

Narrow-band imaging (NBI) green demarcated areas within laterally spreading tumor: a future target for detecting malignancies with artificial intelligence?

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The accurate real-time characterization of colorectal lesions during endoscopy is crucial for histological prediction, allowing one to choose the most appropriate treatment [1]. The characterization of polyps is based on the evaluation of their macroscopic aspect, vascular pattern and pit pattern with magnification, in white-light as well as virtual chromoendoscopy, such as narrow band imaging (NBI) [2]. Nevertheless, colorectal lesions are not homogeneous and the malignant components can sometimes represent a small area of the whole lesion, hence relatively difficult to detect, especially for unexperienced endoscopists.

We report four colorectal lesions with focal malignancies (video 1). The first lesion was a 4 cm granular laterally spreading tumor (LST-G) in the sigmoid with a 5 mm area classified Kudo Vn, Sano IIIa. The second lesion was a 3 cm pseudo-depressed non-granular LST in the sigmoid with a 5 mm area, Kudo Vn. The third lesion was a pseudo-depressed polyp in the right colon with a central area, Kudo Vi. The fourth lesion was an LST-G of the caecum with a 15 mm nodule, Kudo Vi, Sano IIIa. The four lesions were resected by endoscopic submucosal dissection and the suspicious areas were identified as invasive adenocarcinoma into submucosa to a depth of 3500 µm, 900 µm and more than 1500 µm, respectively. For the four lesions, we detected with NBI a green demarcated area (also visualized as a reddish area in TXI mode, Olympus, Tokyo, Japan) corresponding to the area where invasive cancer was found (figures 1, 2, 3 and 4).

These cases reveal that the malignant component within large colorectal lesions could have a demarcated green area easily detectable on a far view of the lesion, without analyzing the whole surface with magnification.

Targeting these areas before precisely analyzing the lesion could be a way to improve prediction for unexperienced endoscopists. As recently reported by our team [3], artificial intelligence systems can sometimes have difficulties to detect these flat lesions. Adding this key feature to artificial intelligence algorithms could be a way to improve their performance, in order to assist endoscopists in spotting malignancies.

- [1] Fabritius M, Gonzalez J-M, Becq A, et al. A simplified table using validated diagnostic criteria is effective to improve characterization of colorectal polyps: the CONECCT teaching program. *Endosc Int Open* 2019; 07: E1197–E1206. doi:10.1055/a-0962-9737
- [2] Sano Y, Tanaka S, Kudo S, et al. Narrow-band imaging (NBI) magnifying endoscopic classification of colorectal tumors proposed by the Japan NBI Expert Team: Japan NBI Expert Team classification. *Digestive Endoscopy* 2016; 28: 526–533. doi:10.1111/den.12644
- [3] Lafeuille P, Lambin T, Yzet C, et al. Flat colorectal sessile serrated polyp: an example of what artificial intelligence does not easily detect. *Endoscopy* 2021



Figure 1: White light view of the first granular LST in the sigmoid (an arrow indicates the suspicious area).

