ASCRS
American Society of Colon & Rectal Surgeons

Screening and Surveillance for Colorectal Cancer Expanded Information

OVERVIEW

Colorectal cancer is a common malignancy for both men and women. Screening for colorectal cancer is the process of identifying apparently healthy people who may be at increased risk of developing this disease. This information was prepared to help patients understand the screening options for colorectal cancer; specifically, recommendations for the age to start, interval between tests, and the various modalities that are used. It may also be useful to the friends, families, and caregivers of patients making decisions about colorectal cancer screening.

Properly done, screening for colorectal cancer saves lives. It is an ideal disease for which to provide screening, since there is an identifiable and treatable pre-cancerous condition – the polyp. Removing a pre-cancerous polyp prevents the development of colorectal cancer. In addition, if found early, colorectal cancer may be cured in up to 90% of cases.

Screening is for people without symptoms. Patients who experience rectal bleeding, changes in their bowel habits, abdominal pain, or unexplained weight loss should seek medical attention, even if they are currently following current screening guidelines.

Patients who are considering screening for colorectal cancer need information about:

WHAT IS THE RISK OF COLORECTAL CANCER?

According to the National Cancer Institute, there were over 147,000 new cases of colorectal cancer and over 53,000 deaths in 2020. It is estimated that the lifetime risk of developing colorectal cancer is about 1 in 23 for men and 1 in 25 for women. The risk is similar for men and women. In men as a whole, it is the third most common non-skin cancer, behind prostate and lung cancers. In Hispanic men, colorectal cancer is more common than lung cancer. For all women, it is also the third most common, behind breast and lung cancers, but is second in women of Hispanic or Asian/Pacific Islander descent.

Some people are at a slightly higher risk for colorectal cancer due to their personal or family characteristics. Patients who have had prior pre-cancerous polyps or a cancer are at an increased lifetime risk of developing more polyps or another cancer. Close relatives (parents, siblings, children) of patients with colorectal cancer OR polyps have a two- to three- fold increased risk of developing colorectal cancer or polyps, depending on the number of affected relatives.

Certain people have a significantly higher risk of developing colorectal cancer. Familial Adenomatous Polyposis (FAP) is an uncommon inherited condition which typically causes hundreds of polyps in the colon. Patients with this condition have an almost 100% chance of developing colorectal cancer, usually before age 50.

Hereditary Non-Polyposis Colon Cancer (HNPCC) is another uncommon inherited condition, characterized by colorectal cancers in multiple family members, some of which may occur at an early age. Cancers involving the kidney, uterus, ovary, or bladder may also be seen in families with this condition. It is estimated that the risk of colorectal cancer is about 70% by age 65 in affected individuals.

Other genetic diseases such as MYH (MYH-associated polyposis or MAP) and the attenuated form of FAP also are associated with a much higher lifetime risk of developing colorectal cancer. Genetic testing and counseling is available for each of these.

Patients with inflammatory conditions of the colon, such as Crohn's disease or ulcerative colitis, have an increased risk of colorectal cancer as well. This is related to the extent, duration, and severity of the inflammation, with patients who have severe colitis involving the whole colon for more than ten years at the greatest risk. Other more common conditions such as hemorrhoids, diverticulosis and irritable bowel disease do not increase the risk of colorectal cancer.

WHAT IS THE BENEFIT OF COLORECTAL CANCER SCREENING?

Like other serious, common medical problems such as high blood pressure and diabetes, colorectal cancer is considered to be a "silent disease" in its early stages. Large studies done both in the United States and in Europe have shown that routine colonoscopy with the removal of polyps may reduce the incidence of colorectal cancer by about 75%.

In addition to finding and removing polyps, screening can aid in the detection of early, asymptomatic cancers that are associated with higher rates of cure. Up to 90% of these early cancers can be cured, but once symptoms develop, cure rates fall to less than 50%. According to the Centers for Disease Control, both the incidence and death rate for colorectal cancer has fallen by about 3% in all populations from 1999 to 2008. It is estimated that over 50% of this reduction is due to increased screening efforts.

Unfortunately, not everyone receives proper screening. Although most screening modalities are now covered by insurance or Medicare, up to half of the population is not current on the appropriate tests. The rate of screening varies widely by location, race, or socioeconomic factors.

WHAT SCREENING TESTS ARE AVAILABLE?

