

Colorectal Cancer Site Analysis

by Kisa E. Weeman, MD

Colorectal cancer is a common and serious disease, but can be prevented and/or successfully treated with screening tests such as colonoscopy. It ranks as the third most common invasive cancer site for both incidence and mortality rates in both men and women in Ohio, from 2003-2007.¹ Nationally, it is estimated that approximately 142,600 new cases of large bowel cancer were diagnosed, of which 102,900 are colon and the remainder rectal cancers. Annually, approximately 51,370 Americans die of colorectal cancer, accounting for about 9% of all cancer deaths.



Trends in incidence and mortality:

Globally, the incidence of colorectal cancer (CRC) varies over 10-fold. The highest incidence rates are in Australia and New Zealand, Europe and North America, and the lowest rates are found in Africa and South-

Central Asia.² These differences are probably due to differences in dietary and environmental exposures that are superimposed upon a background of different genetic susceptibility.

In the United States, both the incidence and mortality have been slowly but steadily decreasing by about 2-3 percent per year over the last 15 years.³ The death rates from CRC have declined progressively since the mid-1980s in the U.S., at least partially due to detection and removal of colonic polyps, detection of cancers at an earlier stage, and more effective treatments, particularly adjuvant therapy after surgical resection.

An estimated 51,370 colorectal cancer deaths were expected to occur in 2010 nationally, accounting for 9% of all cancer deaths. The average annual mortality rate for colorectal cancer in Ohio from 2003-2007 was 19.6 per 100,000. This represents 2,456 average annual deaths in Ohio from colorectal cancer over the time period.⁴

Globally, the U.S. has one of the highest survival rates from CRC. Data collected by the Surveillance, Epidemiology and End Results Reporting (SEER) Program of the United

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States National Cancer Institute suggest that 61% of all patients treated for CRC (all stages and sites combined) survive 5 years.⁵

Risk Factors: Although the exact cause of most colorectal cancers is not known, several risk factors may contribute to the development of colorectal cancer. Although inherited susceptibility results in striking increases in risk, most cases of CRC are sporadic. Currently, a man living in the U.S. has a 1 in 26 lifetime risk of developing invasive colorectal cancer, and a woman has a 1 in 32 lifetime risk.

Genetics and Family History: About 5-10% of patients with colorectal cancer have an inherited genetic syndrome such as familial adenomatous polyposis (FAP) or Lynch Syndrome, which carry a much higher risk of developing colon cancer than the general population. There are also some less common inherited syndromes that predispose to colon cancer, such as Peutz-Jeghers Syndrome or Juvenile Polyposis Syndrome. Genetic counseling, which is available at Aultman Hospital, can help patients determine whether testing for one of these syndromes is warranted.

Family history is also an important risk factor even outside of the syndromes with a defined genetic predisposition. Having a parent, sibling or offspring (in other words, a first-degree relative), who has had colorectal cancer or adenomatous polyps increases risk about twofold over the general population, particularly if the relative was diagnosed before 60.

Age, Gender, Race, Ethnicity: More than 90% of colorectal cancers occur in individuals 50 and older.

Men have a higher incidence rate than women, and African Americans have the highest incidence rate of this cancer.

Personal History: Having had colon cancer, intestinal polyps, or chronic inflammatory bowel disease (which includes ulcerative colitis and Crohn's disease) increases risk. Increasing evidence suggests that diabetes mellitus is associated with an elevated risk of CRC.

Modifiable Risk Factors: Diets high in red meats and processed meats, fat, and low in calcium, folate and fiber may increase risk. An association between alcohol consumption has been seen in several studies, and smoking is a risk factor for colonic polyps, CRC and mortality from CRC.

Protective Factors: Regular physical activity, (either occupational or leisure time), the regular use of aspirin or nonsteroidal anti-inflammatory drugs, and hormone replacement therapy in postmenopausal women have been reported to be associated with a decreased risk of CRC (however, hormone therapy is not recommended for colon cancer prevention due to other associated risks of therapy). There are conflicting studies about the preventive effects of dietary fiber and supplemental vitamins and minerals. Diets high in fruits and vegetables may have a protective effect.

