INFLAMMATORY BOWEL DISEASE

Narrow band imaging with magnification for dysplasia detection and pit pattern assessment in ulcerative colitis surveillance: a case with multiple dysplasia associated lesions or masses

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A 62 year old man with longstanding ulcerative colitis and previous endoscopic excision of two dysplasia associated lesions or masses (DALMs) was admitted to our endoscopy unit for evaluation and resection of other possible DALMs. He had previously been offered and refused colectomy because of comorbidity from Parkinson's disease. He had multiple polypoid and sessile lesions which were assessed using a third generation prototype narrow band imaging (NBI) colonoscope with magnification. Selected lesions were either biopsied or resected with a combination of endoscopic submucosal dissection and endoscopic mucosal resection techniques. We correlated the pit pattern and vascular pattern intensity seen with magnification NBI with histology of both inflammatory and dysplastic lesions. Dysplastic areas showed Kudo pit patterns II, III, and IV and high vascular pattern intensity. Non-dysplastic and dysplastic areas of recurrence immediately adjacent to the scar from a previous endoscopic mucosal resection site were also assessed. This is the first case report where NBI has been shown to help in DALM detection and to distinguish dysplastic from non-dysplastic mucosa in ulcerative colitis.

Detection of potentially dysplastic areas and their differentiation from inflammation in colitis is one of the hardest challenges for the endoscopist. Chromoendoscopy has been shown to improve dysplasia detection in randomised trials, and when combined with magnification can be used to assess pit patterns suggestive of dysplasia.^{1–3} Despite this evidence, dye spraying is not routine clinical practice in colitis surveillance in many centres. It takes additional time, equipment, and training to perform and even with specially designed spray catheters mucosal coverage is not guaranteed.

Narrow band imaging (NBI) is a new endoscopic technology which uses optical filters to illuminate the mucosa with light from selected or "narrowed" bands of the optical spectrum. The filtered light preferentially enhances the mucosal surface and in particular the network of superficial capillaries. NBI has been nicknamed "digital chromoendoscopy" and is available to the endoscopist at the push of a button.⁴ As both adenomas and carcinomas have a richer vascular network than normal mucosa, they are enhanced in wide field view and appear dark brown against a blue green background mucosa.^{5,6} When magnification is combined with NBI, a pit pattern can be distinguished, similar to that described in the Kudo classification, which can be used to estimate whether or not a lesion is dysplastic.⁷ NBI appears to

have a role in dysplasia detection and lesion assessment in the oesophagus and stomach.^{8,9} We report the first use of NBI in colitis surveillance.

CASE REPORT

A 62 year old man with a 25 year history of extensive ulcerative colitis had been seen at our unit 15 months previously for colonoscopic surveillance. A 1.5 cm polyp was removed from the splenic flexure, and low grade dysplasia (dysplasia associated lesion or mass (DALM)) was diagnosed. At this time, other polyps were seen but were considered to be inflammatory polyps using standard white light endoscopy. Seven months later colonoscopy was repeated and a 3.5 cm polypoid lesion was noted in the rectum. Biopsies were positive of high grade dysplasia (DALM). As the patient did not agree to undergo surgery because of comorbidity from Parkinson's disease, endoscopic piecemeal resection of the rectal DALM was attempted. Histology reconfirmed high grade dysplasia but excision was incomplete. There remained suspicion that other polypoid lesions in the left colon might also be dysplastic. Due to the documented presence of multifocal DALMs and gross endoscopic findings, the patient was offered panproctocolectomy but refused although he agreed to further endoscopic therapy. He was therefore colonoscoped a fourth time with a view to confirmation of the nature of the remaining lesions and excision of the largest, at the rectosigmoid junction.

