Colorectal Cancer Screening

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KEYWORDS

• Colorectal cancer • Screening • Prevention • Adenoma • Colonoscopy

KEY POINTS

- Colorectal cancer (CRC) is the third most common malignancy worldwide.
- Screening for colorectal cancer has been shown to reduce CRC incidence and mortality and is implemented in an increasing number of countries.
- Screening modalities include noninvasive fecal tests to detect occult blood or DNA from malignant tumors and invasive tests to detect cancer and remove premalignant polyps.
- The comparative effectiveness of different screening tests to reduce CRC mortality on a population level remains to be clarified.
- Colonoscopy allowing detection of malignant tumors and removal of premalignant polyps is the only 1-step approach to CRC screening, but the magnitude of its effectiveness to reduce CRC incidence and mortality is yet to be established in randomized controlled trials.

INTRODUCTION: EXTENT OF THE DISEASE

Colorectal cancer (CRC) is the third most common cancer worldwide.[1] The estimated numbers of new CRC cases and CRC deaths in the United States in 2014 were approximately 135,000 and 50,000, respectively.[2] The life-time risk of being diagnosed with CRC is approximately 5% in the Western world. Stage at diagnosis is the most important prognostic factor for CRC, with a 5-year survival of approximately 90% for early-stage disease without regional or distant metastases but only around 10% when distant metastases are present.[3] Unlike in many other Western countries, CRC incidence rates have declined in the United States since the mid-1980s, particularly for late-stage disease.[4,5] Although the reasons for this decline are not clear, a concomitant increase in CRC screening may be an important factor (**Fig. 1**).[5]

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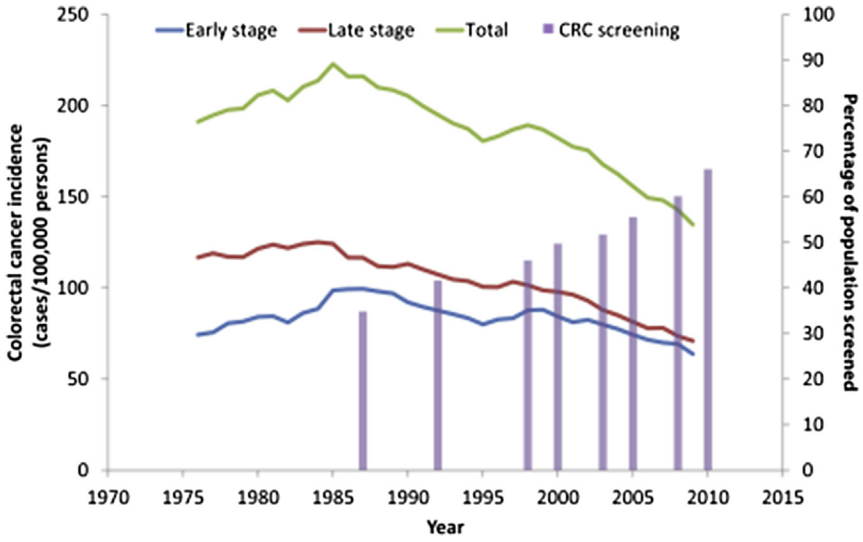

Fig. 1. CRC incidence and associated changes in CRC screening use are illustrated in US adults aged 50 years or older. (*From* Yang DX, Gross CP, Soulos PR, et al. Estimating the magnitude of colorectal cancers prevented during the era of screening: 1976 to 2009. Cancer 2014;120(18):2896; with permission.)

Risk Factors

Individuals with a strong family history of CRC, inflammatory bowel disease, and rare genetic conditions such as familial adenomatous polyposis and Lynch syndrome are at increased risk of CRC and should be referred for specialized care and surveillance.[6–8] However, most CRC cases develop in the so-called average-risk population without any of these known risk factors. In the general population, age is the most important risk factor for CRC, with 90% of cases developing in individuals more than 50 years of age.[2] The median age at CRC diagnosis in the United States is 68 years.[3]

Epidemiologic studies indicate that elements of Western lifestyle may influence the risk of CRC, but the effect of lifestyle modifications is still unclear. Factors that have been linked to a risk increase include high intake of red and processed meat, smoking, excessive alcohol consumption, and obesity,[9–12] whereas physical activity and the use of aspirin have been associated with decreased risk of CRC.[13,14] In the absence of well-defined options for primary CRC prevention, screening is currently the most widely accepted approach to reduce CRC burden.

SCREENING TECHNIQUES AND OPTIONS

Most CRCs develop slowly from well-defined precursors called adenomas through a series of genetic and epigenetic alterations: the adenoma-carcinoma sequence.[15] This transition typically takes at least 10 years. Moreover, early-stage, asymptomatic CRCs may bleed and shed cellular material into the fecal stream. The long premalignant and preclinical development allows different screening strategies to be effective in reducing CRC burden, and several screening tests are available. These tests can be broadly divided into tests for early detection of CRC to allow improved treatment