Screening and Early Detection: Colonoscopy and flexible sigmoidoscopy offer the best opportunity to detect colorectal cancer at an early stage, when successful treatment is likely, and to prevent some cancers by detection and removal

of polyps. According to the 2008 Behavioral Risk Factor Surveillance System, 51% of Ohioans 50 and older reported having had a sigmoidoscopy or colonoscopy within the past 5 years. This is increased from less than 30% in 1993.⁶

The recommended age to start screening is 50 for a patient at average risk; or age 40 (or 10 years younger than the youngest person to have colon cancer in the family) if there is a positive family history. (And possibly earlier if a hereditary syndrome is diagnosed). There are less invasive screening methods, including fecal occult blood tests, fecal immunochemical testing, and stool DNA tests. Imaging tests done for screening include double-contrast barium enemas and CT colonography. Positive tests are followed by colonoscopy.

Treatment and Prognosis: Surgery is the most common treatment for colorectal cancer, and is frequently curative for cancers that have not spread. Chemotherapy or chemotherapy plus radiation (for rectal cancer), is given before or after surgery to patients whose tumors have deeply penetrated the bowel wall or spread to lymph nodes. A chemotherapy combination referred to as FOLFOX (oxaliplatin, fluorouracil, and leucovorin) is often used to prevent recurrences or to treat metastatic disease that has spread beyond the colon. The US Food and Drug Administration has approved three targeted monoclonal antibody therapies to treat metastatic colorectal cancer as well.

Survival is related to the stage at diagnosis. When colorectal cancers are detected in an early stage, the five year survival probability is 90%; after the cancer

has spread regionally to involve adjacent organs or lymph nodes, the 5 year survival probability drops to 70%, and to 12% for persons with distant metastases. Nearly half (47%) of all colorectal cancers in Ohio are diagnosed at a regional or distant stage.⁷

Aultman Site Analysis

Stage: Analysis of the stage of colorectal cancers diagnosed at Aultman Hospital during 2000-2008 shows that 12% were stage 0 ("in situ"), 22% were stage I, 23% were stage II, 23% were stage III, and 12% were stage IV (metastatic spread). (Figure 1)

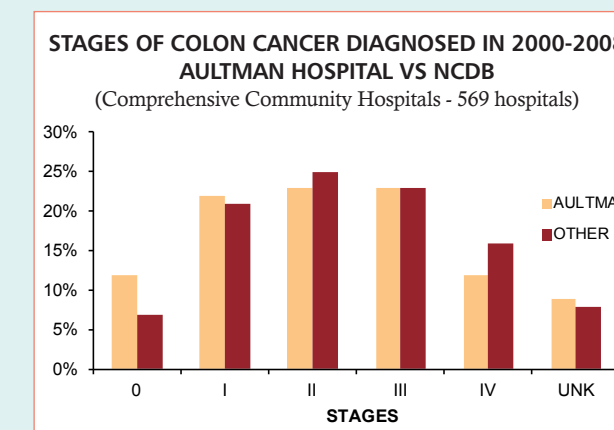


Figure 1

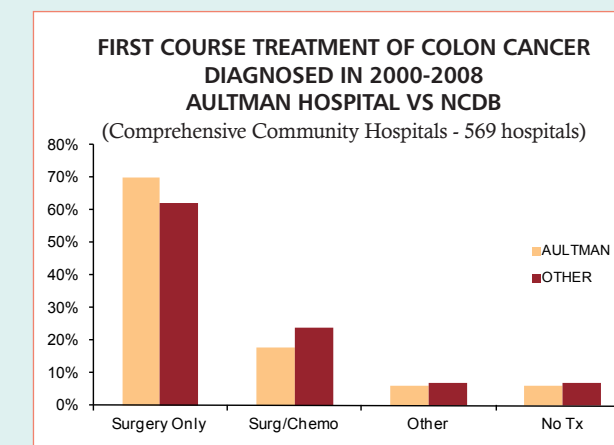


Figure 2

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When compared with data from the American College of Surgeons' Commission on Cancer's National Cancer Database (NCDB), which includes data from 569 hospitals, Aultman had a higher percentage of cases diagnosed at stage 0, (12% vs. 7%), so this may explain why a higher percentage of cases were treated by surgery alone at Aultman (70% vs. 62%). (Figures 1 and 2). A lower percentage of cases at Aultman were diagnosed at stage IV. The percentage of cases diagnosed at stage I, II or III were similar.

