

The Use of Hormone Therapy and Radiation after Breast Conserving Therapy for Estrogen Positive Tumors in Women 65 years of Age and Older: A National Cancer Database Study

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Background

- Multiple studies show that adjuvant radiation (RT) after breast conserving surgery (BCT) can be safely omitted if hormone therapy (HT) is given in elderly patients:
 - The Cancer and Leukemia Group B (CALGB) 9343 showed early stage breast cancer (ESBC) in women > 70 years had no difference in overall survival (OS) (although some improvement in locoregional recurrence).¹
 - After median follow up of 12.6 years, CALGB 9343 again demonstrated RT can safely be omitted if HT given.²
 - PRIME II demonstrated omission RT for patients >65 years old with ESBC can be safely considered, but RT had a modest reduction in local recurrence and omission of RT had a low percentage increase in ipsilateral recurrence at 5 years.³
- Multiple studies have been published demonstrating statistically significant decrease in the usage of RT for elderly women with ESBC, however the majority of patients still undergo RT⁴⁻⁶.

Purpose

- We aim to reassess practice patterns of RT and HT in elderly patients and evaluate the clinical and socioeconomic factors that influence the usage of RT through analysis of the updated National Cancer Database (NCDB).

Methods

- NCDB retrospectively reviewed from 2004-2015.
- Patients underwent BCT for pathologic stage T1-2, estrogen receptor positive (ER+) breast cancers, 65 years of age and older.
- The types of treatment combinations include surgery alone (S), S + Radiation therapy (RT), Surgery + hormone therapy (HT), and S + RT + HT.
- Patients undergoing neoadjuvant chemotherapy were excluded.
- Facility type, distance, age, Charlson Comorbidity Index (CCI), race, income, insurance type, pathologic stage, tumor size, grade and adjuvant chemotherapy were also assessed using a multinomial logistic regression model.
- Overall survival (OS) was analyzed using multivariate cox regression model comparing all four treatment combinations.

References

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Results

- 88,287 patients were included: 7,777 (8.8%) underwent surgery alone (S); 9,050 (10.3%) S + Radiation therapy (RT); 14,046 (15.9%) Surgery + hormone therapy (HT); and 57,414 (65.0%) S + RT + HT.
- When comparing facility type and distance of residence from treating facility (Table 1):
 - Patients at Community Cancer Programs (CCP) and Comprehensive CCP were less likely to undergo S+HT and S+HT+RT
 - CCP were less likely to undergo S+HT+RT
 - Integrated Network Cancer Centers (INCC) were more likely to undergo S+RT and S+RT+HT.
 - Patients at increased distance from hospital were less likely undergo any adjuvant therapy (p<0.001)

Table 1: Facility Type/Distance

Surgery alone (Reference) Variable	Surgery + Rad			Surgery + Hormone tx			Surgery + Rad + Hormone tx			p value
	OR	95 % CI		OR	95 % CI		OR	95 % CI		
Community Cancer Program (CCP)	0.938	0.870	1.012	0.926	0.866	0.991	0.922	0.868	0.980	<.0001
Comprehensive CCP	1.034	0.986	1.085	0.955	0.914	0.997	1.028	0.988	1.068	
Academic/Research Program	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
Integrated Network Cancer Program	1.118	1.044	1.197	1.008	0.947	1.073	1.100	1.040	1.164	
Distance from hospital, per 10 miles	0.915	0.911	0.920	0.971	0.966	0.975	0.836	0.833	0.840	<.0001

- When comparing socioeconomic factors (Table 2):
 - Patients with Increased age were less likely to undergo any adjuvant therapy
 - Race other than black were less likely undergo S+RT and S+RT+HT
 - CCI: 1 more likely undergo adjuvant therapy overall
 - CCI: 3 less likely undergo adjuvant therapy overall.
 - Higher incomes were more likely undergo S+RT and S+RT+HT.
 - Medicare patients were more likely undergo treatment with S+RT+HT

