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Colonic polyps and an update on the bowel cancer screening programme

Kinesh Patel, *research fellow;* **Sarah Marshall,** *clinical programme manager;* **Siwan Thomas-Gibson,** *consultant gastroenterologist*

St Mark's Hospital, Harrow, UK

Background

Colorectal cancer is the third most common cause of cancer death in the UK with about 40,000 cases diagnosed each year.[1] It predominantly affects men and women in the seventh and eighth decades of life, often presenting late but is curable if diagnosed early. Late diagnosis is therefore associated with a poorer outcome.[2]

Early diagnosis is the rationale behind the national Bowel Cancer Screening Programme (BCSP) which has been implemented gradually throughout England since 2006. Similar programmes are running in Wales and Scotland (the Northern Ireland programme has not yet commenced). The BCSP invites asymptomatic men and women in their 60s and early 70s to submit a faecal occult blood test (FOBT): those with a positive result are called for screening colonoscopy. The fundamental aim is to diagnose cancer earlier as this is associated with both much better personal outcomes for patients and improved financial outcomes for the health service.[3]

An important ancillary outcome of the programme is the detection and removal of colonic polyps, for which there is a well described biological progression from precancerous adenomatous lesions to overt neoplasia. Screening therefore offers the opportunity to interrupt this sequence and prevent the future development of colon cancer.[4]

The screening programme

Selection of patients

In England, subjects aged 60–69 years registered with a general practitioner (GP) are sent an invitation to participate in the screening programme. Those accepting the invitation complete a test at home by smearing three separate samples of their faeces on the FOBT card and posting it to one of five regional screening hubs. There are no dietary restrictions before performing the test. The programme is currently extending age participation to the 75th birthday.

The guaiac FOBT (gFOBT) is then processed. Those in whom the test is positive (defined by the presence of haemoglobin in the stool) are sent a further letter inviting them to attend an appointment with a specialist screening practitioner within two weeks to discuss further management.

Most patients will proceed straight to screening colonoscopy. A minority may be directed to radiological imaging but this is not available by patient choice. Computed tomographic (CT) colonography is the preferred radiological option in the BCSP, but is not widely available. A further minority will be deemed unfit or will choose not to proceed with further investigation.

Results from the screening programme

As of December 2011, over 12 million screening kits had been dispatched, with 11,000 cancers detected.[5] The results from the first two million English kits have been analysed and recently published.[6]

Response

The overall response rate for those receiving screening kits in the post is 52%. Uptake varies by sex, geography and social deprivation. More women (54.4%) than men (49.6%) choose to participate nationally but rates vary significantly by area. The response rate in London is significantly lower: 43% and 36.8% for women and men, respectively.[6] The lower uptake in London is also seen with other established screening programmes.[7]

Subjects who live in areas with the highest levels of deprivation are much less likely to participate in screening. This also varies by geography, with significantly higher uptake rates in matched deprived populations in the north-east than in London.

Overall, the gFOBT tests are positive in an average of 2%. However, positivity varies by sex, geography and demographics: in London and the north-east of England, the rate for men is 2.9% compared to 1.9% in the south-east. There is, as expected, a higher average rate in men (2.5%) than women (1.5%) as male gender is a well recognised risk factor for polyp development.

Investigation and diagnosis

Nearly all (98.1%) those undergoing investigation had colonoscopy performed to screen for cancer, with about one in 10 diagnosed with colorectal cancer. Cancer is a more likely diagnosis in men (11.6%) than in women (7.8%).[6]

Significant numbers of polyps were also discovered. On average, 43% of men and 29% of women had a diagnosis of either cancer or high- or intermediate-risk polyps (based on the number of polyps and their size), necessitating further endoscopy within one year or three years respectively.[6] Polyps are usually removed at the time of endoscopy and should help prevent development of cancer, although the screening programme has not been in place long enough for these data to have been analysed.

Cancer

Most cancers (77.3%) were diagnosed in the left side of the colon, with a minority (14.3%) in the right colon, and most (72%) were detected early in their natural history and classified as polyp cancers or Dukes A or B. Treatment of these early cancers correlates with improved survival at five years compared with treatment of more advanced lesions.[3]

Adverse events

Screening asymptomatic populations for disease always confers some risk to individual participants.[8] The most common complications after screening colonoscopy are post-polypectomy bleeding (0.2%) and perforation (0.1 %).[6] Less common complications include abdominal pain necessitating admission and cardiovascular events.

Presentation of colonic polyps outside the screening programme

Colonic polyps are usually asymptomatic. Indeed, the rationale for screening is that most patients undergoing screening colonoscopy for bowel cancer have no lower gastrointestinal (GI) symptoms.

