



## Are we choosing wisely in elderly females with breast cancer?

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### ABSTRACT

**Background:** The Choosing Wisely Organization and the American College of Surgeons have issued recommendations for patients >70 with breast cancer involving screening and use of radiation therapy (RT) and sentinel lymph node biopsies (SNLB) in early stage tumors. This study evaluated compliance and implementation of these recommendations.

**Methods:** A database of patients undergoing breast cancer surgery was retrospectively queried from 2002 to 2017. Patients were divided into cohorts before and after the year of each guideline publication. **Results:** The rate of presentation on mammography was not different before 2009 (65%) vs. after 2009 (66%). RT was given to 57% of patients with T1 ER + Her2-prior to 2013 vs. 27% after ( $p < 0.001$ ). SLNB was performed in 91% of patients with T1, grade 1/2, ER + Her2-tumors prior to 2016 vs. 56% after ( $p < 0.001$ ).

**Conclusion:** Rates of mammography detected breast cancer have not decreased but adjuvant RT and SLNB are less frequently performed in low risk breast cancer in the elderly.

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### 1. Introduction

*Choosing Wisely* is an initiative of the American Board of Internal Medicine (ABIM) Foundation that promotes the avoidance of unnecessary medical tests, treatments and procedures. They have proposed two evidence based practice changing recommendations in elderly females that have been recently diagnosed with breast cancer. These include refraining from ordering screening mammograms for patients with a life expectancy of less than 10 years (2009) and not routinely performing sentinel lymph node biopsies (SLN) for women over 70 with clinically node negative hormone receptor positive breast cancer (2016). The landmark study from the Cancer and Leukemia Group B (CALGB), trial 9343<sup>1</sup> and its subsequent 10-year follow-up report (2013)<sup>2</sup> showed that performance of adjuvant whole-breast radiotherapy (WBRT) after breast conserving surgery for early stage estrogen receptor (ER) positive

breast cancer leads to no difference in distant metastasis or overall survival in women  $\geq 70$  taking tamoxifen. This contributed to the recommendation in 2016 from the American College of Surgeons to omit radiation therapy (RT) for women over 70 with T1N0M0 hormone receptor positive (HR+) breast cancer after lumpectomy.<sup>3</sup> Similar observed outcomes in this patient population regarding performance of axillary dissection<sup>4</sup> led to the recommendation by the Society of Surgical Oncology (SSO) in 2016 to stop routine use of SLN in clinically node-negative women with ER + invasive breast cancer.

After CALGB 9343 was published, adjuvant radiation treatment patterns were slow to change.<sup>5</sup> Even after the formalization of the American College of Surgeons recommendation, more recent reports suggest that radiation practices are changing, but slowly,<sup>6,7</sup> with many women in the group still receiving RT. The recommendation for omission of SNLB has been met with more controversy as evidenced by the recent debate at the American Society of Breast Surgeons society meeting.<sup>8</sup> Since 2016 when the recommendation was made, trends in practice changes have not been well documented.

There is minimal data on the use of screening mammograms for

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women over the age of 74. (USPSTF, Ann Intern Med, 2009; 151:716–26) These recommendations were not intended as a means for cost-saving alone, but to optimize patient care by refraining from over-diagnosis and over-treatment. We sought to measure the impact of these recommendations set forth by the Choosing Wisely campaign and the American College of Surgeons on the practice at a single campus of a National Cancer Institute-designated comprehensive cancer center, and the potential impacts they had on patient outcomes.

## 2. Materials and methods

### 2.1. Patients

After Institutional Review Board approval, a single institution retrospective study was conducted utilizing a prospectively collected and maintained database of patients undergoing breast surgery for breast cancer. The database was queried for the years 2002–2017. Data was collected on patient demographics, presentation, imaging method of diagnosis, tumor characteristics, tumor stage and grade, type of surgery and locoregional recurrence.

To estimate the utilization patterns of screening mammography among patients with ten year or less life expectancy, we evaluated the method of detection (imaging vs exam) and the diagnostic imaging modality of all patients  $\geq 75$  years presenting for breast cancer treatment before and after 2009. This age was chosen as a cutoff because of current national guidelines and the guidance statement published by Qaseem et al. recently favoring no mammography after the age of 75 according.<sup>9</sup> Given that our center is a tertiary referral center, a vast number of patients came with outside mammograms which were not ordered by the physicians involved in this study. Administration of RT after BCT was analyzed by dividing patients over age 70 into pre- and post-2013 groups. Local recurrence was assessed as well. In order to compare implementation of SLN in low risk (T1 ER + Her2-) breast cancer, female patients age  $> 70$  with tumors meeting these criteria were divided into pre- and post-2016 cohorts.