Table 2: Patient Characteristics

Surgery alone (Reference) Variable	Surgery + Rad			Surgery + Hormone tx			Surgery + Rad + Hormone tx			p value
	OR	95 % CI		OR	95 % CI		OR	95 % CI		
Age Per 1 year	0.915	0.911	0.920	0.971	0.966	0.975	0.836	0.833	0.840	<.0001
Race										0.0075
White	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
Black	1.008	0.903	1.125	1.083	0.985	1.192	1.045	0.959	1.139	
Other	0.870	0.760	0.996	0.902	0.800	1.017	0.894	0.804	0.994	
Charlson										<.0001
0	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
1	1.110	1.004	1.228	1.086	1.000	1.180	1.269	1.175	1.370	
2	0.937	0.814	1.078	0.994	0.885	1.117	0.925	0.830	1.031	
3+	0.715	0.572	0.893	0.917	0.770	1.092	0.608	0.515	0.718	
Income										<.0001
Less than \$40,227	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
\$40,227 - \$50,353	1.006	0.949	1.067	1.013	0.961	1.068	0.991	0.945	1.040	
\$50,354 - \$63,332	1.080	1.021	1.142	1.011	0.961	1.063	1.057	1.010	1.107	
\$63,333 +	1.057	1.007	1.110	0.948	0.907	0.991	1.059	1.018	1.102	
Insurance										0.0082
Not Insured	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
Private Insurance / Managed Care	1.081	0.906	1.288	0.905	0.774	1.058	1.034	0.898	1.191	
Medicaid	0.833	0.630	1.100	0.914	0.717	1.164	0.900	0.724	1.119	
Medicare	1.130	0.958	1.333	1.057	0.914	1.223	1.161	1.017	1.325	
Other Government	0.909	0.595	1.388	1.036	0.718	1.494	0.972	0.696	1.357	

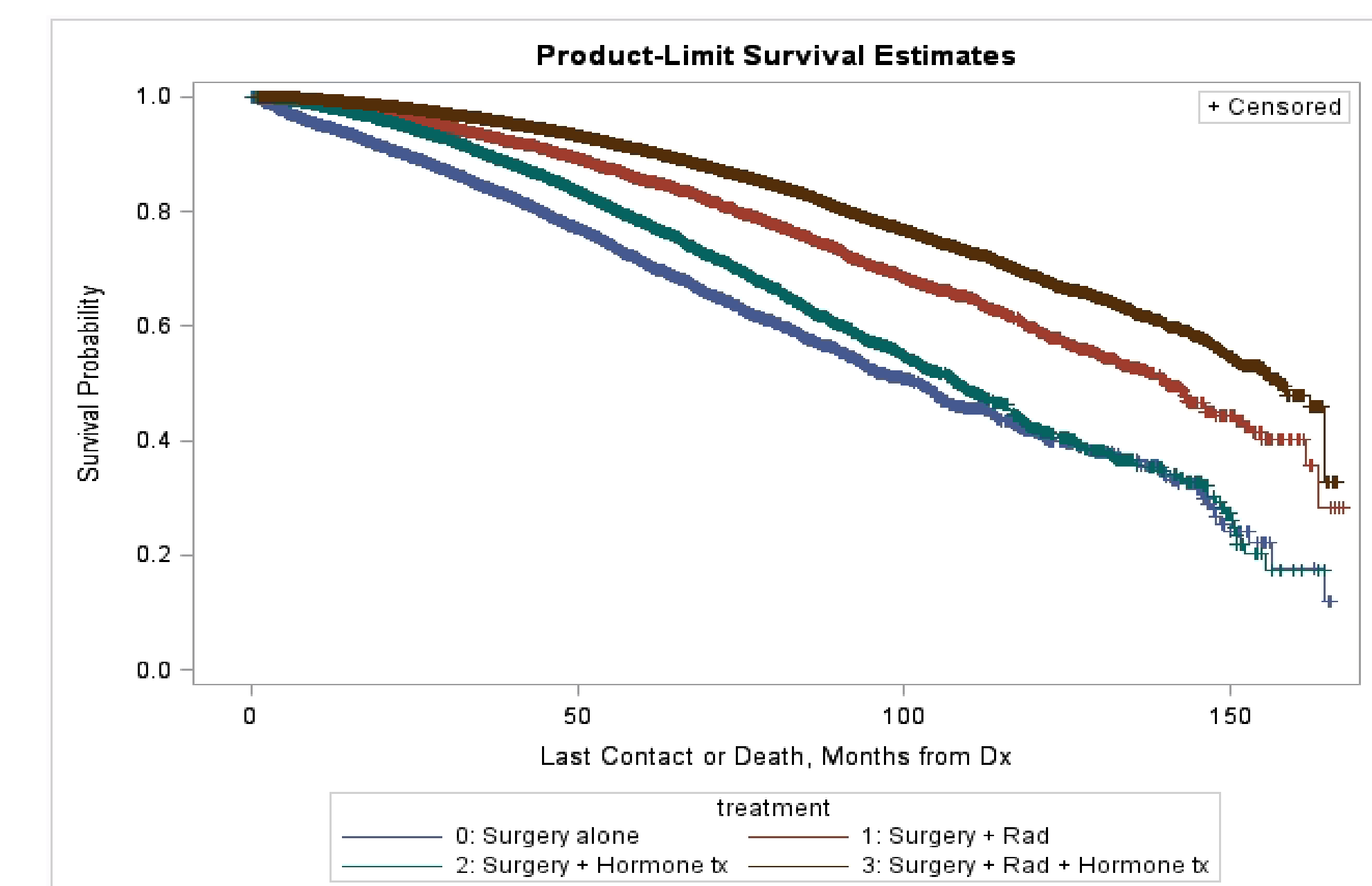
- When comparing tumor characteristics (Table 3)
 - Higher pathologic stage was more likely to undergo S+HT and S+HT+RT.
 - Tumors 2-3 cm (T2) were more likely to receive S+HT and S+HT+RT.
 - Mod-intermediate differentiation were more likely to undergo S+HT than well differentiated tumors.
 - Adjuvant chemo more likely undergo S+RT and S+RT+HT.
- Patients undergoing postoperative chemotherapy were more likely to undergo S+RT or S+RT+HT. (p<0.001)

