Colon capsule endoscopy (CCE-2) for detection of colorectal polyps and cancer

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<tr>
<th>What are colorectal polyps and colorectal cancer?</th>
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<td>Colorectal polyps are abnormal tissue growths on the inner lining of the large intestine (colon/bowel) or the rectum. Colorectal polyps affect one in four people but most are harmless. However, colorectal/bowel cancer often begins as a bowel polyp. Finding and removing polyps before they become cancerous is very effective for preventing bowel cancer.</td>
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<td>Colon capsule endoscopy (CCE-2) is a non-invasive procedure used to look for colorectal polyps by taking pictures of the inside of the bowel. Patients swallow a capsule which contains miniature cameras. Images from these cameras are transmitted to a recording device worn by the patient. After the procedure a specialist examines the images and decides if any polyps need to be removed. If there are polyps needing removed the patient will require a colonoscopy to remove them.</td>
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CCE-2 is not currently used in Scotland, instead patients are referred for a colonoscopy. During a colonoscopy a flexible tube with a camera at one end is inserted through the anus (back passage) and along the colon. Images from the camera are displayed on a TV screen and examined by a specialist during the procedure. Patients who cannot have a colonoscopy are offered another test called CT colonography which creates a 3D image of the inside of the bowel using a CT-scanner.

All the procedures described in this summary require patients to undergo a period of bowel cleansing. This normally involves swallowing clear liquids and laxative solutions in order to empty the bowel. The bowel cleansing needed for CCE-2 is more intensive than for the other tests to ensure that clear images are captured and the capsule is excreted from the body.

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<th>What we did</th>
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<td>We looked for an answer to the question:</td>
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Is colon capsule endoscopy (CCE-2) accurate and good value for money compared with colonoscopy or CT colonography for detecting colorectal polyps and cancer in adults with signs or symptoms of bowel cancer or at increased risk of bowel cancer?
What we found
We applied the evidence we found about the accuracy of CCE-2 for detecting colorectal polyps to a hypothetical group of 1000 people with a positive bowel cancer screening test result. In this imaginary group, an estimated 21 (2.1%) people have polyps that may become cancerous. In the scenario:

- CCE-2 correctly identifies an estimated 18 out of 21 people with potentially cancerous colorectal polyps per 1000 people tested.
- An estimated 253 people have a CCE-2 result indicating that their positive bowel cancer screening test was caused by colorectal polyps. Approximately 235 (93%) of these people would not actually have colorectal polyps.
- Approximately 747 people would have a CCE-2 result indicating that they did not have colorectal polyps. Approximately 3 (0.4%) of these people would have one or more colorectal polyps.
- Approximately 747 fewer people would be referred for colonoscopy compared with current practice where all 1000 people would have a colonoscopy.

These results, which are based on the best evidence available on the accuracy of CCE-2 for diagnosing colorectal polyps, are illustrated in the diagram below:

This hypothetical scenario is based on CCE-2 having an estimated sensitivity of 87% and specificity of 76%. The prevalence of positive bowel screening tests in Scotland is estimated at 2.11%.

tp: true positive – test is positive (indicates colorectal polyps) and patient has colorectal polyps
fp: false positive – test is positive (indicates colorectal polyps) but patient does not have colorectal polyps
tn: true negative – test is negative (indicates colorectal polyps not present) and patient does not have colorectal polyps
fn: false negative – test is negative (indicates colorectal polyps not present) but patient has colorectal polyps
In the best case scenario the number of cases of colorectal polyps missed by CCE-2 decreases to approximately 1 per 1000 people tested. In the worst case scenario CCE-2 misses an estimated 5 people with clinically relevant colorectal polyps per 1000 people tested.

The accuracy of CCE-2 estimated in studies will likely be affected by how effective the bowel cleansing regime is, whether the capsule obtained images of the whole bowel, and the expertise of the people examining images after the procedure.

It was not possible to determine the accuracy of CCE-2 in people unable or unwilling to have a colonoscopy, or who have previously had an incomplete colonoscopy. We also could not assess whether CCE-2 was good value for money as we did not find any relevant studies on costs that would apply in Scotland.

There are some risks associated with having a CCE-2 procedure. In published studies, the CCE-2 capsule became stuck in the bowel in 0.8% of people tested. In 0.1% of people tested the capsule was accidentally inhaled into the lungs. Some patients may experience mild/moderate symptoms during the bowel cleansing period, for example nausea. CCE-2 may not be suitable for some patients, for example people with narrow bowels or swallowing disorders.

Patient and public preferences relating to tests for colorectal polyps varied which suggests the choice of test may be a personal decision. Important considerations for patients when choosing a test include invasiveness of the procedure, intensity of the bowel cleansing process, and whether patients need another procedure to remove any polyps identified.

**What is our advice to NHSScotland?**

Colon capsule endoscopy (CCE-2) is not recommended for routine use in NHSScotland for the detection of colorectal polyps and bowel cancer. There is currently insufficient evidence to show that CCE-2 is accurate and good value for money.

CCE-2 may however be considered as an option for patients who are able to cope with the intensive bowel cleansing needed for CCE-2 and who are unable to have a colonoscopy or CT colonography.

In future CCE-2 could potentially be conducted at home or through local community health centres. This could benefit people who currently travel long distances to access hospital services. Research is needed to explore how to ensure adequate bowel cleansing and improve the number of CCE-2 procedures that image the whole bowel.

**Future work**

More research is needed to determine if CCE-2 is good value for money and to establish patients’ views on CCE-2, colonoscopy and CT colonography. Some NHS boards in Scotland (Highland, Grampian and Western Isles) are going to trial the use of CCE-2 for selected patients.

This plain language summary has been produced based on SHTG Advice Statement 014-18, November 2018.