Appendiceal Adenocarcinomas Are Associated With Better Prognosis Than Cecal Adenocarcinomas: A Population-based Comparative Survival Study

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INTRODUCTION

The incidence of appendiceal cancer in the U.S. has increased over the past two decades despite stable rates of appendectomies. Although the appendix and cecum share the same anatomic origin, appendiceal and colorectal adenocarcinomas have distinct molecular profiles. Differences in survival outcomes between these malignancies have not been compared extensively.

OBJECTIVE

To conduct a comparative survival analysis of appendiceal and cecal adenocarcinomas and identify demographic and clinical factors associated with cancer-specific mortality in both malignancies.

METHODS

We used the Surveillance, Epidemiology, and End Results (SEER) database to identify individuals aged 30 years or older diagnosed with appendiceal or cecal adenocarcinomas from 1975 to 2016. Demographic and clinical were extracted using SEER*Stat software. Demographic covariates included sex, age at diagnosis, year of diagnosis, race, ethnicity, and marital status. Clinical data consisted of primary cancer site, tumor histology, tumor stage, tumor grade, surgery, chemotherapy, and survival.

Cancer-specific survival was compared by the Mantel-Haenszel log-rank test, and survival curves were generated using the Kaplan-Meier method. Relative hazard ratios for death in the five-year period following diagnosis were calculated using multivariate Cox regression analyses, adjusted for other covariates. The p-value level of significance was set at <0.05 for a two-tailed test. Data was analyzed using SAS 9.4 and R software.

RESULTS

Figure 1: Five-year cancer-specific and overall survival curves for appendiceal and cecal adenocarcinoma

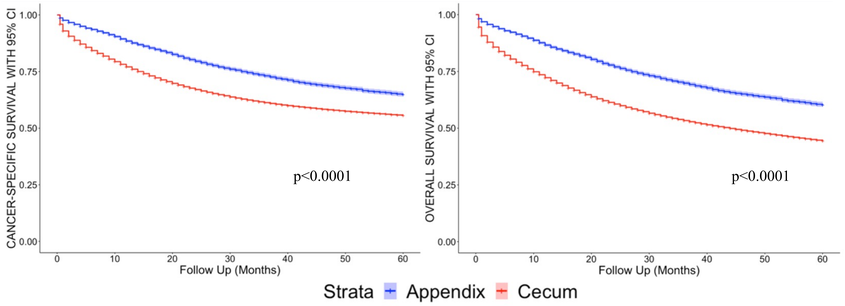

Table 1: Demographic and clinical factors associated with five-year cancer-specific survival following diagnosis of appendiceal or cecal adenocarcinoma

	Parameter	P-value	Hazard Ratio	95% Confidence Interval
Sex	Male		1	
	Female	<0.0001	0.89	0.87-0.91
Age	>60		1	
	≤60	<0.0001	0.78	0.76-0.80
Year of Diagnosis	2005-2016		1	
	1991-2005	<0.0001	1.25	1.27-1.59
	1975-1990	<0.0001	1.56	1.49-1.63
Marital Status	Married		1	
	Divorced	<0.0001	1.14	1.10-1.19
	Widowed	<0.0001	1.21	1.18-1.24
	Never married	<0.0001	1.15	1.12-1.19
Race	White		1	
	Asian/Pacific Islander	0.0003	0.91	0.87-0.96
	Black	<0.0001	1.13	1.10-1.17
Ethnicity	Non-Hispanic		1	
	Hispanic	0.003	0.94	0.90-0.98
Histopathology	Non-mucinous		1	
	Mucinous	<0.0001	0.89	0.86-0.91
	Signet ring cell	<0.0001	1.26	1.19-1.33
Stage	Local		1	
	Regional	<0.0001	3.60	3.43-3.77
	Distant	<0.0001	17.61	16.79-18.47
Grade	I: Well differentiated		1	
	II: Moderately differentiated	<0.0001	1.32	1.26-1.37
	III: Poorly differentiated	<0.0001	1.99	1.90-2.08
	IV: Undifferentiated; anaplastic	<0.0001	2.11	1.96-2.28
Surgery	Surgical excision		1	
	Biopsy only	<0.0001	3.55	3.38-3.74
	No surgery or biopsy/Unknown	<0.0001	5.39	4.87-5.97
Chemotherapy	Chemotherapy		1	
	No/Unknown	<0.0001	1.06	1.03-1.08

RESULTS

- Our study consisted of 16,491 appendiceal adenocarcinomas and 99,387 cecal adenocarcinomas.
- The five-year cancer-specific and overall survival curves for appendiceal and cecal cancer are shown in Figure 1. Compared to cecal cancers, appendiceal adenocarcinomas had higher cancer-specific (HR 0.64; p<0.0001) and overall survival (HR 0.63; p<0.0001).
- Male sex, age >60, earlier year of diagnosis, unmarried marital status, black race, and non-Hispanic ethnicity were significantly associated with higher cancer-specific mortality (Table 1).
- Non-mucinous adenocarcinoma was significantly associated with worse survival than mucinous adenocarcinoma but improved survival compared to signet-ring cell carcinoma (Table 1).
- Advanced stage and grade were significantly associated with higher mortality, while surgery and chemotherapy significantly were associated with survival benefits (Table 1).

LIMITATIONS

- The SEER database lacks additional pertinent clinical data, including co-morbidities, specific chemotherapy regimens, and postoperative complications.
- Our study included a larger sample size of cecal adenocarcinoma compared to appendiceal adenocarcinoma, although this is reflective of the substantially rarer incidence of appendiceal cancer.

CONCLUSIONS

In this largest comparative survival study of appendiceal and colorectal cancers, appendiceal adenocarcinomas were associated with improved survival compared to that of cecal adenocarcinomas. Further investigation of prognostic factors and molecular mechanisms of appendiceal cancers is needed to establish standardized treatment guidelines.