

Comparison of Health Utility Weights among Elderly Patients Receiving Hormonal Therapy With or Without Radiotherapy after Breast-Conserving Surgery: A Commentary

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Background

Breast Cancer (BCa) is one of the leading cancer related cause of death among women. It has been estimated that 252,710 new cases and 40,610 deaths in 2017 [1]. Age is the strongest risk factors for breast cancer incidence and mortality. The majority of elderly women are diagnosed with Hormone Receptor Positive (HR+) early-stage breast cancer, and treating this group of patients is challenging. Radiotherapy after Breast Conserving Surgery (BCS) is a recommended treatment for patients diagnosed with early-stage breast cancer. However, the benefit associated with the addition of radiotherapy to hormonal therapy following BCS, for this patient population, remains controversial.

Options for treating early-stage breast cancer usually include some combination of surgery, radiation, chemotherapy, and hormonal therapy and/or targeted therapy [1]. Yet, the selection of the optimal treatment combination depends on the early-stage breast cancer subtype, the balancing of the benefits and harms of these treatment options as well as patient preferences in regard to the resulting outcomes. For patients diagnosed with HR+ breast cancer, hormonal therapy and radiotherapy are recommended treatments following BCS.

Health Related Quality of Life (HRQoL) data are a very important piece of information in treatment decision, especially patients with limited life expectancy. Furthermore, they represent valuable information that fuel economic evaluations, which are crucial for both clinical and reimbursement decision-making. HRQOL measures can be obtained from multiple sources. Nowadays, HRQOL measuring is embedded in Randomized Clinical Trials (RCTs) as secondary objectives and usually benefit from the internal validity inherent in this study design.

Although RCTs have strong internal validity, they have a number of weaknesses which include: 1) short duration, 2) patients included are

not representative of real-world populations, 3) do not allow the study of the impact of comorbidities on the estimation of the outcome of interest, 4) generate only efficacy and safety data as opposed to effectiveness data. Thus, the results of RCTs have limited applicability in real-world clinical and reimbursement decision-making [2].

Keywords: Breast cancer; Hormone receptor; Randomized clinical trials

Commentary

We tried to estimate health utility weights for elderly women diagnosed with early-stage hormone receptor positive breast cancer and received radiotherapy plus hormonal therapy versus hormonal therapy alone after BCS using data from the Surveillance, Epidemiology, and End Results (SEER) linked with Medicare Health Outcomes Survey (MHOS). HRQoL data, obtained from a survey using VR-12, were converted into health utility weights for the radiotherapy and no radiotherapy groups using a novel multi-stage mapping algorithm by Kazis [3]. From the SEER-MHOS 618 patients met the inclusion criteria. Among the 618 patients, our propensity score matching generated 459 treated and 133 control patients. The average time from diagnoses to survey and diagnosis to treatment were 27.31 and 1.81 with standard deviation 20.57 and 1 month respectively.

The results showed that there is a significant difference in health utility among radiotherapy and no radiotherapy groups. The mean health utility weight was 0.696 (CI: 0.686, 0.706). The mean health utility weight for patients who were treated with radiotherapy were 0.701 and for those who did not receive radiotherapy were 0.676.

Overall mean		Treatment groups				
		No radiation (N=133)		Radiation (N=459)		p-value
	Mean	N	Mean (SD)	N	Mean (SD)	
Utility	0.696		0.676 (0.130)		0.701 (0.123)	0.0423
Age						
65-69	0.72	29	0.686 (0.132)	155	0.727 (0.116)	0.091

70-74	0.709	35	0.698 (0.135)	154	0.711 (0.123)	0.566
75-79	0.668	30	0.655 (0.123)	89	0.673 (0.114)	0.465
80+	0.657	39	0.669 (0.117)	61	0.652 (0.131)	0.57
Race						
White	0.697	110	0.675 (0.128)	372	0.704 (0.120)	0.031
Black	0.688	12	0.679 (0.106)	44	0.691 (0.143)	0.786
Others	0.689	11	0.687 (0.142)	43	0.690 (0.125)	0.958
Marital status						
Married	0.717	55	0.690 (0.119)	244	0.722 (0.109)	0.053
Unmarried	0.674	78	0.666 (0.132)	251	0.677 (0.133)	0.2813
Comorbidity						
Healthy (0 comorbidity)	0.801	11	0.794 (0.105)	44	0.803 (0.107)	0.818
1 or 2 comorbidities	0.744	59	0.729 (0.110)	186	0.744 (0.105)	0.327
More than 2 comorbidities	0.638	63	0.607 (0.105)	229	0.647 (0.113)	0.012
Time from diagnosis to treatment						
<2 months	0.696	110	0.674 (0.124)	375	0.702 (0.122)	0.034
≥ 2 months	0.693	23	0.686 (0.142)	84	0.695 (0.127)	0.765