We used a third generation prototype, high definition, NBI system with the capacity to magnify up to 100 times (XCF-H240FZL/I video colonoscope, XCLV-260HP xenon light source and XCV-260HP video system centre; Olympus Medical System Corp., Tokyo, Japan) on a 14 inch monitor. The white light image is made up by illuminating the mucosa sequentially with white light passed through a rotating red-green-blue filter reflected to a high resolution monochrome charge coupled device. The narrow band image is made up by illuminating the mucosa with blue and green light only, the filters for which have narrowed bandwidths centred on 415 nm (bandwidth 30 nm) and 540 nm (bandwidth 20 nm), respectively. Switching back and forth between illumination modes could be performed at any time during the procedure via a button on the endoscope, light source, or keyboard. We aimed to use the NBI and magnification functions to help distinguish dysplastic and non-dysplastic areas endoscopically and then verify this histologically. The endoscopic team had a combined experience of over 100 cases with this NBI system in the colon and over 10 000 conventional colonoscopies (BPS). Histology was reviewed

Abbreviations: DALM, dysplasia associated lesion or mass; NBI, narrow band imaging

Figure 1 (A) Inflammatory polyp showing stretched distorted glands (pseudo-type IV pit pattern) and fibrin cap, with similar pattern intensity to adjacent normal mucosa; narrow band imaging (NBI) and magnification. (B) Polypoid dysplasia associated lesion or mass (DALM) showing type IV (arrow 1) and type II (arrow 2) pit patterns with high vascular pattern intensity; NBI and magnification. (C) Sessile DALM, wide angle view, white light. (D) Same sessile DALM, wide angle view; NBI. (E) Sessile DALM showing type III pit pattern with high vascular pattern intensity; NBI and magnification. (F) Scar at previous endoscopic mucosal resection site showing dysplastic recurrence (arrow 1) and peri-scar inflammation (arrow 2); NBI and magnification.

by a specialist gastrointestinal pathologist with experience in ulcerative colitis dysplasia diagnosis (AvH).¹⁰

The colon was intubated to the caecum. On withdrawal, the colon was scarred with quiescent inflammation. In the descending colon, two polypoid areas, 3 mm in size, were seen with macroscopic appearances consistent with inflammatory polyps. With NBI and magnification, the pit pattern looked distorted and stretched with some similarities to a type IV (dysplastic) pattern⁷; however, the vascular pattern intensity was similar to that of the background mucosa except immediately adjacent to the fibrin cap (fig 1A). They were snares resected and histologically confirmed as inflammatory polyps.

In the sigmoid colon there was a 1.5 cm polypoid mass. Examination with NBI and magnification showed areas with both type IV (ceribriform) and type II (papillary) pit patterns. The vascular pattern intensity was stronger than that of the

normal mucosa (fig 1B). A single biopsy from each area demonstrated low grade dysplasia, with the former showing villiform glands.

Immediately proximal to the rectosigmoid junction, there was a 4.0×1.5 cm sessile mass. This was assessed with white light and NBI with a wide field view (fig 1C, D) and then with NBI and magnification. In comparison with the white light view, the NBI view improved contrast compared with normal mucosa, with the dysplastic areas appearing darker. Magnification NBI showed type II, III, and IV pit patterns, all with strong vascular pattern intensity. No type V pattern was seen. This mass was resected predominantly with endoscopic submucosal dissection using a flex knife (KD-630L; Olympus Medical System Corp., Japan) but due to poor lifting of the proximal portion the procedure was completed by endoscopic mucosal resection with a snare. Histopathological examination of the resection specimen

Figure 2 Histological section of a sessile dysplasia associated lesion or mass in the upper rectum. (A) There was an atypical tubular gland with low grade dysplasia in the mucosa and (B) mucinous adenocarcinoma in the submucosa.

showed a neoplastic lesion with low and high grade dysplastic glands. A mucinous adenocarcinoma had developed in its centre which invaded the submucosal excision margin (fig 2A, B).

The scar from the previous endoscopic mucosal resection site in the rectum was assessed (fig 1F). There were areas adjacent to the scar that had stretched distorted pits but similar pattern intensity to the normal mucosa except immediately adjacent to the scar that were assessed as inflammatory and benign and biopsies were negative for dysplasia; however, there was a second area that appeared to have a type IV pit pattern with high vascular pattern intensity that was suspected to be dysplastic and biopsy was positive for low grade dysplasia.

