

# Optical diagnosis of colorectal lesions requires technology, dedication, and knowledge of its limits

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## Bibliography

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## Abbreviations

▼	
FIT	fecal immunochemical testing
NBI	narrow band imaging
NICE	NBI International Colorectal Endoscopic
PIVI	Preservation and Incorporation of Valuable Endoscopic Innovations

Optical diagnosis of small colorectal polyps without the need for histopathology has the potential to improve the cost effectiveness of colonoscopy by reducing the time for polyp retrieval and the cost of histopathology [1,2]. In addition, the ability to tell patients the surveillance interval needed immediately after the procedure reduces the cost associated with follow-up and alleviates patient anxiety. Many studies, including several meta-analyses [3–5], have shown that optical diagnosis of small colorectal polyps is safe and feasible in routine clinical practice and that the results are comparable to those found using histopathology, the current reference standard. In academic centers and in vivo settings, experienced endoscopists have achieved 93% concordance of surveillance intervals needed when made by optical diagnosis and histopathology and >90% negative predictive value for rectosigmoid polyps.

Because the risk of malignancy increases with the size of the polyp (>1 cm), most studies have focused on evaluating the accuracy of optical diagnosis of smaller polyps (<10 mm). Americans, however, are uncomfortable with even the small risk of advanced malignancy that 6–9 mm polyps may harbor and tend to concentrate on diagnosis of diminutive polyps (<6 mm). The American Society of Gastrointestinal Endoscopy Preservation and Incorporation of Valuable Endoscopic Innovations established diagnostic thresholds for real time endoscopic assessment of the histology of diminutive colorectal polyps to facilitate standardized research and implementation in clinical practice [6].

There are two proposed thresholds for optical diagnosis of diminutive colorectal polyps:

1. For colorectal polyps ≤5 mm to be resected and discarded without histopathologic assessment, endoscopic technology (used with high confidence) to determine histology combined with histopathologic assessment should provide a ≥90% agreement in the assignment of post-polypectomy surveillance intervals when compared to decisions based on pathology assessment of identified polyps.
2. For a technology to be used to guide the decision to leave suspected rectosigmoid hyperplastic polyps ≤5 mm in place (without resection), the technology (used with high confidence) should provide ≥90% negative predictive value for adenomatous histology.

The study by Stegeman et al published in this Issue failed to fulfill the second criterion (the first criterion was not assessed) and the authors concluded that the accuracy of optical diagnosis for colonic lesions is not acceptable for colonoscopies for patients with positive fecal immunochemical testing (FIT) results. Their study highlights many issues with the studies of optical diagnosis and the conclusions drawn.

## 1. Defining optical diagnosis

In the context in which optical diagnosis of colorectal polyps is used as a basis for deciding to discard polyps or leave hyperplastic polyps in situ, the initial Detect InSpect ChAracterise Resect and Discard (DISCARD) study included only polyps smaller than 10 mm because the risk for advanced neoplasia increases significantly in bigger lesions [2]. Since the publication of Preservation and Incorporation of Valuable Endoscopic Innovations (PIVI) there is agreement among experts that only lesions smaller than 6 mm should be included in studies of optical diagnosis because it is in those lesions that the risk of advanced neoplasia

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is small. Indeed, this was confirmed by Stegeman et al. where all cancers detected were > 10 mm.

## 2. Defining outcomes

From the PIVI recommendations, the outcomes should include both the accuracy of optical diagnosis (in particular, the negative predictive value for adenomatous histology) and, of more relevance to the patient, concordance of surveillance intervals as determined by optical diagnosis and histopathology.

## 3. Using appropriate technology

There are many studies in the literature that have convincingly shown that white light alone is not sufficient for optical diagnosis because its accuracy is significantly lower than the accuracy of histopathology [7–10]. Studies that have shown white light results that are comparable to histopathology results have all used technology in addition to white light. Chromoendoscopy and more recently narrow spectra technologies such as narrow band imaging (NBI; Olympus) have been most often studied. Stegeman et al offered no clear protocol for the use of technologies in addition to white light and hence it is unclear whether the results represent the use of white light alone or an unknown combination of white light and other add-on techniques.

## 4. Standardized criteria

To date the NBI International Colorectal Endoscopic (NICE) classification [11] is the only validated criterion for the classification of neoplastic and non-neoplastic polyps as well those with deep submucosal invasion [12] when using NBI during real time colonoscopy. Other classification systems for NBI, other narrow spectra technologies, and chromoendoscopy have been described. In addition, the level of confidence in the results should always be considered when making an optical diagnosis—the endoscopist must be confident of the diagnosis before lesions are resected and discarded or left in situ. When the endoscopist has low confidence in the optical diagnosis, polyps should be sent for histopathology.

## 5. Training in optical diagnosis

Much like performing colonoscopy, optical diagnosis requires training. We developed a PowerPoint training module using still images (with validated construct and content), which demonstrated that a short training session can improve the accuracy of optical diagnosis [13]. Rastogi et al [14] showed similar results using video images and, in addition to improved diagnostic accuracy after training, revealed an increase in the proportion of high confidence diagnoses. There are many other training modules available and studies assessing optical diagnosis should use these validated tools, and only those endoscopists who ‘pass’ the training should participate in the in vivo part of the study. In addition, endoscopists should receive active feedback on their optical diagnoses and assessment when the study is underway to ensure sustained performance.

## 6. Photo documentation

The ability to take a clear image of the polyp on which optical diagnosis is made is of paramount importance because it serves as a record for both the patient and the self-audit for the endoscopist. Optimization of the quality of the image contributes to consistent and reliable image capture.

To conclude, optical diagnosis of small colorectal polyps was envisaged to be used for selected lesions—those without suspicious

features that would suggest advanced neoplasia (eg, irregular shape, central depression, irregular color) when assessed using white light endoscopy and in which endoscopists were confident of their diagnosis using white light endoscopy with additional technology (chromoendoscopy/narrow spectra technologies). Optical diagnosis was never meant to replace histopathology but was an attempt to reduce the workload in assessing diminutive polyps, which are increasingly being detected, with improved standards of colonoscopy. The study design offered by Stegeman et al does not effectively address whether the technique for optical diagnosis of diminutive colorectal polyps could be translated into routine clinical practice. Thus, the reasons for the poor performance of optical diagnosis of polyps found are not necessarily due to an inherent inaccuracy in the technique, but are caused by its incorrect application.

**Competing interests:** None

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