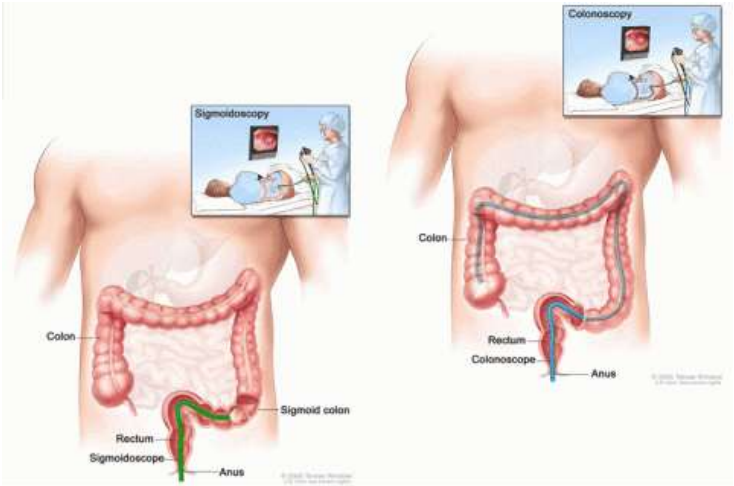
Fecal occult blood testing (FOBT) uses either a chemical reaction or antibodies to detect very small amounts of blood in stool that may have been shed from a cancer or polyp. Usually two samples are taken from three consecutive stools at home and are placed on collection cards. These are then returned to the ordering physician or lab for analysis. Short-term changes in diet may be needed around the time the samples are collected to prevent falsely positive results. Well-done large studies have shown that when properly administered to patients between 50 and 80 years of age, FOBT will reduce the risk of death from colorectal cancer by 15-33%.

The advantages of FOBT are that it is inexpensive and non-invasive; bowel cleansing and sedation are not required. Disadvantages include its low specificity (low likelihood a positive test indicates the presence of cancer) – only about 2-5% of patients with a positive FOBT actually have cancer. Additionally, it is not very sensitive (the test identifies a cancer if it is present); about half of all colorectal cancers can be detected by this method, but only 10% of patients with pre-cancerous polyps will have a positive test. Positive tests require another procedure, typically a colonoscopy.

Flexible sigmoidoscopy uses a thin, flexible tubular instrument to give magnified views of a patient's large intestine (colon and rectum). It allows the doctor to examine the lower third of the colon and the rectum directly and to take samples of abnormal areas for testing in the lab. The colon and rectum are cleansed with a liquid diet and enemas given shortly before the procedure, which is commonly done in an office without sedation. The procedure itself is short and causes minimal discomfort.

Flexible sigmoidoscopy has been shown to be highly effective in detecting polyps in the area viewed and is an effective method, especially when paired with FOBT, to reduce colorectal cancer mortality. The main advantages are its short duration, the ability to take samples, and the lack of significant discomfort. A rigorous bowel cleansing and sedation are also not required, allowing patients to resume normal activities immediately afterwards. Disadvantages include the inability to see the whole colon, making a follow-up colonoscopy necessary for patients who have a polyp found on flexible sigmoidoscopy. There is also a small (2 per 10000 patients) risk of causing a tear in the colon wall or significant bleeding.

Colonoscopy is similar to flexible sigmoidoscopy, but the entire colon is examined. A colonoscope is a long, thin, flexible tubular instrument that provides magnified views of a patient's large intestine (colon and rectum). Abnormal areas can be sampled or removed completely, depending on their size. As this is a more extensive test, a thorough cleansing of the bowel is required. Patients undergoing colonoscopy are typically sedated, so they need someone to drive them home upon completion; normal activities can be safely resumed the next day. Colonoscopy is often considered the "gold-standard" screening test, as it allows for both detection and removal (or sampling) of polyps and cancers.



During a sigmoidoscopy (left), a thin, lighted tube is inserted through the anus and rectum and into the lower part of the colon to look for abnormal areas. During a colonoscopy (right), a similar instrument is used to visualize the entire colon. (Illustrations by Terese Winslow for NCI)

The advantages of colonoscopy are the ability to examine the whole colon and to sample or remove abnormal tissue. Disadvantages include the need for a more thorough bowel cleansing and sedation and the need to stop certain medications, especially blood thinners such as aspirin, warfarin or clopidogrel. Complications of colonoscopy are rare (1 per 1,000 procedures), but are potentially life-threatening. The rate of colonic rupture ranges from 0.6 per 1,000 for colonoscopy alone, to 7.0 per 1,000 if samples are taken or a polyp is removed. Significant bleeding can occur in up to 8.7 per 1,000.