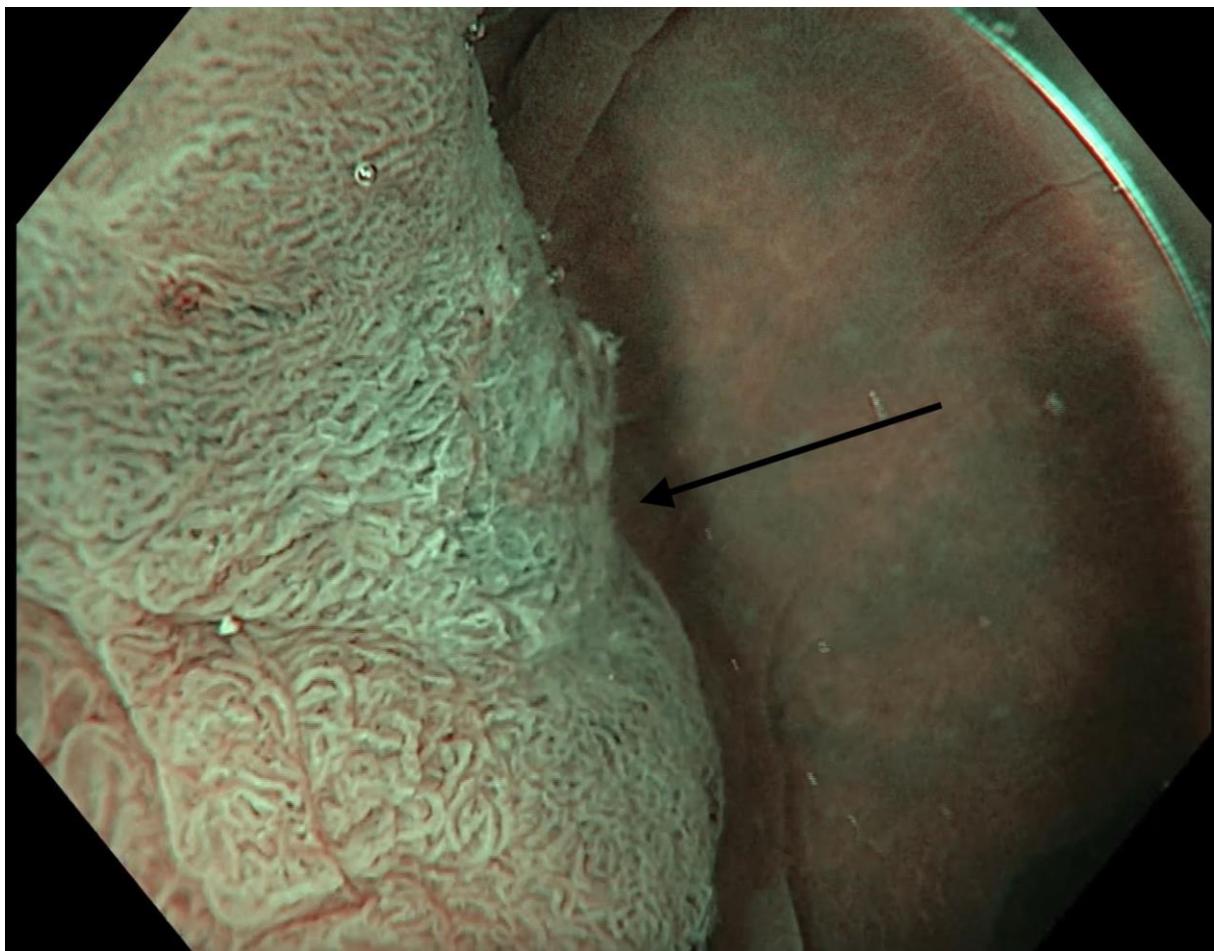


Figure 2: NBI view of the lesion (an arrow indicates the corresponding green demarcated area).

