Narrow band imaging endoscopy for real-time assessment of duodenal villi

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The technology of narrow band imaging (NBI) has been available commercially for about a decade. The NBI filter allows only blue and green wavelength of light to pass through and this gives blood vessels a dark appearance [1]. This, along with image magnification and the use of a high definition monitor, allows detailed assessment of the microsurface and microvasculature of the mucosal surface. Accordingly, the information obtained during NBI endoscopy is much more than during conventional white light endoscopy [2]. In the duodenum, villi are clearly seen during magnification NBI endoscopy. Most studies on NBI in the gastrointestinal tract have focussed on the esophagus and colon especially for the evaluation of Barrett's esophagus and detection of colorectal polyps [3, 4]. In contrast, relatively little data is available on its utility in assessing duodenal pathology. This technology has been reported to be helpful in assessing ampullary lesions and detecting villous atrophy in the duodenum [5–8].

The study by Goswami et al. published in the current issue of this *Journal* [9] assesses the role of NBI in predicting duodenal villous morphology. They prospectively enrolled 105 patients with suspected malabsorption and compared the observations made on duodenal villous morphology during NBI endoscopy with histopathology findings. Interestingly, 59 patients had celiac disease or tropical malabsorption and only 1 patient had irritable bowel syndrome (IBS). As chronic diarrhea was one of the inclusion criteria, one would have expected more IBS patients in the study population. Fifty-eight patients had villous atrophy on histology and magnification NBI imaging had 95 % sensitivity and 90.2 % specificity in detecting villous atrophy when interpreted by the

person performing the procedure. The endoscopy images were also assessed by another person and they found good interobserver agreement with the primary assessor. The authors have classified the appearance of duodenal villi on magnification NBI into four categories, although this lacked external validation as the authors have mentioned. The appearance of duodenum on NBI endoscopy in patients with normal villi, partially atrophic villi, and completely atrophic villi has been already described in previous studies, and the current study does not provide any additional features for observation [6, 7]. However, results from this study are a welcome addition to the data on the usefulness of NBI in duodenal disease.

The findings from this study are encouraging and indicate that NBI has a potential role in detecting villous atrophy. A few previously published studies have shown similar results [6, 7, 10]. Table 1 shows the results of these studies along with data from the current study. All of them show very good sensitivity and specificity of magnification NBI in detecting duodenal villous atrophy. Normal duodenal villi appear finger or leaf-shaped while abnormal villi appear short and stubbed or gyrate or are completely absent. In a clinical setting, this would potentially help targeting biopsies to abnormal appearing areas to improve diagnostic yield compared to random biopsy. This may be especially relevant in patients with positive celiac serology and normal previous duodenal biopsy as NBI can detect the presence of patchy atrophy which is sometimes seen in patients with celiac disease [10, 11]. It might also help to reduce the need for biopsy if villi appear normal and thus reduce the cost of care.

Having discussed the potential benefits, we need to exercise some caution before reaching firm conclusions. All causes of malabsorption may not be associated with villous atrophy and hence duodenal biopsy may still be required in cases of suspected malabsorption. The cost of the equipment, added cost of the procedure to the patient for using NBI endoscopy, increased procedure time, and need for sedation

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Table 1 Performance of narrow band imaging endoscopy in assessing duodenal villous atrophy

Authors	Setting	Detection of duodenal villous atrophy on narrow band imaging endoscopy	
		Sensitivity	Specificity
Singh et al. [6], 2010, Australia	41 videos (10 celiac and 31 normal)	93.3 %	97.8 %
De Luca et al. [10], 2013, Italy	44 patients with suspected celiac disease	100 %	93 %
Dutta et al. [7] 2014, India	100 patients with suspected malabsorption	87.5 %	95.2 %
Goswami et al. [9] 2014, India	105 patients with suspected malabsorption	95 %	90.2 %

need to be balanced against the potential usefulness of this procedure. The current level of evidence is still in its early stages and more data is required before recommending widespread clinical usage. Overall, magnification NBI endoscopy appears to be a promising tool in assessing duodenal villous morphology and is likely to play a role as a diagnostic aid in evaluation of patients with suspected malabsorption.

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