Table 3: Tumor Characteristics/Post-Op Chemo

Surgery alone (Reference) Variable	Surgery + Rad			Surgery + Hormone tx			Surgery + Rad + Hormone tx			p value
	OR	95 % CI		OR	95 % CI		OR	95 % CI		
Path Stage (T)										<.0001
p1	0.916	0.798	1.051	0.702	0.615	0.800	0.641	0.572	0.718	
p1A	0.983	0.864	1.119	1.067	0.948	1.202	0.805	0.724	0.895	
p1B	0.980	0.866	1.109	1.412	1.261	1.582	1.275	1.153	1.410	
p1C	1.060	0.917	1.226	1.301	1.143	1.480	1.346	1.199	1.511	
p2	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
Tumor Size										<.0001
0: <= 10 mm	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
1: > 10 mm but <= 20 mm	1.123	0.865	1.456	0.917	0.739	1.139	1.036	0.851	1.262	
2: > 20 mm but <= 30 mm	0.976	0.793	1.201	1.310	1.105	1.552	1.264	1.083	1.475	
3: > 30 mm but <= 40 mm	0.900	0.696	1.163	1.123	0.910	1.386	1.093	0.904	1.321	
4: > 40 mm but <= 50 mm	0.701	0.479	1.025	1.261	0.949	1.675	1.102	0.849	1.430	
Grade										<.0001
Well differentiated, differentiated, NOS	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
Moderately, intermediate differentiation	0.962	0.759	1.219	1.409	1.067	1.860	1.129	0.925	1.377	
Poorly differentiated	1.045	0.816	1.337	1.101	0.827	1.467	1.131	0.921	1.389	
Undifferentiated, anaplastic	1.089	0.540	2.196	0.480	0.210	1.098	0.873	0.485	1.573	
Post Op Chemo										<.0001
No	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	
Yes	1.138	1.044	1.240	0.926	0.850	1.009	1.208	1.123	1.300	

- OS was longest in S+RT+HT followed by S+RT, S+HT and S alone. (Figure 1)

Figure 1. A Comparison of Survival Probability from Date of Diagnosis for Treatments Received



Discussion

- Our data demonstrates 65% of patients with early stage T1/T2, ER+ breast cancer treated with lumpectomy and hormone therapy are still receiving adjuvant RT. Although the percent decrease in omission of RT in this population is small compared to the earlier studies comparing pre- and post-CALGB percentages, this percentage remains significant and shows that there continues to be a trend in the reduction of RT for this specific population.
- Even with the increased omission of RT from treatment of ESBC, S+RT+HT remains the most common treatment combination.
- Specific facility type, patient characteristics, socioeconomic factors and tumor characteristics that led to the omission of RT were patients receiving care at CCP, those who lived further from a hospital, increase in age, minorities other than black and a higher CCI.
- Overall survival continues to be longest for those undergoing S+RT+HT.
- Differences in receipt of treatments may be due noncompliance, financial factors, access to care or intolerance of the HT side effects due to comorbidities.

Conclusion

- Our analysis of NCDB reveals that there continues to be a shift with the omission of RT from practice patterns.
- Treating facility, patient characteristics, socioeconomic and tumor characteristics appear to influence the omission of RT
- However, when determining a treatment regimen for this specific patient population, it is important to take into account all factors including high risk features, life expectancy, co-morbidities, functional status, quality of life, financial needs, patient preference etc. as RT and HR in addition to patients receiving BCT surgery result in the longest OS.