The Impact of Oophorectomy on Breast Cancer Survival in Patients with a BRCA1 Mutation

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Introduction

It has been established that preventive bilateral salpingo-oophorectomy (BSO) provides a survival advantage for women with breast cancer and a BRCA1 mutation, if done before or after diagnosis. It is of interest to see if the benefit of BSO varies according to the age at breast cancer diagnosis, age at oophorectomy and ER-status of the tumour.

Methods and Materials

We are following a cohort of 2904 women with breast cancer and a BRCA1 mutation for survival. We excluded 256 women who had an oophorectomy before breast cancer. We also excluded women with metastatic cancers, with cancers diagnosed after age 70, and with cancers for greater than 10cm in size, leaving 2541 women for the present analysis. Of these, 1498 had an oophorectomy after breast cancer (mean time from diagnosis to BSO 2.3 years).

We followed the women from diagnosis to death for a mean of 9.5 years (range 0.1 to 27.5 years). 289 women died of breast cancer. We conducted a survival analysis (Cox model) including BSO as a time-dependent variable, adjusting for tumour size (<2cm, 2-5cm, 5-10 cm) and lymph node status (positive/negative). Hazard ratios were for breast cancer survival.

Fig.1 Twenty-year breast cancer survival by oophorectomy

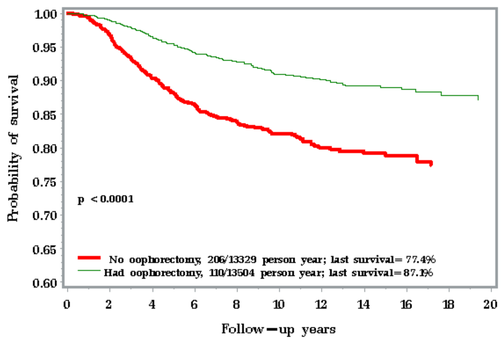


Table 1. Characteristics of Patients in the Database

Variables	Mean (range) and frequency
Date of birth	1968.4(1934-1998)
Age at diagnosis	43.0(18.7-70)
Year of diagnosis	2011.4(1995-2024)
Follow-up years	9.4(0.1-29.0)
Node	
Negative	1988
Positive	801
ER	
Negative	2096
Positive	766
PR	
Negative	2195
Positive	609
HER2	
Negative	2343
Positive	321
Vital status	
Alive	2444
Dead	460
Initial surgery	
Lumpectomy	959
Mastectomy	1271
Bilateal Mastectomy	674
Radiotherapy	
No	1163
Yes	1702
Chemotherapy	
No	297
Yes	2607

Fig.2 Fifteen-year breast cancer survival, by oophorectomy; ER + and age <= 50

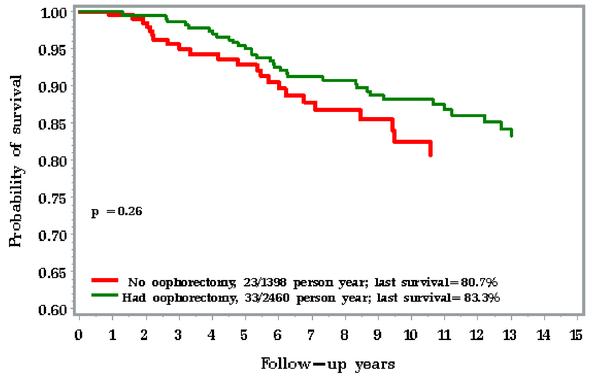


Fig.3 Fifteen-year breast cancer survival by oophorectomy in ER+ subjects, age > 50

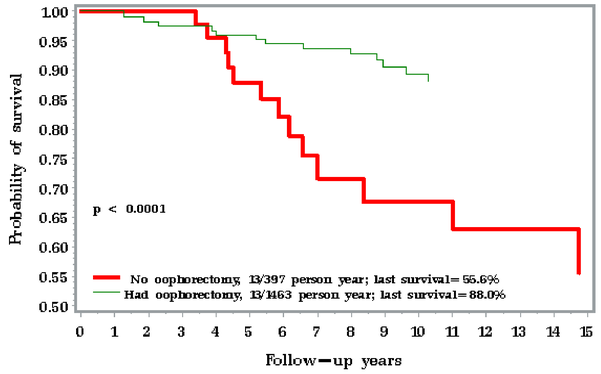
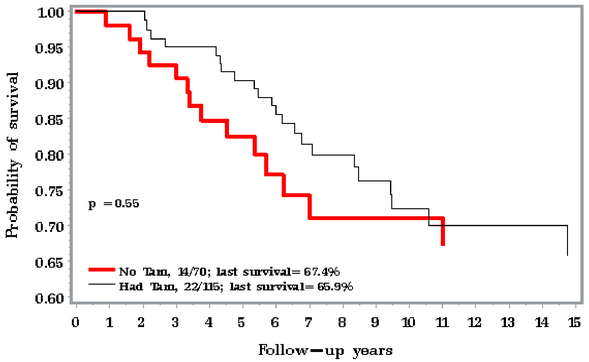


Fig.4 Fifteen-year breast cancer survival, in subjects with ER+, no oophorectomy, by tamoxifen



Results

Of those women diagnosed with breast cancer before age 50, BSO was associated with a hazard ratio of 0.53 (95%CI 0.40 to 0.69). Of those women diagnosed with breast cancer after age 50, BSO was associated with a hazard ratio of 0.30 (95%CI 0.17 to 0.53). Of all women diagnosed with ER-positive breast cancer, BSO was associated with a hazard ratio of 0.57 (95%CI 0.35 to 0.90).

Stratified by age of diagnosis, among women diagnosed with ER-positive breast cancer before age 50, BSO was associated with a hazard ratio of 0.74 (95%CI 0.42 to 1.30) and among women diagnosed with ER-positive breast cancer after age 50, BSO was associated with a hazard ratio of 0.26 (95%CI 0.10 to 0.65). Of all women diagnosed with ER-negative breast cancer, BSO was associated with a hazard ratio of 0.45 (95%CI 0.33 to 0.60). Among women diagnosed with ER-negative breast cancer after age 50, BSO was associated with a hazard ratio of 0.32 (95%CI 0.15 to 0.69).

Conclusions

In summary BSO after breast cancer is associated with improved survival across all age groups, with the possible exception being young women with ER+ breast cancer.

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