Diagnostic performance of chromoendoscopy and narrow band imaging for colonic neoplasms: a meta-analysis
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CRD summary
The review concluded that chromoendoscopy and narrow band imaging had similar diagnostic performance for assessing colonic neoplasms, but both gave unacceptably high false positive rates. These conclusions reflect the data presented, but should be interpreted cautiously due to limitations in study selection, quality assessment and analysis.

Authors’ objectives
To compare the diagnostic performance of chromoendoscopy and narrow band imaging for the detection of colonic neoplasms.

Searching
MEDLINE, EMBASE and The Cochrane library were searched to March 2009. Search terms were reported, but only articles published in English were included.

Study selection
Studies that assessed the diagnostic accuracy of chromoendoscopy or narrow band imaging to differentiate neoplastic from non-neoplastic colorectal lesions were eligible for inclusion. Studies were required to use pathology from biopsy, endoscopic or surgical treatment as the reference standard to confirm diagnosis and to report absolute numbers of true-positive, false-positive, true-negative and false-negative test results or sufficient data to calculate these. Studies of patients who were undergoing the procedure for the surveillance of ulcerative colitis were excluded.

Diagnostic modalities used varied across studies (details were reported in the article). Most included studies used magnifying endoscopy and five also used colour chip imaging. Approximately half of the studies used sequential imaging from a video system. Nine of the studies limited their analyses by polyp size and two by macroscopic appearance; the remaining studies did not report any limitations.

The authors did not state how many reviewers assessed studies for inclusion.

Assessment of study quality
The methodological quality of the included studies was assessed using the 14-item QUADAS tool. QUADAS assessment was used to generate an overall quality score.

The authors did not state how many reviewers performed the quality assessment.

Data extraction
Data were extracted on the numbers of true positive, false negative, false positive and true negative test results and estimates of specificity, with 95% confidence intervals (CIs), which were reported for each study and diagnostic modality.

Two reviewers independently extracted data and any disagreements were resolved by discussion and consensus.

Methods of synthesis
The possibility of a threshold effect was assessed by evaluating the correlation between sensitivity and specificity and by examination of ROC (receiver operating characteristic) curves. In the absence of evidence of threshold effect, pooled estimates of sensitivity, specificity and likelihood ratios, with 95% confidence intervals were calculated using a random-effects model. Where there was evidence of threshold effect, a bivariate model was used.

Between-study heterogeneity was assessed with I² and meta-regression was used to investigate potential sources or heterogeneity. Variables assessed were: whether magnifying endoscopy was used; type of video system (colour chip imaging, sequential imaging, or other); whether the study was prospective or cross-sectional; quality (QUADAS score...
above 12); and size of the target lesion and/or macroscopic appearance. A subgroup analysis was performed, which included studies in which magnifying endoscopy was used as the only diagnostic modality and in which there were no restrictions of polyp size or macroscopic appearance of the lesion.

Publication bias was assessed by calculating the discriminative d and by examining funnel plots and using the Begg’s tests.

Results of the review
Twenty-seven studies (23 prospective and four retrospective) were included in the review. Studies reported data for a total of 11,658 polyps (range 43 to 3,438); the number of participants was not reported. QUADAS scores ranged from 8 to 13, with most studies scoring 10 or more.

Twenty-two studies assessed the diagnostic performance of chromoendoscopy. The pooled estimate of sensitivity, derived from a bivariate model, was 95% (95% CI 93 to 97), $I^2=89.8\%$ and the corresponding pooled estimate of specificity was 85% (95% CI 79 to 90), $I^2=79.9\%$.

Ten studies assessed the diagnostic performance of narrow band imaging. The pooled estimate of sensitivity, derived from a random-effects model, was 94% (95% CI 91 to 97) $I^2=94.5\%$ and the corresponding pooled estimate of specificity was 88% (95% CI 83 to 89), $I^2=17.3\%$.

Subgroup analyses produced similar results. Meta-regression indicated no statistical difference between chromoendoscopy and narrow band imaging for either sensitivity or specificity and none of the variables assessed was significantly associated with heterogeneity. There was no evidence of publication bias. Summary estimates of positive and negative likelihood ratios were also reported.

Authors’ conclusions
Chromoendoscopy and narrow band imaging have a similar performance in diagnosing the pathological features of polyps.

CRD commentary
The article provided a clearly stated research objective and reported appropriate inclusion criteria. Several sources were searched for relevant studies, but the restriction to English language studies raised the possibility of language bias and missed studies. The data extraction process included measures to minimise error and bias; it was not clear whether similar measures were applied to inclusion screening and the quality assessment of included studies.

The methodological quality of included studies was assessed using an appropriate tool (QUADAS), but results were reported as summary scores only; guidance for the use of QUADAS recommends that summary scores should not be used. Exploration of the effects of study quality on estimates of test accuracy was limited to summary quality scores and may have masked potential effects of individual QUADAS items. Appropriate methods were used to generate pooled estimates of test performance, but most studies evaluated only one of the two tests making comparative estimates of test accuracy questionable. Four studies appeared to have evaluated both tests, but no separate direct comparison data were presented. The authors’ conclusions reflected the data presented, but should be interpreted cautiously given some limitations in study selection, quality assessment and analysis.

Implications of the review for practice and research
Practice: The authors stated that the overall rate of false negative results (5.7%) was unacceptably high for both tests, which indicated that polyps should be biopsied rather than evaluated by narrow band imaging or chromoendoscopy. The authors further stated that it may sometimes be acceptable to manage small polyps with chromoendoscopy or narrow band imaging and that band imaging may have been preferable since it did not require a dye spray. If the decision was made not to excise or biopsy a small polyp based on narrow band imaging or chromoendoscopy findings, repeat colonoscopy at three to five years was recommended.

Research: The authors stated that further research and improvements in test methods were needed to increase the sensitivity and reduce the false-negative rate.

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