Barium enema is an x-ray test that allows examination of the lining of the colon. In screening for colorectal cancer, a double contrast barium enema (DCBE) is used. After a thorough bowel cleansing similar to that used for colonoscopy, barium (a substance that x-rays do not pass through) and air are introduced into the colon via a small catheter that is placed in the rectum to help display the outline of the colon and show polyps or cancers. Multiple pictures are taken with the patient in various positions; sedation is not required. Some cramping during the procedure is normal and patients may resume normal activities immediately upon completion. DCBE is not as good as colonoscopy at finding polyps or cancer. The main advantage of DCBE is that sedation is not required. Disadvantages include a small risk of perforation (<1%), x-ray exposure, less sensitivity, and the need for a thorough colon cleansing. Additionally, if abnormalities are seen, a colonoscopy is then required.

Computed tomographic colonography (CTC, previously called 'virtual colonoscopy') uses a CT scan to make images of the lining of the colon that appear similar to views seen during standard colonoscopy. This test usually requires the same type of thorough bowel cleansing needed for colonoscopy. Sedation is not given, but an IV may need to be placed for drug or contrast administration and air or carbon dioxide is introduced into the rectum, which can cause cramping. Normal activities can be resumed immediately after the scan. Several studies in multiple institutions show that CTC detects 85-90% of polyps, which compares to standard colonoscopy. CTC has not been specifically studied as a colorectal cancer screening tool for average risk patients.

The primary advantage of CTC is its ability to accurately visualize the entire lining of the colon in a non-invasive manner, reducing the risk of bleeding, perforation, or sedation side-effects. The main disadvantage is the need for a follow-up colonoscopy if abnormalities are detected.

Another confusing issue in CTC is finding unexpected abnormalities outside of the colon, such as other cancers or blood vessel problems. While this may appear to be an advantage, studies have shown that CTC generates the need for further testing 6-24% of the time. These additional tests lead to extra worry and expense, but yielded few significant findings. For example, 118 of 2,869 women undergoing CTC were found to have a potential mass of the ovary; 80 had further testing, but no ovarian cancers were found.

DNA is the hereditary material in human cells. Colorectal cancers, and to a lesser extent polyps, shed DNA into the stool, where it can be analyzed for changes that occur as cancer develops. A whole bowel movement must be collected and shipped to the lab. Studies have shown that this test can detect cancers (53%) and advanced polyps (18%), but at a rate far below colonoscopy. Given its cost and sensitivity, it is not currently recommended for routine screening. Several blood tests have recently been investigated as well, but none yet rise to the accuracy level needed for use as a screening tool.

WHAT ARE THE RECOMMENDED STARTING AGES AND FREQUENCY FOR SCREENING TESTS?

For average risk individuals, screening should start at age 45.* This is based on the rate of colorectal cancer in varying age groups, which begins to rise significantly after age 50. Studies have shown that this rise in cancer starts at an earlier age in African-Americans.

Of the screening methods discussed above, FOBT should be done yearly, along with a flexible sigmoidoscopy every 5 years. If colonoscopy is chosen, then it should be done every 10 years if the initial examination was normal and no new symptoms develop. DCBE or CTC is recommended every 5 years and may be useful in patients who cannot tolerate colonoscopy or have an incomplete study.

Several large studies have concluded that the risk of developing a colorectal cancer after an initial normal colonoscopy is very low, at ranges of 11 -14 years. This supports the recommendation for every 10 year screening without the need for additional testing in between screening colonoscopies. Screening remains important for average risk patients; only about a quarter of all colorectal cancers occur in patients with identifiable factors that increase their risk.

Screening should begin earlier in people with a family history of colorectal cancer or polyps. It is important for patients and health care providers to recognize that the presence of pre-cancerous polyps in the family history is just as significant as a history of an invasive cancer. These individuals should begin at 40, or at an age 10 years before the youngest relative was diagnosed with either cancer or polyps. The guidelines above should be followed for intervals between tests.

People with multiple family members with colorectal, urinary tract (kidney or bladder), or gynecologic (uterus or ovary) cancers, especially if these cancers occurred at an early age, may have a condition called hereditary non-polyposis colorectal cancer. They should undergo genetic testing and counseling; colonoscopy every 1-2 years beginning at age 20-25 is recommended.

People with an inherited condition called familial adenomatous polyposis have an extremely high risk of colon cancer; their close relatives should undergo genetic testing and counseling. If genetic testing conclusively shows that they do not have the affected gene, then they can begin screening like average risk people. If the gene test is positive, inconclusive, or not done, then flexible sigmoidoscopy should be done yearly starting at puberty.

There is no clear recommendation on the upper age at which screening for colorectal cancer should stop. Current guidelines suggest regular screening from ages 45-75, and then base further screening on multiple factors including current health status and how long other family members have lived. In general, most doctors would feel screening is not needed after the age of 80-85.