DISCUSSION

This is the first report on the use of NBI to detect and differentiate dysplasia during colonoscopic surveillance of ulcerative colitis. We demonstrated that DALMs may show a variety of pit patterns, some of which (type II) would not be considered indicative of dysplasia under the Kudo classification; however, this was not an original aim of that classification.⁷ Similarly, inflammatory polyps have a neoplastic appearance with pseudo-type IV pattern due to stretching and distortion of the crypt openings. The key to differentiating these difficult lesions where the pit pattern does not match the expected histology appears to be the vascular pattern intensity. Dysplastic lesions seen with NBI have a stronger (blackier) capillary vascular pattern compared with normal mucosa. This is expected as NBI shows up fine superficial blood vessels whose diameter and density are increased in neoplastic lesions compared with normal mucosa.⁶ Assessment of vascular pattern intensity is unique to NBI and is a further means of assessing neoplastic potential in addition to pit pattern and is not seen at chromoendoscopy. Therefore, despite a type II pit pattern, areas of high vascular pattern intensity should be viewed as potentially dysplastic and confirmatory biopsies taken. Likewise, inflammatory polyps may have a pattern similar to type IV but comparable vascular pattern intensity to normal mucosa except at points of maximal inflammation. Standard macroscopic features of inflammatory polyps such as filiform appearance and fibrin cap can easily be identified with the NBI system activated and should also be factored in when assessing a lesion's likelihood of dysplasia.

Despite careful assessment of the largest lesion before resection was attempted, it had already progressed to become an invasive carcinoma which was not revealed by features on standard white light examination or with NBI and magnification. Therefore, although helpful for detecting dysplasia

in this case, NBI was not helpful in determining the potential presence of invasion that can be suggested by a type V non-structured pit pattern prior to resection, seen in most early colorectal cancers detected in non-colitic patients.⁷

The scar from the previous polypectomy site was observed and correct assessment was made differentiating dysplasia recurrence and normal but inflamed mucosa. NBI may also be useful in assessing resection margins postpolypectomy and at follow up following endoscopic resections in both colitis and non-colitic patients.

The most important features of the NBI system are its speed and ease of use, with rapid push button switching between modes, and no problems with incomplete mucosal coverage associated with dye spray. This has the potential to have a large impact in colitis surveillance as NBI seems to provide many of the benefits of chromoendoscopy without the aforementioned downsides, hopefully encouraging greater clinical use of techniques which increase dysplasia detection. Compared with chromoendoscopy, pit pattern alone does not seem to be sufficient for dysplasia differentiation and features specific to NBI such as vascular pattern intensity may need to modify the interpretation of the standard Kudo pattern to maximise differentiation. The clinical impact of these results will need to be evaluated in large, prospective, randomised studies which are being initiated at our institution.

In summary, we have reported a case where NBI with magnification was able to successfully detect and differentiate dysplasia in colitis. Pit pattern and vascular pattern intensity both play a role in differentiation of dysplasia with NBI.

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EDITOR'S QUIZ: GI SNAPSHOT

Unusual findings in the biliary tract

Robin Spiller, Editor

Clinical presentation

A 65 year old woman consulted a local clinic because of elevated liver enzymes recognised on annual routine check. Dilation of the bile duct along with a cystic mass in the left lobe of the liver was then demonstrated on ultrasound. She was referred to our hospital for further evaluation. Laboratory examination demonstrated mild elevation of biliary tract enzymes (glutamate-oxaloacetate transaminase 36 IU/l (normal range 14–32); glutamic pyruvic transaminase 20 IU/l (normal range 9–25); alkaline phosphatase 315 IU/l (normal range 109–312); γ -glutamyl transpeptidase 169 IU/l (normal range 10–28); and total bilirubin 1.0 mg/dl (normal range 0.2–1.2)). Levels of tumour markers were within normal limits (α -fetoprotein 6 (normal range 1–7); carcinoembryonic antigen 3.2 ng/ml (normal range 0.6–3.8); cancer antigen 19–9 U/ml (normal range 1–37)). Endoscopic retrograde cholangiography showed filling defects at the upper part of the extrahepatic bile duct, and opacification of the left hepatic bile duct was insufficient (fig 1). There was mucin oozing through a bulging papilla of Vater.

Question

What do these findings show?

See page 1439 for answer

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Figure 1 Endoscopic retrograde cholangiogram showing filling defects in the dilated extrahepatic bile duct. Pool-like opacification was observed in the left intrahepatic duct.

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