Table: 1 Health utility comparison of between treated and untreated groups

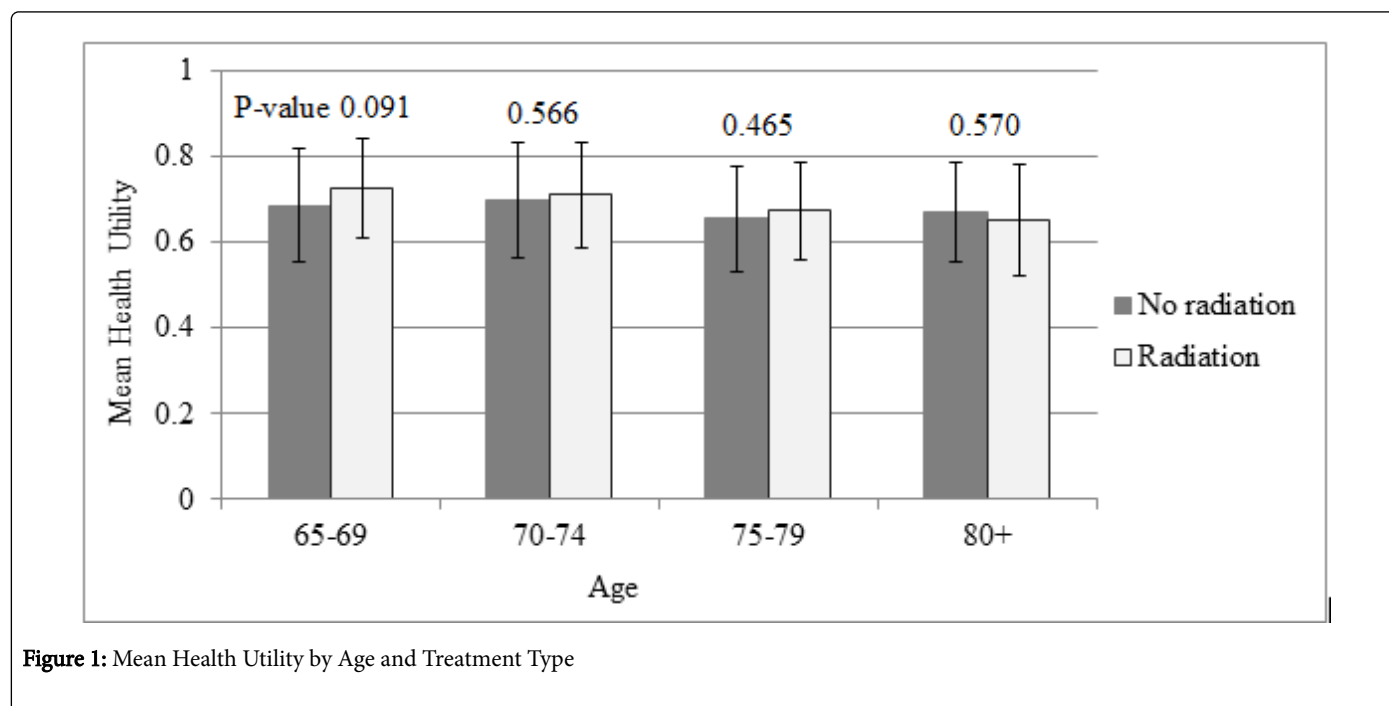


Figure 1: Mean Health Utility by Age and Treatment Type

As shown in (Table 1) and (Figure 1), the results of our study showed that the mean health utility weight in the radiotherapy group decline as the patient's age increases. Women aged 80 and older and did not receive radiotherapy had a higher health utility compared to those who were treated with radiotherapy; however, this difference was

not statistically significant. White women who were treated with radiotherapy had a higher health utility weight than who were not treated with radiotherapy; and this was statistically significant. Women who received radiotherapy had a higher health utility weight if they were treated within 2 months of initial treatment compared to those

who did not received radiotherapy after initial treatment. Black and other racial group women had a higher health utility if they were treated with radiotherapy than no radiotherapy; however this difference is not statistically significant.

Implications

In this study, the health utility weights associated with the addition of radiotherapy to hormonal therapy versus its omission after BCS were estimated. The results suggest that patients who received radiotherapy after BCS have a higher health utility compared to those who did not receive radiotherapy.

Previous studies reported that comorbid conditions impact the health-related quality of life of patients, i.e. patients with multiple comorbid condition often have lower quality of life compared to patients with fewer or no comorbidities [4-7]. Our study reported that health utility weights decreased as the number of comorbidity increases in both radiotherapy and no radiotherapy groups, with a sharp decrease in the no radiotherapy group. However, comorbid conditions were not accounted for in this analysis. Identifying which comorbid condition has a negative association with health utility weight of elderly women diagnosed with hormone receptor positive early-stage breast cancer could improve treatment decisions in elderly women with comorbid conditions. The omission of treatment related adverse events could lead to the overestimation of the health utility weights of patients treated with radiotherapy. Additionally, the results of this study are prone to uncertainty due to small sample size, missing data, and misclassification of some of the variables [8]. Even though, this study used propensity score matching to balance the treatment and the control group over observed covariates, we were not able to control for physicians influence on the selection of treatment and

individual self-selection behavior due to lack of data. We recommend that future studies to conduct sensitivity analysis to understand the impact of missing data. Furthermore, we recommend the use of instrumental variable analysis with a larger sample size to disentangle the real effect of the treatment.

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