



Are we catching women in the safety net? Colorectal cancer outcomes by gender at a safety net hospital



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ABSTRACT

Background: Our goal was to evaluate presentation and outcomes for colorectal cancer across gender in a safety net hospital (SNH).

Methods: An institutional Tumor Registry was reviewed for colorectal cancer resections 12/2009–2/2016. Patients were stratified into male and female cohorts. The main outcome measures were stage at presentation and oncologic outcomes across gender.

Results: 170 women (48.6%) and 180 men (51.4%) were evaluated; 129 (84.1%) females and 143 (79.4%) males underwent curative resection. There were no significant differences in prior colorectal cancer screening. On presentation, there were similar rates of stage IV disease across genders ($p = 0.3$). After median follow-up of 26.5 months (female) and 29.9 months (male), there were no significant differences in overall survival, survival by stage, or disease-free survival by gender (all $p = 0.7$). The local (1.4% females vs. 2.6% males, $p = 0.7$) and distant recurrence (16.6% females vs. 14.9% males, $p = 0.7$) were similar across gender.

Conclusion: With equal access to treatment, there were no significant differences in overall survival, survival by stage, or local or distant recurrence rates by gender. These findings stress the importance of the SNH system, and need for continued support.

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1. Introduction

In the United States, there are disparities in access to cancer incidence, access to care, and outcomes. There have been many studies looking at disparities across variables such as race and insurance status, with less data on gender.^{1–4} However, gender differences in cancer incidence and survival are an issue. For all cancers, the National Cancer Institute Surveillance Epidemiology and End Results (SEER) database has reported a higher overall incidence of cancer for men compared to women, with rates per 100,000 people for all cancers of 553.0 for males and 416.5 for females, an incidence rate ratio (IRR) of 1.33.⁵ The gender differences

are especially highlighted in colorectal cancer. Colorectal cancer is common, representing the 2nd most common cause of cancer-related deaths in men, and the 3rd most common cause of cancer deaths in women worldwide. In the United States, the lifetime risk of colorectal cancer is higher for men than for women.⁶ Studies have affirmed a higher overall incidence and mortality rate for colorectal cancer in men compared to women with rates approximately 30%–40% higher worldwide.^{5,7–11} The reason for the disparity is multifactorial, including tumor biology, race, late stage presentation, and variations in treatment, but access to screening and treatment is a major factor. Survival outcomes can be impacted by differences in access to early diagnostic studies and receipt of timely, high-quality treatment.^{12–14} It has not been previously studied if these differences across genders persist in a safety net hospital setting, where patients have equal access to care.

Safety net hospitals (SNH) are equal access institutions designated to provide health care to vulnerable populations. By mission and legal mandate, they provide care for all patients regardless of

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their ability to pay, and have a substantial share of uninsured, Medicaid, and other vulnerable patients as part of their case mix. These institutions provide a great benefit to uninsured and Medicaid-insured patients, offering affordable access to timely and appropriate care and reducing emergency colorectal cancer surgeries relative to hospitals without a safety net mission.¹⁵ The equal access institutions have been shown to have better survival outcomes for colorectal cancer in this vulnerable patient population and compared to national outcomes.^{16–19} However, prior works have focused on variables within the SNH population, such as insurance and race.^{2,3,16,17,20,21} Little research to date has looked specifically at colorectal cancer outcomes by gender in an equal access system.

Our goal was to evaluate the patient demographics, rates of screening, presentation stage, and cancer survival across genders in a safety net hospital. Our hypothesis was that with equal access to treatment in a SNH, differences in survival outcomes might be abated across the sexes.

2. Materials and methods

After receiving Institutional Review Board approval from MetroHealth (IRB16-00067), a retrospective review of a prospectively maintained institutional Tumor Registry was performed for patients diagnosed with colorectal cancers at MetroHealth Medical Center (MHMC) from December 21, 2009, through February 17, 2016. MHMC is an urban, public, non-profit 635-bed hospital in Cleveland, Ohio, and a part of the safety net hospital system. Patients with colorectal cancer as the primary diagnosis for the episode of care were included in the analysis. Colorectal cancer cases were identified using the International Statistical Classification of Diseases and Related Health Problem- 9th and 10th edition-Medical Diagnosis Codes: 153.1, 153.2, 153.3, 153.6, 154.0, 154.1, C182, C184, C186, C187, C19, and C20. Patients were excluded from the analysis if they were younger than 18 years of age, had a primary diagnosis of polyps (ICD-9211.3, 211.4), were diagnosed with benign disease, had a non-colorectal primary malignancy, or incomplete medical records. Included patients were then stratified into male and female cohorts.