*In 2018, secondary to new data on the increased risks of colon cancer in those under 50, the American Society of Colon and Rectal Surgery changed recommendations to consider starting screening at age 45.

SURVEILLANCE

Surveillance refers to the process of evaluating patients with a personal history of polyps or cancer. People who have precancerous polyps completely removed should have a colonoscopy every 3-5 years, depending on the size and number of polyps found. If there are 1-2 polyps <1 cm in size (~1/2 inch), then another colonoscopy in 5 years is appropriate. Colonoscopy at 3 years is recommended for patients with 3-4 polyps <1 cm in size or one polyp >1 cm. If there are 5 or more small or 3 or more larger polyps, then follow-up in one year is recommended. Findings on subsequent colonoscopies will determine the next follow-up interval; in general, the time between colonoscopies may be increased if fewer or no polyps are found.

If a polyp is not completely removed by colonoscopy or surgery, and the biopsy results are completely benign, another colonoscopy should be done in 3-6 months. Every effort should be made to remove polyps, as there is a significant risk that over time they can progress to an invasive cancer. If a polyp cannot be removed with colonoscopy, surgery to remove that portion of the colon is often needed.

Most patients who have a colorectal cancer removed surgically should have a colonoscopy within one year. If the whole colon could not be examined prior to surgery, then colonoscopy should be done within 3-6 months after surgery. If this first surveillance is normal, then follow-up colonoscopy should be done every 3-5 years. The risk of developing another colorectal cancer is estimated to be about 0.3% per year.

Patients with ulcerative or Crohn's colitis for eight or more years should have a colonoscopy with multiple biopsies every 1-2 years. Pre-cancerous changes may be hard to evaluate in the presence of long-standing inflammation. Once these pre-cancerous changes (called dysplasia) are found, complete removal of the colon and rectum is usually recommended; the rate of finding an invasive cancer in these patients is 6-10%.

QUESTIONS TO ASK AND ANSWER:

- Given my personal and family history, what is my risk of colorectal cancer?
- At what age should I start screening?
- Can screening be safely stopped at some point?
- What are my options for effective colorectal cancer screening?
- What are the benefits of colorectal cancer screening?
- What are the risks involved with the various screening methods?

WHAT IS A COLON AND RECTAL SURGEON?

Colon and rectal surgeons are experts in the surgical and non-surgical treatment of diseases of the colon, rectum and anus. They have completed advanced surgical training in the treatment of these diseases as well as full general surgical training. Board-certified colon and rectal surgeons complete residencies in general surgery and colon and rectal surgery, and pass intensive examinations conducted by the American Board of Surgery and the American Board of Colon and Rectal Surgery. They are well-versed in the treatment of both benign and malignant diseases of the colon, rectum and anus and are able to perform routine screening examinations and surgically treat conditions if indicated to do so.

DISCLAIMER

The American Society of Colon and Rectal Surgeons is dedicated to ensuring high-quality patient care by advancing the science, prevention and management of disorders and diseases of the colon, rectum and anus. These brochures are inclusive but not prescriptive. Their purpose is to provide information on diseases and processes, rather than dictate a specific form of treatment. They are intended for the use of all practitioners, health care workers and patients who desire information about the management of the conditions addressed. It should be recognized that these brochures should not be deemed inclusive of all proper methods of care or exclusive of methods of care reasonably directed to obtain the same results. The ultimate judgment regarding the propriety of any specific procedure must be made by the physician in light of all the circumstances presented by the individual patient.

CITATIONS

Hall, J. F. and Read, T. E. Chapter 39, "Colorectal Cancer: Screening". Chapter in Beck, D. E., Roberts, P. L., Saclarides, T. J., Senagore, A. J., Stamos, M. J., Wexner, S. D., Eds. ASCRS Textbook of Colon and Rectal Surgery, 2nd Edition. Springer, New York, NY; 2011.

Ko, C., Hyman, N. H. on behalf of the Standards Committee of The American Society of Colon and Rectal Surgeons. Practice Parameter for the Detection of Colorectal Neoplasms: An Interim Report (Revised). Dis Colon Rectum. 2006; 49:299-301.

SELECTED READINGS

National Cancer Institute: http://www.cancer.gov/cancertopics/factsheet/detection/colorectal-screening

Centers for Disease Control and Prevention: http://www.cdc.gov/cancer/colorectal/basic_info/screening/

American Cancer Society:
http://www.cancer.org/cancer/colonandrectumcancer/moreinformation/colonandrectumcancerearlydetection/index

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