Treatment: Figure 2 shows the treatment modalities initially used in the treatment of the colon cancer patients during the years 2000-2008. Please note that these graphs refer to colon cancer cases only, and do not include rectal cancers. A higher percentage of cases at Aultman were treated with surgery only (70% vs. 62%), when compared to cases from community hospitals in the NCDB database. One explanation for this finding may be that a higher percentage of cases at Aultman Hospital were diagnosed in stage 0 and 1 which are not treated with chemotherapy.

Age and Gender Distribution: The age and gender distribution of colon cancer cases at Aultman Hospital have also been graphed and compared to the NCDB database, which is shown in Figure 3. Interestingly, there were more women than men diagnosed with colon cancer at Aultman Hospital in 2010, even though on a national level in the U.S. the incidence rates (and mortality rates) for colon cancer are higher in men than women.

90% of colon cancers occur in people over 50 years of age. Therefore, it is not surprising that

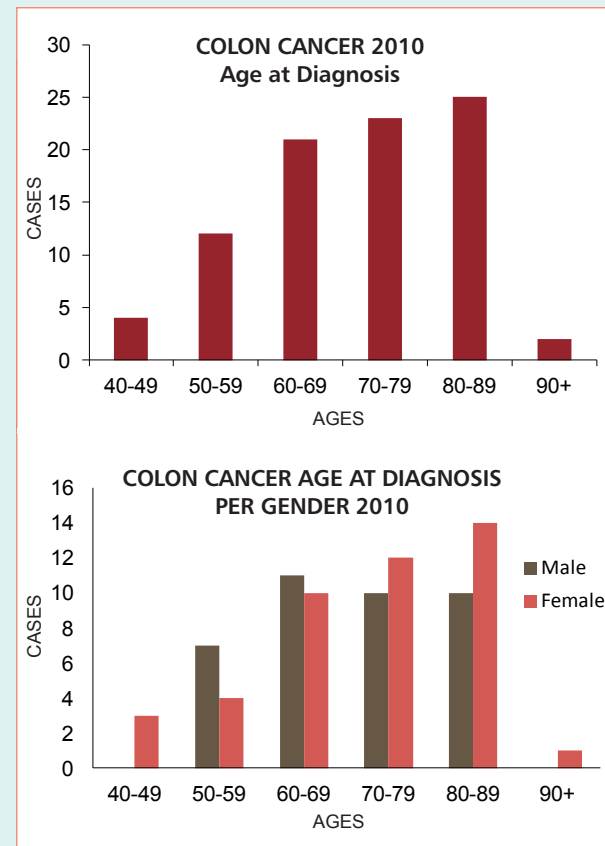


Figure 3

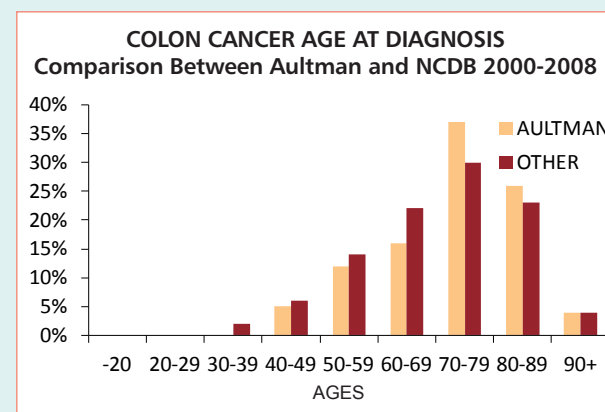


Figure 4

the numbers diagnosed at Aultman were quite low under 50, then rise steadily with each decade thereafter, until age 90, when the rate drops off. (see Figure 3). The numbers are similar to those reported in the NCDB database, (Figure 4), except that Aultman

has a higher percentage of cases diagnosed from age 70-79 and 80-89 whereas the NCDB hospitals have a larger proportion diagnosed between the ages of 50-59 and 60-69. This difference in age at the time of diagnosis may be a reason why a higher percentage of patients were treated with chemotherapy in addition to surgery for stage III disease in the NCDB database compared to Aultman. (Figures 5 and 6). Older patients tend to have more medical problems, and are therefore less likely to receive adjuvant chemotherapy.

