Colorectal cancer (CRC) is one of the most common cancers in the Western world, with an estimated incidence of 148,810 cases in the USA in 2008, and about 50,000 deaths from this disease. If detected early, patients with disease localised to the colonic wall have a 5-year survival of 90%. The 5-year survival for patients with regional disease is 68%, and a dismal 10% in the presence of distant metastases. Given that most sporadic CRCs develop from adenomatous polyps, it has been shown that CRC risk can be reduced by removal of the precursor lesion, the adenomatous polyp. However, not all polyps will develop into cancers; the polyp size and histology are determining factors for CRC risk. Advanced adenomas are defined as being 10 mm or greater in size, have a villous component, or show features of high-grade dysplasia.

It is important to establish the individual patient’s risk for CRC in order to advise the appropriate age at which screening should commence. Average-risk persons are individuals aged 50 years or older, with no history of colonic adenomas or CRC, and with no family history of polyps or CRC.

Risk stratification

It is important to establish the individual patient’s risk for CRC in order to advise the appropriate age at which screening should commence, and also the type and frequency of screening procedure.

Important questions to ask are:

• Does the patient have a history of colonic adenomas or CRC?

• Does the patient have a history of any condition that might predispose them to the development of CRC, e.g. inflammatory bowel disease?

• Is there a family history of colonic adenomas or CRC? If so, it is important to establish the number of affected relatives, the degree of relationship and the age at diagnosis.

• This review will focus on those individuals at ‘average risk’ of CRC. Average-risk persons are individuals aged 50 years or older, with no history of colonic adenomas or CRC, and with no family history of polyps or CRC. The average-risk person has a lifetime risk of developing CRC of 6%. CRC has no gender preference, with males and females being at similar risk.

Several CRC screening guidelines have been published, the latest being a joint guideline from the American Cancer Society, the US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology. Screening should begin at age 50, or as soon as possible after age 50, to age 75. The latest recommendation from the United States Preventative Services Task Force (USPSTF) advises against screening from age 76 to 85 years and older, as the yield from screening in this population group does not justify the additional colonoscopies performed. This recommendation applies only to screening, and not to patients in whom an indication exists for investigation. In a recently published study, a risk assessment tool has been described for use in white males and females without known susceptibility. Various factors are included in the assessment, including a history of flexible sigmoidoscopy or colonoscopy, body mass index, levels of exercise and dietary history. The assessment can be accessed online (http://www.cancer.gov/colorectalcancerrisk) and can be useful in patient counselling. A validation study for the risk assessment tool has been performed.

Screening tests for CRC

The preferred test or tests are those that will prevent CRC, rather than just detect the adenomatous polyp. At present only optical colonoscopy offers this possibility, as the polyp can be removed during the examination. The other tests screen for the presence of the polyp or cancer which, if present, mandates colonoscopy for removal of the polyp or biopsy of the suspected cancer. Screening tests can be divided into stool tests or structural tests.

Stool tests

• Faecal occult blood tests (FOBT)
• Faecal DNA tests.

Structural tests

• Colonoscopy
• Flexible sigmoidoscopy (FSIG)
• Double-contrast barium enema (DCBE)
• Computerised tomography colonography (CTC)
• Capsule colonoscopy (CC).

The stool tests are intended to detect cancers, but may detect larger adenomas. The tests may be used alone or in combination with other tests to improve sensitivity, e.g. FOBT and FSIG, or to follow an incomplete or unsatisfactory examination, e.g. colonoscopy followed by CTC.
The average-risk person has a lifetime risk of developing CRC of 6%.

There exist several barriers to screening. Possibly the greatest barrier is a lack of awareness by the general public and many health care providers of the importance of CRC screening. Other barriers include the costs associated with screening, and a lack of screening performance or referral by health care providers.

Faecal occult blood tests

These tests may detect cancers and larger polyps (greater than 1 cm). Polyp and cancer bleeding may be intermittent. FOBT tests thus require multiple samples to be submitted for testing, to improve the yield of the test. Annual FOBT testing is recommended. A positive FOBT must be followed by colonoscopy.

Guaiac-based FOBT (gFOBT). Guaiac FOBT detects peroxidase activity of haeme or haemoglobin. Patients performing gFOBT must restrict certain drugs known to cause gastrointestinal bleeding, e.g. aspirin and NSAIDs, and vitamin C, which may give a false negative result. Certain foods including red meat, poultry and fish, and certain raw vegetables, are to be avoided. Three stool specimens are required. Doctors should not perform gFOBT on stool samples obtained following digital rectal examination. This method of screening has been shown to have a sensitivity of only 5% for advanced neoplasia, and 9% for cancers. The sensitivity of gFOBT used correctly varies from 37% to 79%. Studies using gFOBT have been shown to detect cancers at an earlier stage, with a protective effect lasting 10 years or longer.

Colonoscopy does allow examination of the whole colon, with the ability to biopsy suspected lesions and, most importantly, to perform polypectomy. Good colonic preparation is essential prior to colonoscopy, the following endoscopist requirements must be met:

- The operator must arrange appropriate post-polypectomy care.
- The operator must have the ability to document polyps, and the method of removal.
- The operator must have the ability to perform polypectomy, and therefore mandates a colonoscopy.
- The operator must arrange appropriate post-polypectomy care.
- Appropriate training and experience must be demonstrated.
- Patient risk assessment must be documented.
- A complete examination to the caecum must be performed.
- The operator must have the ability to detect and safely remove polyps.
- The operator must have the ability to document polyps, and the method of removal.
- The operator must be skilled in the management of adverse events.
- The operator must arrange appropriate follow-up of histopathological results.
- The operator must provide appropriate recommendations for follow-up surveillance and screening.

