Stage Migration in Colorectal Cancer: A Rural Appalachian Veteran's Affairs Medical Center's Experience 1997-2018

Ruth Gerola, MD, Micah Singer CTR, James Brown PhD, PharmD, David Denning, MD, Todd Gress, MD, Robert Finley, MD

Marshall University: Department of Surgery and Hershel "Woody" Williams Veterans Affairs Medical Center

Huntington, West Virginia

Background

Colorectal cancer is the fourth leading cause of cancer and second most common cause of cancer mortality in the United States[1]. Increase in colorectal cancer screening and surveillance have helped decrease colorectal cancer incidence and mortality due to the process of detecting early stage colorectal cancers and precancerous lesions in asymptomatic patients without prior history of colorectal cancer[2]. When detected at a localized stage, the 5-year survival rate in colorectal cancer is greater than 90% however it is diagnosed early in only 39% of patients[3]. Thus, it is important to screen people who have no symptoms. We seek to document stage migration in our colorectal cancer patients at Hershel "Woody" Williams Veteran's Affairs Medical Center in Huntington, WV between 1997-2018.

This is important because West Virginia has a poverty rate of 20% based on the government census done in 2019 which is 5.7% more than the national average which places our population in the less likely screened group[4,5]. Individuals who are economically disadvantaged have higher colorectal cancer death rates due to higher incidence rates and poorer disease outcomes due to high prevalence of comorbidities and more advanced disease state[6,7,8].

Purpose

The purpose of this study is to show the impact of colonoscopy over time in patients at Hershel "Woody" Williams Veterans Affairs Medical Center in Huntington, West Virginia.

Methods

Approval from the Institutional Review Board and local Research and Development Committee approval is attained for a single institution retrospective study.

We access the tumor registry to find all colorectal cancer patients diagnosed between January 1, 1997 to December 31, 2018. CPRS (Computerized Patient Record System), the VA's electronic health record system is used to gather patient information and demographics. To assure privacy, information security measures are followed including encryption and password protection.

STATA (16.0 College Station, Texas) is used to analyze the data by ANOVA, Chi Square Testing, and Confidence Intervals (CI). The incidence of colon cancer per colonoscopy is calculated using data from the DHCP, including colonoscopies per year and the number of colon cancers per year. Amongst those diagnosed with colon cancer, the stage is divided between the different stages of colorectal cancer based on pathology. We use AJCC (American Joint Commission on Cancer) colon and rectum staging system between 1997-2018 which comprises the 4th edition through 7th edition.

We identify 521 patients with colon cancer between 1997 and 2018. Colonoscopy is performed by attending physicians in general surgery and gastroenterology and by general surgery residents under their supervision. Excluded are patients that do not have pathologic documentation of colorectal cancer in the electronic health record.

Results

- Colorectal Cancer Stage 0 (carcinoma in situ) was seen in 55.5% of patients seen between 2014-2018 vs 1% of patients between 1997-1998
- Stage 0 cancers over the study period increased to 55.5%, reflecting a large stage migration
- The percentage of patients with Stage I, II, III, and IV decreased over the study period
- Other risk factors identified with significant change over the study period include smoking, alcohol use and BMI with a p<0.001
- Only stage is predictive of survival in multivariate analysis Contemporary group (2008-2018) vs an early group (1997- 2007)
- There is an improvement in survival in the contemporary group with p=.05

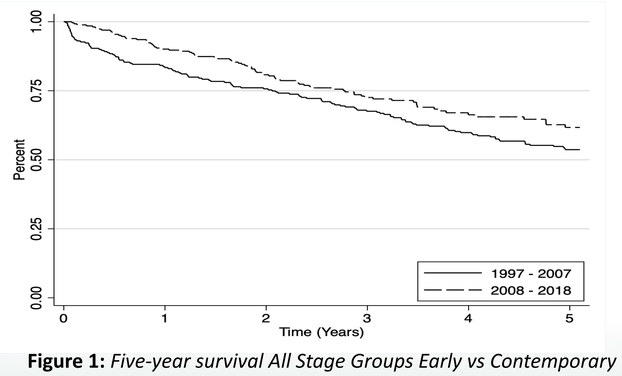


Figure 1: *Five-year survival All Stage Groups Early vs Contemporary*

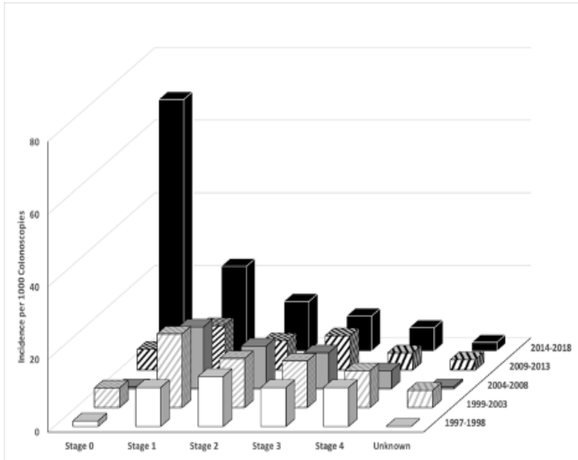


Figure 2: *Incidence of colorectal cancer by stage over time*

Characteristic	1997-1998 (N=31)	1999-2003 (N=99)	2004-2008 (N=145)	2009-2013 (N=91)	2014-2018 (N=155)	P Value
Age, mean (sd)	68.5 (10.2)	69.0 (8.9)	69.0 (9.4)	67.8 (11.3)	67.5 (8.4)	0.61
Male Gender, %	100 (31)	99.0 (98)	96.6 (140)	97.8 (89)	96.8 (150)	0.63
Race						
White	93.6 (29)	98.9 (98)	99.3 (144)	97.8 (89)	94.2 (146)	0.054
Black	6.4 (2)	1.0 (1)	0.69 (1)	1.1 (1)	5.2 (8)	
Other	0 (0)	0 (0)	0 (0)	1.1 (1)	0.65 (1)	
Smoking	45.2 (14)	27.3 (27)	25.5 (37)	28.6 (26)	26.4 (41)	**<0.001**
Alcohol	41.9 (13)	14.1 (14)	11.7 (17)	22.0 (20)	20.6 (32)	**<0.001**
Body Mass Index	26.7 (6.1)	26.3 (6.7)	26.5 (6.0)	27.9 (7.4)	29.8 (6.9)	**<0.001**
Stage						
0	3.2 (1)	8.1 (8)	1.4 (2)	13.2 (12)	**55.5 (86)**	**<0.001**
I	22.6 (7)	30.3 (30)	37.9 (55)	28.6 (26)	18.7 (29)	
II	29.0 (9)	20.2 (20)	26.2 (38)	18.7 (17)	11.0 (17)	
III	22.4 (7)	19.2 (19)	22.1 (32)	22.0 (20)	7.7 (12)	
IV	22.6 (7)	15.2 (15)	11.0 (16)	11.0 (10)	**5.2 (8)**	
Unknown	0 (0)	7.1 (7)	1.4 (2)	6.6 (6)	1.9 (3)	

Table 1: *Colorectal Cancer in 521 patients by year of diagnosis at VAMC, Huntington, West Virginia between 1997-2018*

Conclusion

- During a 20-year practice of colonoscopy, we see significant migration toward colorectal cancer stage 0.
- This is associated with improved survival.
- Stage migration demonstrates efficacy in our colorectal cancer screening program.

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