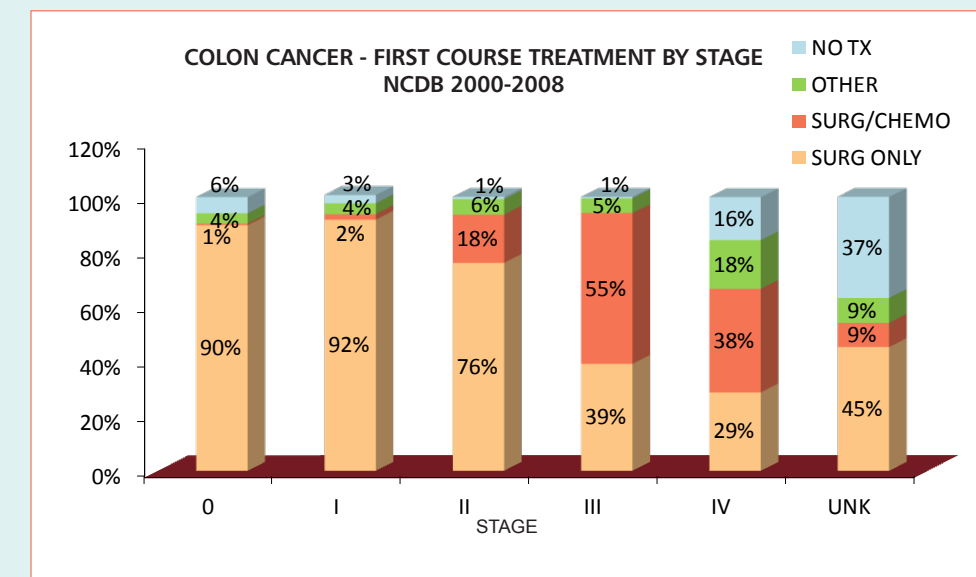


Figure 5

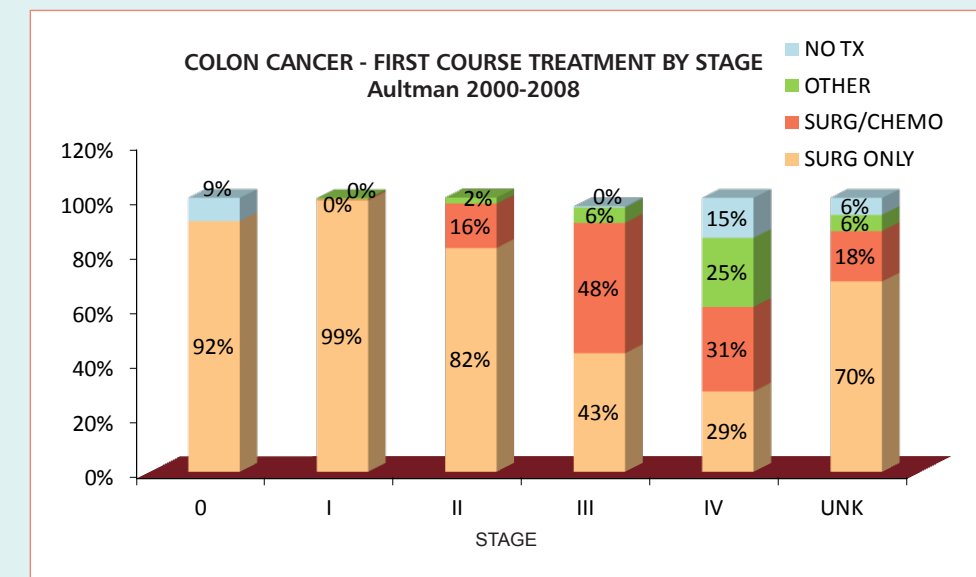


Figure 6

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Survival Statistics: Figures 7 and 8 show the survival graphs of patients according to the stage of diagnosis, at Aultman Hospital and the NCDB hospitals, for the years 1998-2002. The survival rate at stage zero was slightly higher at Aultman Hospital, and the survival rates for the other stages were quite similar, with the exception of stage III disease, which was lower for the Aultman cases. If the findings observed in 2010 were also present in years 1998-2002 (a higher percentage of older patients treated at Aultman), then this might explain the survival difference, as older patients have more medical problems (other competing causes of mortality) and are less able to receive chemotherapy.