At the time of this study, all 5 surgeons involved along with the radiation oncologists and medical oncologists were completely aware of the Choosing Wisely and American College of Surgeons recommendations. They are widely distributed and disseminated and their adherence is encouraged throughout the three main campuses of our National Cancer Institute-designated comprehensive cancer center and enterprise wide. Patients and their surgeons had extensive conversations discussing the benefits and disadvantages of each of these recommendations. Ultimately the definitive management was selected by the patient. All patients met with a medical oncologist and radiation oncologist. Expected lifespan was subjectively determined on an individual basis by the surgeon based on patient comorbidities and overall health. Some patients, not all, were discussed in multidisciplinary tumor board. Practice changes were discussed at enterprise wide multidisciplinary meetings.

### 2.2. Statistical analysis

Descriptive statistics were used to summarize results for each

factor, divided into cohorts before and after the year each was published. For comparisons, patient demographics, pathology, and treatment variables were compared between categories by ANOVA for continuous variables; Fisher's exact test, or chi-square tests were used for categorical variables. Time to locoregional recurrence was defined as the time from primary surgery date to the date of first local or regional recurrence. A patient was censored at last follow-up or death if the patient had not previously experienced a local or regional recurrence. Event curves were estimated by the Kaplan-Meier method and compared between groups by the log-rank test. Two-sided *P*-value less than .05 were considered statistically significant.

## 3. Results

### 3.1. Mammogram utilization

There were a total of 493 female patients  $>75$  years who underwent breast surgery for newly diagnosed breast cancer. Of these, 228 were treated surgically before and 265 after the 2009 publication of the Choosing Wisely recommendation to not perform screening mammograms in females with a life expectancy of less than ten years. There were no differences in BMI, tumor stage, grade or size. Pre-2009 patients were slightly younger (79.5 vs 80.4;  $p = 0.03$ ) and 99.6% pre-2009 were white versus 95.4% 2009 and after ( $p = 0.03$ ). The rate of the initial presentation of cancer being on mammography was not different among those before 2009 (65%) vs. after 2009 (66%) ( $p = 0.73$ ) (Table 1). The patients with mammogram-detected tumors after 2009 had smaller tumors ( $p < 0.001$ ), more low-grade tumors ( $p = 0.003$ ), more ER+/HER2-tumors ( $p < 0.001$ ), and higher rates of BCT ( $p < 0.001$ ) when compared to patients with self/clinical exam-detected tumors.

### 3.2. RT in patients $\geq 70$ with T1 ER + Her2 tumors

There was a total of 421 female patients undergoing BCT prior to 2013 of which 242 (58%) were diagnosed with T1 ER + Her2-tumors. After this date, 171 patients underwent BCT for breast cancer of which 77 (45%) had T1N0 ER + Her2-tumors. RT was given to 79% of patients  $>70$  with T1 ER + Her2-prior to 2013 vs. 27% after ( $p < 0.001$ ) (Table 2). Those who had RT after 2013 were younger (73.4 vs 78.5,  $p = 0.001$ ) but were similar in all other features (Table 3). There was no difference in local recurrence rate for the two time periods ( $p = 0.56$ ) and only one patient developed a local recurrence among those not undergoing radiation (Graph 1A-B).

### 3.3. SLN in patients with T1, grade1/2, ER+, Her2-tumors

Prior to 2016, 738 patients were diagnosed with breast cancer. Of these, 405 (55%) had T1, grade1/2, ER+, Her2-tumors. The vast majority underwent BCT (82%) and 57% had adjuvant RT. After 2016, a total of 104 patients underwent breast surgery for breast cancer. Of these, 43 (41%) had T1, grade1/2, ER+, Her2-tumors. 91% underwent BCT and 9% a mastectomy. SLN was performed in 91% of patients with T1, grade1/2, ER+, Her2-tumors prior to 2016 vs. 56% after ( $p < 0.001$ ) (Table 4). Patients who had SLN after 2016 had

