Population screening for colorectal cancer by colonoscopy

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INTRODUCTION
To date, colorectal cancer (CRC) is the most common cancer in Europe.(1) The prognosis of patients in whom CRC is detected is largely influenced by the clinical and pathological stage at the time of diagnosis.(2) CRC mortality rate is lower if cancer is detected early, whereas both the incidence and mortality rate can be decreased by the timely detection and removal of colorectal adenomas, the most important precursor lesions of CRC.(3)

One of the ways of achieving early detection of CRC and colorectal polyps is through the development of population screening programs in asymptomatic individuals. Population screening for CRC has shown to be effective for lowering the CRC mortality rate. This can be explained by the relatively high prevalence of detectable precursor lesions and the slow progression from adenoma to invasive cancer (4;5).

Several CRC screening tests are now available. Each test has particular advantages and disadvantages that affect its acceptability profile and its accuracy in detecting colorectal neoplasia. Screening tests can be roughly classified into two categories: stool-based tests and structural exams. Most stool-based tests detect blood (guaiac and immunochemical fecal occult blood tests). Structural exams can be subdivided into endoscopic techniques (such as flexible sigmoidoscopy and colonoscopy) and radiological exams (e.g. computed tomography (CT) colonography).

When the research reported in this thesis started, the Netherlands did not have a population-based screening program. An evidence-based estimate of the participation rate was considered essential for estimating the effectiveness and costs of a national screening program. In 2005, a National Consensus meeting recommended investigating the implementation of a nationwide CRC screening program. In 2008 and 2009, two Dutch pilot studies were conducted to investigate the feasibility of fecal occult blood tests (FOBT) and flexible sigmoidoscopy (FS) for colorectal cancer screening. The conclusion was that between 47% and 50% would participate in a guiac FOBT screening program, 60% to 62% in a fecal immunochemical test (FIT) screening program, and 32% in a flexible sigmoidoscopy screening program.(6;7) Colonoscopy and CT colonography were considered to be the most accurate exams in detecting colorectal neoplasia, but it was not known to what extent the Dutch population would participate in such programs.

The aim of the work reported in this thesis was to contribute evidence for evaluating colonoscopy screening. To achieve this goal, we performed a large population based randomized screening trial comparing colonoscopy and CT colonography as primary CRC screening methods. In this trial we could estimate participation and diagnostic yield, and assess other factors that may influence the effectiveness of colonoscopy screening.

Chapter 2 reviews the literature on the available screening tests and their performance, corresponding participation rates and resulting effectiveness. Although fecal immunochemical testing is increasingly used worldwide, solid data evaluating the accuracy of FIT against colonoscopy as the reference standard are scarce, as most studies to date have only performed colonoscopy in subjects with a positive FIT only, not in those with a negative FIT. The colonoscopy pilot-study gave us the opportunity to invite each colonoscopy participant to additionally perform a FIT. Chapter 3 reports on this additional study on the accuracy of FIT.
Although colonoscopy is considered the most accurate exam in detecting colorectal neoplasia, it can still miss a significant number of lesions. (8) Adenomas can be visible and not recognized or they can be located outside the visual field, hidden behind folds or flexures. The use of a transparent cap attached to the tip of a colonoscope could increase colonic surface visualization by depressing and pushing away the colonic folds with the cap. We compared the adenoma detection rate of cap-assisted colonoscopy with that of regular colonoscopy and report the results in Chapter 4.

Chapter 5 addresses factors associated with the detection of serrated polyps. Such polyps can progress to invasive cancer via the serrated pathway, one that differs from the traditional adenoma-carcinoma sequence. Serrated polyps have traditionally been thought to be benign, with a low likelihood to progress to colorectal cancer. Growing evidence now supports their malignant potential. Identifying factors associated with serrated polyp detection may help endoscopists to improve the detection of these polyps.

The main results of our randomized screening trial, participation and diagnostic yield of colonoscopy and CT colonography screening, are described in Chapter 6.

Participation in a colonoscopy screening program can be influenced by the anticipated and the expected burden of the screening test. Those who anticipate the screening procedure to be burdensome may be less likely to take part, while the experienced burden of the procedure could play a role in future program adherence. Chapter 7 describes the expected and perceived burden of colonoscopy screening compared to CT colonography screening.

Reasons to accept or decline a screening invitation could be based on erroneous assumptions. We explored and compared reasons for participation and non-participation between colonoscopy and CT colonoscopy screening and report on them in Chapter 8. Such findings may be of help in the design of future screening invitations, which can remove barriers to participation in colonoscopy screening.

Chapter 9 presents a comparison of two different types of a pre-consultation in colonoscopy screening. A face-to-face consultation allows personal attention and may facilitate decision making about participation. In contrast, a telephone consultation does not require the invitee to travel and be absent from work. We studied the participation rate with a pre-colonoscopy consultation by telephone and compared that with participation using a standard visit at the outpatient clinic. We report on this comparison in Chapter 9. In the final Chapter 10 we summarize our main findings and discuss future perspectives for colonoscopy screening.
REFERENCES


