

- Title** Capsule Endoscopy for Colorectal Cancer (CRC) Screening
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**Aim**

To review evidence on the effectiveness, safety and cost-effectiveness of capsule endoscopy for colorectal cancer screening (CRC) in adult population compared with conventional colonoscopy in MOH facilities.

**Conclusions and results**

In the first generation capsule endoscopy (CCE-1), there was fair to good level of evidence that showed its accuracy in detecting polyps in patients with average risk (asymptomatic patients aged 50 years and above) and increased risk of CRC (individuals with personal and family history of adenomatous polyps or CRC, history of inflammatory bowel disease or those diagnosed with hereditary non-polyposis colon cancer or familial adenomatous polyposis). The sensitivity and specificity ranged from 68 to 84% and 62 to 92%, respectively. Its positive predictive value (PPV) ranged from 20 to 77% and negative predictive value (NPV) ranged from 71 to 93%. The diagnostic yield of the CCE-1 in detecting CRC ranged from 27 to 76%. In second generation capsule endoscopy (CCE-2), there was also fair to good level of evidence that suggested its accuracy in detecting polyps and CRC among the average and increased risk patients. For the detection of polyps, CCE-2 showed sensitivity and specificity of 84 to 90% and 64 to 76%, respectively while its detection rate for CRC ranged from 90% to 93%. The accuracy of CCE-1 was found to be suboptimal as compared to colonoscopy. There were wide variations in the sensitivity, specificity, positive predictive value and negative predictive value of CCE-1 reported in the studies. The sensitivity of CCE-2 was found to be comparable to the sensitivity of colonoscopy although the specificity was slightly low. There was no retrievable evidence on mortality rate, survival rate and quality of life related to screening CRC using capsule endoscopy in the general population.

In terms of safety, there was fair level of evidence to show that both CCE-1 and CCE-2 were safe to be used in the screening for colorectal cancer among the average and increased risk patients. Most of the adverse events were mild and related to bowel preparation. Both types of capsule endoscopy claimed to have received CE mark, with CCE-2 received US FDA approval to be used in cases of failed or incomplete colonoscopy.

From the cost-effectiveness perspective, there was limited evidence on cost-effectiveness of CCE-1 in screening for CRC. In the Markov model, a hypothetical population of 100 000

individuals aged 50 years and over who underwent a 10 yearly screening procedure, the incremental cost-effectiveness (compared with no screening) of colonoscopy and capsule endoscopy was \$16165 and \$29244 per life-year saved, respectively. With 30% increase in compliance to screening, CCE-1 became more cost-effective than colonoscopy. However, there was no retrievable evidence on economic evaluation conducted on CCE-2. The cost per capsule was reported to be around RM 1688.25 (USD 500; 1 USD = RM 3.37).

**Recommendations (if any)**

Based on this review, CCE-2 may be considered as a diagnostic tool to identify colonic polyps or CRC among patients with average or increased risk of CRC, particularly among those who are unwilling to undergo colonoscopy, have contraindication for colonoscopy and have history of incomplete colonoscopy. However, for general population screening for CRC, capsule endoscopy cannot be recommended yet until further quality evidence is available.

**Methods**

Electronic databases such as MEDLINE, PubMed, EBM Reviews-Cochrane Database of Systematic Reviews, EBM Reviews-Cochrane Central Register of Controlled Trials, EBM Reviews-Health Technology Assessment, EBM Reviews-Cochrane Methodology Register, EBM Reviews-NHS Economic Evaluation Database, Database of Abstracts of Reviews of Effects (DARE), Horizon Scanning database, INAHTA database, HTA database and FDA database were searched. Additional articles were identified from bibliographies of retrieved articles and hand-searching of journals. General search engine was used to get additional web-based information. No limits were applied to the search. Studies were selected based on inclusion and exclusion criteria. All relevant literature was appraised using the Critical Appraisal Skills Programme (CASP) tool. All full text articles were graded based on guidelines from the U.S./Canadian Preventive Services Task Force.

**Further research/reviews required**

Further high quality evidence is needed before recommending capsule endoscopy for population screening.

**Written by**

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