**Table 1**  
Presentation of breast cancer.

Presentation	Pre 2009 N = 228	Post 2009 N: 265	Total N: 403	P value
Self/Clinical Exam	80 (35%)	89 (34%)	169 (34%)	0.076
Mammogram	148 (65%)	176 (66%)	324 (66%)	

**Table 2**  
Use of adjuvant radiation therapy.

Radiation Therapy	T1 ER + HER2- $\geq$ 70 years old			P value
	<2013 N = 242	$\geq$ 2013 N = 77	Total N = 421	
Yes	79%	27%	324 (66%)	<0.001

**Table 3**  
Adjuvant radiation therapy. Characteristics of patients  $\geq$ 2013 T1 ER + HER2-.

Characteristics	Adjuvant Radiation Therapy		P Value
	Yes N = 21	No N = 56	
Mean Age	73.4	78.5	0.001
Grade			
- 1	7 (33%)	24 (43%)	0.218
- 2	9 (43%)	27 (48%)	
- 3	5 (24%)	5 (9%)	0.847
Mean Tumor Size	1.3	1.3	

**Table 4**  
Use of SNL biopsy.

SNL Biopsy	T1 ER + HER2-, Grade 1,2 $\geq$ 70 Years Old			P value
	<2016 N = 405	$\geq$ 2013 N = 43	Total N = 448	
Yes	91%	56%		<0.001

larger tumors (mean 1.8 cm vs 1.5 cm,  $p = 0.04$ ) and a 17% rate of mastectomy versus 0% among those who did not undergo SLN ( $p = <0.001$ ) (Table 5). There was no difference in the rate of lymph node metastases between these two groups.

#### 4. Discussion

The median age of presentation for those with breast cancer is 62 and 30% of newly diagnosed breast cancers are among those  $\geq$ 70 years old.<sup>10,11</sup> Guidelines exist for treatment of breast cancer in younger women, but the elderly population has consistently been underrepresented in previous trials, thus leaving this vulnerable population open to variable physician judgment. This is associated with additional costs related to unnecessary diagnostic tests and treatments and additional morbidity for patients with no benefit in short or long term survival. Through our study, we sought to measure the effect of the Choosing Wisely and American College of Surgeons recommendations pertaining to breast cancer treatment or screening among older patients, and the potential impacts they had on patient outcomes. We found that in our institution, the surrogate measurement for the use of mammography for screening women with an expected lifespan of ten or fewer years (breast cancer detected by screening mammography among women  $>$ 75 years old) did not change. RT application for T1 ER + Her2 tumors

**Table 5**  
SNL biopsy. Characteristics of patients  $\geq$ 2016 T1 ER + HER2-, grade 1,2.

Characteristics	SNL Biopsy		P Value
	Yes N = 24	No N = 19	
Mean Age	73.4	78.5	0.768
Grade			
- 1	11 (46%)	4 (21%)	0.09
- 2	13 (54%)	15 (79%)	
Mean Tumor Size	1.8	1.5	0.003
SLN( + )	4 (17%)	N/A	

Graph 1A - Local-Regional Recurrence by RT before 2013.

Graph 1B - Local-Regional Recurrence by RT after 2013.

among those undergoing BCT decreased by 52% with no apparent difference in local recurrence rate ( $p = 0.56$ ). The use of SLN among those age 70 or older decreased by 35%. These results demonstrate an apparent impact on our practice by the Choosing Wisely and American College of Surgeons recommendations.

The rates of screen-detected breast cancer did not decrease at our institution among women over 75 in response to the Choosing Wisely recommendation to not use mammographic screening if a woman's life expectancy is less than ten years. While mammography is the screening test of choice for breast cancer and is known to decrease mortality when utilized in women  $<$ 70 years by 15–19%,<sup>12–14</sup> there are conflicting recommendations on its use and utility in older women. Some studies have shown a mortality benefit when mammography is used in older women without major comorbidities,<sup>15–17</sup> while others suggest screening in this setting can lead to over diagnosis and unnecessary invasive procedures.<sup>18,19</sup> The United States Preventative Services Task Force currently has no guidelines for the use of mammography in the elderly population due to insufficient evidence.<sup>20</sup> American Society of Breast Surgeons most recently recommending screening in women with  $>$ 5 years life expectancy.<sup>18,21</sup> Others recommend that women should individually choose whether they want to continue mammography screening based on their life expectancy, current comorbidities and personal wishes and beliefs.<sup>22–24</sup> In a recent publication by Qaseem et al., in 2019, they provide a guidance statement specifying that average risk women older than 75 years should cease screening for breast cancer if their life expectancy is determined to be less than 10 years.<sup>9</sup> Our institutional guidelines, published in 2017, state that providers should “counsel patients with an expected lifespan of  $<$ 10 years that screening mammography is unlikely to provide significant survival benefit and can be discontinued.” Our ability to evaluate our institution's implementation of these internal guidelines as well as the Choosing Wisely recommendations is poorly represented by our surrogate marker of screening rates among those treated for breast cancer since more of such patients are diagnosed outside of our institution than within. This surrogate measurement may be an indicator that overall rates of screening among elderly patients have not changed substantially to this point.