In a minority, polyps may be symptomatic, for example causing rectal bleeding or giving rise to other signs such as iron deficiency anaemia. It is unusual for polyps to cause alteration of bowel habit, but a notable exception is the villous adenoma which may produce mucus per rectum or diarrhoea. Large rectal polyps may very occasionally also cause symptoms such as tenesmus.

The recent National Early Diagnosis campaigns for bowel cancer, like other tumour groups, aims to draw the public's attention to symptoms such as those mentioned above to encourage earlier presentation to GPs for urgent investigation. These campaigns have resulted in a significant increase in referrals under the two-week wait pathway for lower GI symptoms.[9]

Diagnosis of polyps

The most common and accurate method of diagnosing colonic polyps remains flexible endoscopy, either flexible sigmoidoscopy or colonoscopy. The latter requires a cleared bowel using potent laxatives administered the day before and sometimes on the day of the procedure.

Ongoing technological improvements in optics and image processing in endoscopy continue to enhance the views obtained of the colonic mucosa. Endoscopy now permits direct visualisation of polyps to such a level of detail that increasingly the histology of the polyp can be predicted by the macroscopic appearances at the time of the procedure.[10] The vast majority of polyps can be removed with little risk at the time of colonoscopy.

More advanced procedures such as endoscopic mucosal resection and endoscopic submucosal dissection are capable of removing very large benign polyps and even very early cancers, thus eliminating the need for surgery in an increasing number of cases.

New technologies for polyp detection

Lower GI endoscopy remains unpalatable to many people. Significant interest has therefore been shown in methods of screening not relying on conventional endoscopy, for which there are currently three principal contenders.

CT colonography

The technique of CT colonography uses rectal insufflation to distend the prepared bowel using carbon dioxide in combination with laxatives. There are few complications and it is less uncomfortable than traditional colonoscopy.[11] The sensitivity for larger polyps (>10 mm) approaches that of colonoscopy.[12]

The principal disadvantages are that smaller polyps may be missed, radiation is used and any positive colonic findings usually require a colonoscopy for therapy or confirmation.

Wireless capsule endoscopy

The ingestion of a miniaturised camera which passes through the digestive tract transmitting pictures to an external receiver has revolutionised the imaging of the small bowel.

A newer development is a swallowed capsule (Pillcam Colon™, Given Imaging Yoqneam, Israel) which produces targeted images of the colon. A trial comparing this first-generation device with conventional endoscopy found a sensitivity of 64% for the capsule detecting polyps larger than 6 mm. The capsule is being refined and in the future may provide better performance to allow it to compete with the diagnostic abilities of colonoscopy.[13]

Faecal DNA testing

About half of all colonoscopies performed under the BCSP have no polyps or cancer detected. A better faecal test to help select patients for therapeutic colonoscopy is clearly an attractive proposition.

The current generation of faecal tests relies on the detection of intermittent bleeding from colorectal cancer or advanced polyps. The same lesions shed DNA continuously into the colonic lumen where it is mixed with the stool. Because of increased cellular proliferation and enhanced survival of dysplastic cells, this DNA may comprise a significant proportion of total stool human DNA and can be analysed for the mutations common in colorectal lesions.

A recent study combining these techniques with a faecal haemoglobin assay showed a sensitivity of 85% for colorectal cancer and 64% for adenomas larger than 10 mm.

The future of bowel cancer screening

The BCSP is now well established, performing colonoscopy after a positive FOBT.

A recent large randomised clinical trial demonstrated the potential benefits of screening the entire population for polyps with a one-off flexible sigmoidoscopy at age 55 without an antecedent faecal test. In this trial there was a significant reduction in both the incidence (23%) and mortality (31%) from colorectal cancer.[14] As a result of this trial, work is currently in progress to train new screeners and expand the infrastructure to permit mass screening with

Key points

- **The removal of colonic polyps allows the interruption of the adenoma-carcinoma sequence, preventing the future development of cancer**
- **Polypectomy is safe and usually well-tolerated**
- **The Bowel Cancer Screening Programme has detected over 11,000 cancers to date and is on course to reduce national mortality from colorectal cancer**
- **Screening of the population from the age of 55 with flexible sigmoidoscopy is about to commence**

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flexible sigmoidoscopy of the general population at age 55. This new part of the programme will be launched in England in 2013 and rolled out through the country in forthcoming years.

The two programmes will run in parallel. Those screened at 55 with flexible sigmoidoscopy will still be invited to perform a FOBT every two years from the age of 60 onwards. It is anticipated that the increased amount of endoscopy performed under both programmes will realise further reductions in colorectal cancer mortality.

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Address for correspondence:
Dr K Patel, St Mark's Hospital, Norhtwick Park, Watford Road, Harrow, Middlesex HA1 3UJ.
Email: kinesh.patel@gmail.com