Preoperative patient demographics and screening history, perioperative, and oncologic outcomes were evaluated across each cohort. Variables analyzed included age, gender, body mass index (BMI), race/ethnicity, co-morbidities, past surgical history, stage at presentation, prior colorectal cancer screening, insurance status, admission type (elective versus emergent), operative approach, pathologic stage, and survival outcomes. Zip code of residence was evaluated as a surrogate for socioeconomic status. Prior screening was defined as report of prior colonoscopy, flexible sigmoidoscopy, fecal occult blood testing, or CT colonography in the data registry or medical record. The median income for each zip code per the United States Census Bureau website was recorded, and each patient was placed into a defined quartile according to the median income of the zip code of his or her residence; these income quartile income brackets stem from the Nationwide Inpatient Sample (NIS) model and were previously described and validated in prior socioeconomic factors and outcomes studies.^{22–24} The main outcome measure was overall survival across gender at MHMC. Secondary outcome measures were differences in stage at presentation and survival rate by stage across gender at MHMC.

Statistical analysis, was performed using compared using two-sided Student's t-tests for continuous variables, reported as a mean (\pm standard deviation) or median (range), and Chi-square statistics or the Fisher exact test, as appropriate, for nominal variables. For adequate power to assess pathologic staging, patients were grouped into early stage (stages I-II) or late stage (III-IV)

cohorts. Survival outcomes were assessed with Kaplan-Meier survival curve with log-rank test. Statistical significance was defined at a p-value of alpha <0.05. All analyses were completed using Stata/SE 14.2 (StataCorp, College Station, Texas). Study data were collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tools hosted at University Hospitals Cleveland Medical Center.²⁵

3. Results

During the study period, 170 women (48.6%) and 180 men (51.4%) were evaluated. The demographic profile of patients was comparable, with similar mean age, BMI, race, primary language, and median household income (Table 1). There were significant differences in insurance status across gender, with higher rates of Medicare for males (42.9% vs. 29.4%, respectively), and higher rates of Medicaid coverage (32.8% female vs. 25.9% men) or no coverage/self-pay (20.0% female vs. 12.4% men) in females compared to males ($p = 0.03$). There were no significant differences in rates of prior colorectal cancer screening. Overall, 65.9% of females and 66.7% of males reported no prior screening. Females presented with higher incidence of colon cancer (84.1% vs. 71.1%, $p = 0.004$), while males had more rectal cancers (25% vs. 12.9%, $p = 0.004$). There were similar rates of stage IV disease at initial presentation across genders (20.3% vs. 25.7%, $p = 0.3$). Based on disease stage and comorbidities, 27 (15.9%) of females and 24 (11.3%) of males were deemed unresectable, 14 females (8.2%) and 13 males (7.2%) underwent endoscopic or transanal resection, and 129 (84.1%) of females and 143 (79.4%) of males had a curative surgical resection.

Complete perioperative and outcome variables are seen in Table 2. For patients that went onto surgery, significantly more females underwent emergent/urgent resection (20.9% female vs. 11.9% male, $p = 0.05$). The majority of surgeries for both genders were performed through a laparoscopic approach (62.3% female, 72.7% male, $p = 0.06$); this did not reach statistical difference among genders. Conversion rates to open surgery were similar amongst genders (7.1% female vs. 10.6% male, $p = 0.30$). The pathologic stage was similar across both sexes ($p = 0.40$). Postoperatively, the mean length of stay (LOS) was shorter for females (7.2 ± 6.4 vs. 8.9 ± 8.1 , $p = 0.05$). The rate of overall postoperative complications was comparable across genders ($p = 0.07$), but males had higher rates of superficial site infection (10.8% female vs. 19.5% male, $p = 0.039$) and postoperative ileus (8.6% female vs. 16.9% male, $p = 0.04$). Visits to the emergency department ($p = 1.0$) and unplanned readmissions within 30 days ($p = 0.2$) were analogous for men and women.

After a median follow-up period of 26.5 months (female) and 29.9 months (male), there were no significant differences in overall survival ($p = 0.7$) (Fig. 1) or disease-free survival ($p = 0.7$) (Fig. 2) by gender. The survival rate by stage was also comparable across gender (Fig. 3). The local recurrence rate was 1.4% in females and 2.6% in males ($p = 0.7$). The rate of distant recurrence was 16.6% in females and 14.9% in males ($p = 0.7$).

4. Discussion

Colorectal cancer is one of the most common cancer types in both genders in the US.⁶ In colorectal cancer, disparities in incidence and mortality by gender have been reported.^{5,7–11} These differences in incidence rates and outcomes reflect differences among men and women in the “epidemic of diagnosis” and access to care.^{12–14,26} As access may be accountable for differences in outcomes, these gender disparities may not exist in an equal access safety net hospital. Our goal was to evaluate the presentation and outcomes for colorectal cancer across genders in a safety net

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