cancer patients decrease with increasing age ($p < 0.001$). Māori and Pacific patients have lower overall survival rates ($p < 0.001$). Patients with axillary node disease have higher survival rates than those who do not have nodal spread ($p < 0.001$). At all three intervals, surgery, radiotherapy and hormone therapy had higher survival rates than no treatment or chemotherapy ($p < 0.001$).

Table 2: Overall Survival Rates

Covariates	Total	Deaths	Survival estimates at 1 year	Survival estimates at 5 year	Survival estimates at 10 year	P-value
Age group						
70-74	710	249	0.94 (0.009)	0.77 (0.017)	0.59 (0.024)	<.0001
75-79	757	370	0.93 (0.01)	0.68 (0.019)	0.42 (0.024)	
80-84	552	332	0.9 (0.013)	0.55 (0.023)	0.27 (0.025)	
85-89	359	282	0.84 (0.019)	0.35 (0.027)	0.12 (0.021)	
90-94	154	136	0.86 (0.028)	0.24 (0.036)	0.03 (0.018)	
>94	24	23	0.58 (0.101)	0	0	
Ethnicity						
NZ European	1743	970	0.92 (0.007)	0.6 (0.013)	0.36 (0.015)	<.0001
Other European	390	215	0.89 (0.016)	0.58 (0.027)	0.3 (0.032)	
NZ Māori	98	57	0.85 (0.036)	0.52 (0.056)	0.19 (0.063)	
Pacific Islander	117	70	0.79 (0.038)	0.45 (0.05)	0.25 (0.055)	
Asian	131	40	0.94 (0.022)	0.76 (0.042)	0.62 (0.058)	
Other	13	8	1	0.59 (0.145)	0.47 (0.156)	
Not stated/ Missing/ Response unidentified	64	32	0.84 (0.046)	0.55 (0.067)	0.38 (0.087)	
Surgery						
No	456	456	0.63 (0.023)	0.13 (0.016)	0.01 (0.005)	<.0001
Yes	2100	936	0.97 (0.004)	0.71 (0.011)	0.45 (0.015)	
Adjuvant						
No	1966	902	0.96 (0.004)	0.7 (0.011)	0.45 (0.015)	0.7682
Yes	134	34	0.99 (0.011)	0.77 (0.044)	0.53 (0.075)	
Chemotherapy						
No	1256	626	0.95 (0.006)	0.65 (0.015)	0.39 (0.018)	<.0001
Yes	843	309	0.99 (0.004)	0.79 (0.016)	0.54 (0.024)	
Adjuvant Radiation						
No	1040	488	0.95 (0.007)	0.66 (0.016)	0.42 (0.021)	0.0008
Yes	1070	458	0.98 (0.004)	0.75 (0.015)	0.47 (0.02)	
Therapy						
No	493	187	0.97 (0.007)	0.8 (0.02)	0.55 (0.03)	<.0001
Yes	1040	459	0.98 (0.005)	0.74 (0.015)	0.46 (0.021)	
Grade						
1	566	289	0.94 (0.01)	0.57 (0.023)	0.35 (0.027)	
2	1040	459	0.98 (0.005)	0.74 (0.015)	0.46 (0.021)	
3	956	289	0.94 (0.01)	0.57 (0.023)	0.35 (0.027)	
Axillary Nodes						
No	239	172	0.94 (0.016)	0.54 (0.034)	0.26 (0.033)	<.0001
Yes	1859	764	0.97 (0.004)	0.73 (0.012)	0.48 (0.016)	