Adjuvant radiation is standard therapy for women diagnosed with T1 ER + Her2 tumors after breast conservation therapy to decrease locoregional recurrence. Adjuvant RT has been shown to reduce recurrence rates by 50% and reduces mortality by 16%,<sup>25</sup> but is also associated with morbidity.<sup>26</sup> But several studies have shown that among older patients with early breast cancer, the addition of RT to endocrine therapy has less of an effect on outcomes. Matuschek et al. showed a decrease in time to recurrence with the addition of RT, but no difference in overall survival.<sup>27</sup> The PRIME II Trial showed similar results as Matuschek but also found that 5-year recurrence rates were low enough to omit the use of RT.<sup>28</sup> Multiple randomized and retrospective studies have shown similar findings.<sup>29–31</sup> Palta et al. showed a significant decrease in the utilization of RT in elderly patients after BCT.<sup>30</sup> The CALGB 9343 study and its 10 year follow up both proved that although RT does decrease local recurrence, this does not translate into an advantage in OS, distant disease-free survival, or breast preservation among patients age 70 and older.<sup>1,2</sup> Despite this evidence, it's been previously shown that the CALGB 9343 trial had minimal impact on the use of RT among older women in the Medicare population, even among the oldest women and those with shorter life expectancies.<sup>32</sup> The decrease in the rates of RT among our later time cohort show that the results of these trials have changed our practice in parallel with the corresponding American College of Surgeons recommendation.

Lymph node involvement in the axilla has historically been

considered the most important prognostic factor in a woman diagnosed with breast cancer, though better measurements of the molecular characteristics of primary tumors is rapidly changing this anatomic approach to prognosis. Sentinel lymph node biopsy is the mainstay diagnostic procedure for breast cancer staging. The recommendation to not routinely use SLN in women >70 years with clinically node negative hormone receptor positive breast tumors is one of the most recent guidelines endorsed by the Choosing Wisely Organization and originally recommend by the Society of Surgical Oncology. Martelli et al. also suggested that SLN could be omitted due to the very low cumulative incidence of axillary disease in women >70 years.<sup>4,33</sup> The International Breast Cancer Study group even demonstrated that women who avoided SLN or axillary surgery and who received endocrine therapy alone had similar survival with a better quality of life.<sup>34</sup> Our current institutional guidelines, published in 2018, recommend omission of SLN biopsy be strongly considered for those >70 years with ER + T1 grade 1–2 tumors and those with a life expectancy of fewer than five years. As the evidence has accumulated and external and internal guidelines have reflected a decreased use of SLN biopsy among these older patients, the rates of SLN operations has measurably decreased in our institution among patients over 70.

We acknowledge several clear limitations of the present study. Although our sample size was moderate, the data is retrospective and the possibility of selection bias as well incorrectly classified data points is present. This is a single institution review and the results are subject to the practice patterns of multiple surgeons, radiation oncologists, and medical oncologists at our institution. Finally, the change in rates over time is almost certainly due to multiple factors and points of evidence, not just a response to a particular guideline. This study is limited to a single institution and may not represent the adoption of the Choosing Wisely and American College of Surgeons recommendations on a national level.

## 5. Conclusions

In the time periods before and after the Choosing Wisely and American College of Surgeons recommendations for breast cancer patients, the rates of patients >75 presenting with mammography-detected breast cancer has not decreased, but adjuvant RT is less commonly used and SLN biopsy is less frequently performed in low risk breast cancer patients >70 years old. Practice-changing evidence, Choosing Wisely and the American College of Surgeons recommendations have impacted our practice, but therapeutic decisions must remain individualized through shared decision-making.

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