

Boost Radiation Treatment for Anal Cancer Decreases the Risk for Lifetime Colostomy: Analysis from the National Cancer Data Base (NCDB)

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Background:

Treatment for anal canal cancer has evolved from abdominoperineal resection to a combined chemoradiotherapy (CRT) approach, which allows for sphincter preservation. An additional boost dose of radiation is often used for patients (pts) with advanced local disease (T3, 4, and N+), and/or persistent disease following standard CRT. The specific aim was to determine the relationship between boost radiation treatment (RT) and future colostomy construction rate.

Methods:

All pts with *de-novo* anal cancer from the NCDB were examined (53,523 pts). After excluding pts with anal margin cancer, missing data points, and/or those who did not receive standard CRT, 1025 pts were analyzed. Variables included age, gender, race, primary tumor size, clinical nodal status, TNM stage, boost radiation, and colostomy construction. We assessed which pts received boost RT after standard CRT. A logistic regression model assessing the relationship between boost RT and colostomy construction was developed.

Results:

A cohort of 1025 pts met inclusion criteria. Four hundred and fifty patients received CRT without boost RT; 575 patients received CRT with boost RT. The two groups were similar in age, gender, race, tumor size, nodal status, and TNM stage, (p-values all = NS). Statistically significant variables for colostomy construction were age (p=0.05), tumor size (p<0.001), negative nodal status (p<0.001) and boost RT (p=0.002), while gender, race, and TNM stage did not reach statistical significance. On logistic regression model, when controlling for age, tumor size, and nodal status, colostomy construction is less likely to occur with an RT boost (Odds Ratio 0.63 with boost RT, 95% CI 0.47-0.85, p=0.003).

Patient and Tumor Characteristics

Variable	Boost Radiation (N=575)	No Boost Radiation (N=450)	p-value
Age ¹	57 (49, 65)	56 (49, 66)	0.24 ^a
Gender ²			1.00 ^b
Male	205 (36%)	161 (36%)	
Female	370 (64%)	289 (64%)	
Race ²			0.06 ^b
White	504 (88%)	371 (82%)	
Black	58 (10%)	67 (15%)	
American Indian	13 (2%)	12 (3%)	
Tumor Size ²			0.40 ^b
<=40 mm	314 (55%)	233 (52%)	
> 40 mm	261 (45%)	217 (48%)	
Clinical Node Status ²			0.66 ^b
Negative	249 (43%)	202 (45%)	
Positive	326 (57%)	248 (55%)	
AJCC Stage ²			0.57 ^b
Stage 0	2 (<1%)	3 (<1%)	
Stage I	34 (6%)	36 (8%)	
Stage II	145 (25%)	116 (26%)	
Stage III	362 (63%)	261 (58%)	
Stage IV	32 (6%)	34 (8%)	

Table 1. Patient and tumor characteristics comparing the group who received boost radiation to those who did not receive boost radiation.

¹ Median and interquartile range
² Number and percent within population
^a Welch Two Sample t-test
^b Pearson's Chi-squared test

Odds of Lifetime Colostomy

Variable	Odds Ratio (95% CI)	p-value
Age	1.03 (0.83, 2.54)	0.021
Tumor Size >40mm	1.88 (1.39, 2.54)	<0.001
Clinically Node Positive	0.28 (0.21, 0.39)	<0.001
Boost Radiation	0.63 (0.47-0.85)	0.003

Table 2. Multivariable logistic regression analysis for abdominoperineal resection with permanent colostomy construction. Adjusting for age, tumor size, and clinically positive nodal status, there is a statistically significant decreased need for lifetime colostomy when boost radiation was administered.

Conclusions:

- Boost RT has been administered to pts regardless of their demographics and stage of disease
- When controlling for age, tumor size and nodal status, those who received boost RT, were less likely to require future colostomy.
- The role of boost RT may warrant validation as part of prospective clinical trial.