Table 1: Rates of Management by Demographics

Covariate	Level	Surgery			Adjuvant Chemotherapy			Adjuvant Radiotherapy			Adjuvant Hormone Therapy		
		No Treatment =456	Treatment =2104	P-value	No Treatment =1970	Treatment =134	P-value	No Treatment =1042	Treatment =1072	P-value	No Treatment =1042	Treatment =1072	P-value
Age Group													
70-74		45 (6.32)	667 (93.68)	<.001	587 (88.01)	80 (11.99)	<.0001	311 (46.63)	356 (53.37)	<.0001	296 (44.31)	372 (55.69)	<.0001
75-79		85 (11.23)	672 (88.77)		626 (93.02)	47 (6.98)		366 (54.46)	306 (45.54)		302 (44.54)	376 (55.46)	
80-84		95 (17.15)	459 (82.85)		452 (98.47)	7 (1.53)		326 (71.02)	133 (28.98)		241 (52.51)	218 (47.49)	
85-89		124 (34.54)	235 (65.46)		234 (100)	0 (0)		188 (80.34)	46 (19.66)		154 (65.25)	82 (34.75)	
90-94		87 (56.49)	67 (43.51)		67 (100)	0 (0)		63 (94.03)	4 (5.97)		47 (68.12)	22 (31.88)	
>94		20 (83.33)	4 (16.67)		4 (100)	0 (0)		4 (100)	0 (0)		2 (50)	2 (50)	
Ethnicity													
NZ European		300 (17.2)	1444 (82.8)	0.011	1349 (93.42)	95 (6.58)	0.759	856 (59.32)	587 (40.68)	0.111	737 (50.83)	713 (49.17)	0.003
Other European		72 (18.32)	321 (81.68)		299 (93.15)	22 (6.85)		185 (57.63)	136 (42.37)		157 (48.46)	167 (51.54)	
NZ Māori		24 (24.49)	74 (75.51)		69 (93.24)	5 (6.76)		41 (55.41)	33 (44.59)		20 (27.03)	54 (72.97)	
Pacific Islander		29 (24.79)	88 (75.21)		86 (97.73)	2 (2.27)		66 (75)	22 (25)		44 (49.44)	45 (50.56)	
Asian		12 (9.16)	119 (90.84)		112 (94.12)	7 (5.88)		75 (63.03)	44 (36.97)		52 (43.7)	67 (56.3)	
Other		3 (23.08)	10 (76.92)		9 (90)	1 (10)		6 (60)	4 (40)		4 (40)	6 (60)	
Not stated/ Missing/ Response unidentified		16 (25)	48 (75)		46 (95.83)	2 (4.17)		29 (60.42)	19 (39.58)		28 (58.33)	20 (41.67)	
Grade													
1		-	495 (100)		493 (99.6)	2 (0.4)	<.0001	296 (59.8)	199 (40.2)	0.904	338 (68.28)	157 (31.72)	<.0001
2		-	1041 (100)		1006 (96.64)	35 (3.36)		627 (60.23)	414 (39.77)		381 (36.6)	660 (63.4)	
3		-	567 (100)		471 (83.07)	96 (16.93)		335 (59.08)	232 (40.92)		323 (56.97)	244 (43.03)	
Axillary Node													
No		-	239 (100)		238 (99.58)	1 (0.42)	<.0001	191 (79.92)	48 (20.08)	<.0001	161 (67.36)	78 (32.64)	<.0001
Yes		-	1863 (100)		1730 (92.91)	132 (7.09)		1066 (57.25)	796 (42.75)		880 (47.26)	982 (52.74)	
Size													
Median		-	-		22	26	<.0001*	24	20	0.0019*	20	25	<.0001*
IQR		-	-		15-30	20-40		16-32	15-32		18-35	18-35	

Reference

1. Blackmore, T., Lawrenson, R., Lao, C., Edwards, M., Kuper-Hommel, M., Campbell, I. (2018) The characteristics, management and outcomes of older women with breast cancer in New Zealand. *Maturitas* 112 64-70 <https://doi.org/10.1016/j.maturitas.2018.03.018>

Conclusion

As patients age, breast cancer therapy is less aggressive. As our population's life expectancy improves, this may not be appropriate. As the survival for patients under 85 years old was over 50% at 5 years, perhaps more aggressive treatment should be offered. A prospective study to investigate the reasons patients do not have breast cancer surgery would be worthwhile.

The median tumour size and the high percentage of patients with lymphadenopathy (88.6%) is suggestive of a late diagnosis of breast cancer. As the New Zealand public breast cancer screening ends at age 69 years old, this may provide evidence to increase the screening age group beyond 69 years old.

It is widely acknowledged that Māori and Pacific Islanders suffer health inequities, their European counterparts do not. Of concern in this study was the lower rates of breast cancer surgery and poorer survival rates for Māori and Pacific Island patients, across all measured intervals. This requires further investigation and action.

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