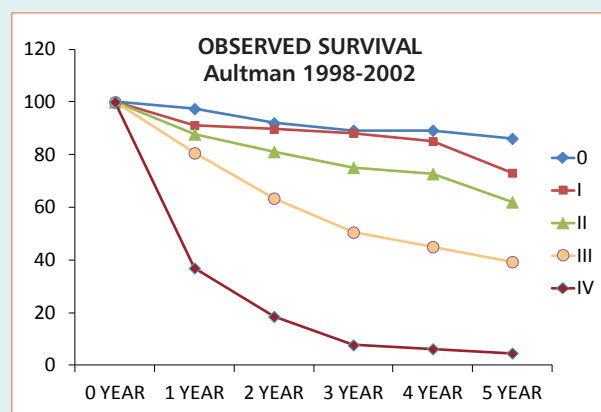


Figure 7

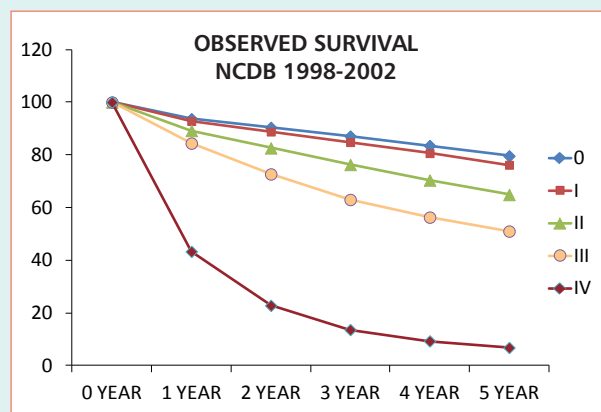


Figure 8

Quality Initiatives for Colon Cancer Patients at Aultman Hospital

As a Commission on Cancer (“COC”) accredited program (a program of the American College of Surgeons), Aultman Hospital is actively engaged in procedures to promote improvements in the quality of care for cancer patients.

Evaluation of surgical specimens: One of the biggest undertakings was a multidisciplinary effort to resect and evaluate more lymph nodes microscopically in the pathology department after a patient has surgery for their colon cancer. It has been shown in a large study that the survival is increased as more lymph nodes are examined.⁸ The NCCN (National Comprehensive Cancer Network) encourages a standard of removing and examining at least 12 lymph nodes for surgical colon cancer cases. This standard has been implemented at Aultman Hospital and in 2010 the majority of cases had over 12 lymph nodes removed and examined.

Tumor testing: Furthermore, in 2011 the pathology department, in conjunction with the cancer genetics department, began a program of testing colon cancer tumor cells for the presence or absence of mismatch repair proteins, in all patients aged 60 years of age and younger. (It can also be ordered for older patients at their doctor’s discretion). This tumor testing can help with chemotherapy decisions, and also it can identify patients who may have a hereditary colon cancer syndrome (Lynch syndrome). If the test is abnormal, genetic counseling can be offered to see if further evaluation should be done, which could benefit

the patient and their family members as they could take advantage of additional cancer screening and prevention options if appropriate for them.

Research: Lastly, our clinical trials department is also actively involved in the care of colorectal cancer patients. In addition to several chemotherapy trials, we are taking part in a national study designed to see if a “statin” medication (a drug used to lower cholesterol levels) can prevent colon polyps in patients with colon cancer that has been surgically removed. This is known as the NSABP “P-5” polyp prevention trial, and is still accepting patients.

Summary

Colon cancer remains a serious health problem in the United States, but many advances have been made in both screening and prevention of the disease, as well as in treatment options. It is because of the combined efforts of multiple healthcare professionals (including gastroenterologists, surgeons, oncologists and nurses to name just a few), and especially patients, who have been willing to participate in

screening and treatment studies, that the incidence and death rate from this disease has improved.

References

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Note: The statistics used for Figures (1-8) came from the Commission on Cancer website (National Cancer Database Benchmarks) and the Cancer Registry at Aultman Hospital.

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