Colonoscopy has been considered the ‘gold standard’ test for CRC screening. However, it has become apparent that this is not the case, with an advanced polyp miss rate of 6 - 12%, and a cancer miss rate of up to 5%. Most missed lesions are in the right colon. Colonoscopy does not examine the left colon. Colonoscopy is very operator skill dependent.

There are no prospective randomised controlled studies of colonoscopy for reduction of CRC mortality. Indirect evidence exists from FOBT and FSG trials where patients with positive tests underwent colonoscopy, with subsequent reduction in CRC mortality rates. Polypectomy may be ineffective, and can result in CRC occurring in up to 25% of subjects between screening examinations. Complications of colonoscopy include post-polypectomy bleeding up to 14 days after the examination, and perforation in 1/1000 cases, almost always following polypectomy. Colonoscopy sedation may result in oxygen desaturation, hypotension and arrhythmia. Adequate monitoring is therefore mandatory, with emergency treatment readily available in case of complications.

To ensure the highest standards of colonoscopy, the following endoscopist requirements must be met:

- The ORIGINAL low dose aspirin
- 81mg
- is the safer.
Current guidelines suggest follow-up colonoscopy after 10 years in average-risk individuals with a normal colonoscopy. Patients found to have adenomas or CRC should be followed up as per current surveillance guidelines. The USPSTF recommends that screening be discontinued from age 75. This should however be considered on a case-by-case basis.

Radiological imaging studies

Double-contrast barium enema (DCBE) and computerised tomographic colonoscopy (CTC) are the two radiological modalities used in screening for CRC. DCBE allows visualisation of the entire colon. It has a sensitivity of 48% for adenomas ≤7 mm, and 73% for adenomas >7 mm, and will detect most carcinomas. Patients are required to undergo colonic preparation, and the study is performed without sedation. The risk of perforation is estimated at 1:25 000. Patients found to have polyps >6 mm are advised to undergo colonoscopy and polypectomy. DCBE is operator dependent, and with the declining popularity of the modality, fewer radiologists are skilled in the technique. The present role of DCBE is screening for CRC when CTC is not available and for completion of colonic examination where colonoscopy has been unable to examine the entire colon.

CTC has made great strides due to technological advances in CT imaging. Colonic preparation and air insufflation is required, as in the case of optical colonoscopy. The procedure is performed without sedation, and takes about 10 minutes. Faecal tagging is performed in some centres, allowing for more accurate polyp detection. Patients may experience discomfort due to air insufflation. Recent studies have shown sensitivity of 89% for polyps >6 mm, and 94% sensitivity for large adenomas. Two meta-analyses showed sensitivity for larger polyps (>10 mm) of 85 - 93%, with a specificity of 97%. The sensitivity and specificity for smaller polyps was 76 - 83% and 83 - 97%, respectively. The sensitivity for advanced CRC was 96%, similar to optical colonoscopy.

Patients found to have significant polyps at CTC must undergo colonoscopy and polypectomy. CTC interpretation is highly operator dependent, and adequate training is required. Flat polyps may not be detected at CTC. Although small, the risk of radiation may be important in patients undergoing multiple radiological procedures over several years. Perforation rates of 1:3 600 to 1:7 000 have been reported. Of concern are the number of incidental extracolonic findings at CTC. Clinically significant findings have been reported in 4.5 - 11%. Most findings are of low to moderate importance, e.g. gallstones, kidney stones, etc. The further evaluation of the extracolonic findings can result in increased risk and cost to the patient. Patients with CTC-detected polyps >10 mm in size, or with 3 or more polyps >6 mm, and 94% sensitivity for large adenomas. Patients are required to undergo colonoscopy and polypectomy.

Colorectal cancer screening

Conclusions

Colorectal cancer can, in most instances, be prevented by using screening procedures. Screening for CRC should begin at age 50, or later if no screening examinations have been performed. The upper age limit for screening is currently recommended at 76 years. A variety of screening tests are available. The tests of choice are those that can both diagnose polyps and early cancers, and allow the opportunity for therapeutic intervention, i.e. polypectomy and biopsy. Patients found to have polyps discovered with imaging tests or positive stool tests must be referred for colonoscopy and polypectomy. Several of the screening modalities are operator-skill dependent, and the necessary level of training and expertise must be demonstrated. Practices should endeavour to educate the general public regarding the importance of CRC screening. CRC screening tests have been shown to be cost effective; this depends largely on good-quality examinations being performed and follow-up guidelines adhered to. No screening test is perfect and patients need to be aware of this shortcoming.

References


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**Colorectal cancer screening**

**In a nutshell**

- Colorectal cancer can, in most instances, be prevented by using screening procedures.
- Screening for CRC should begin at age 50, or later if no screening examinations have been performed.
- The upper age limit for screening is currently recommended at 76 years.
- A variety of screening tests are available. The tests of choice are those that can both diagnose polyps and early cancers, and allow the opportunity for therapeutic intervention, i.e. polypectomy and biopsy.
- Patients found to have polyps discovered with imaging tests or positive stool tests must be referred for colonoscopy and polypectomy.
- Several of the screening modalities are operator-skill dependent, and the necessary level of training and expertise must be demonstrated.
- Practices should endeavour to educate the general public regarding the importance of CRC screening.
- CRC screening tests have been shown to be cost effective; this depends largely on good-quality examinations being performed, and follow-up guidelines adhered to.
- No screening test is perfect, and patients need to be aware of this shortcoming.

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