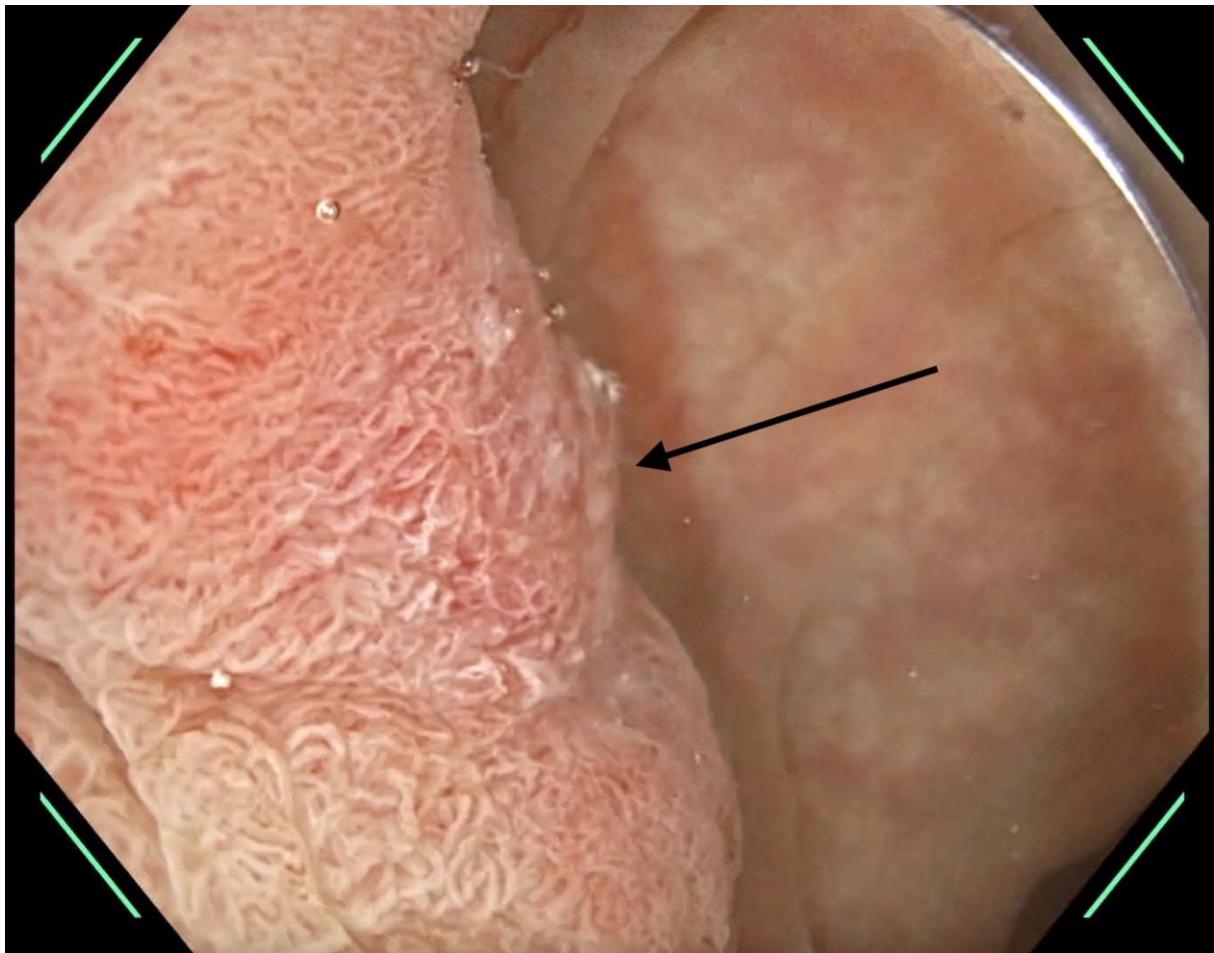


Figure 3: TXI (Texture and Color Enhancement Imaging) view of the lesion (an arrow indicates the corresponding reddish area).

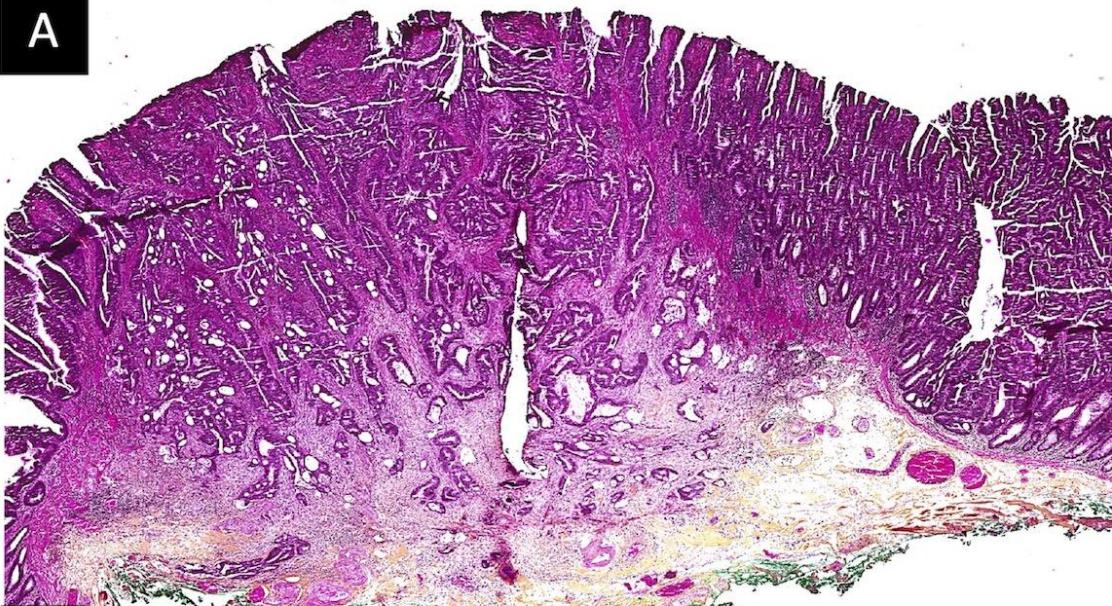
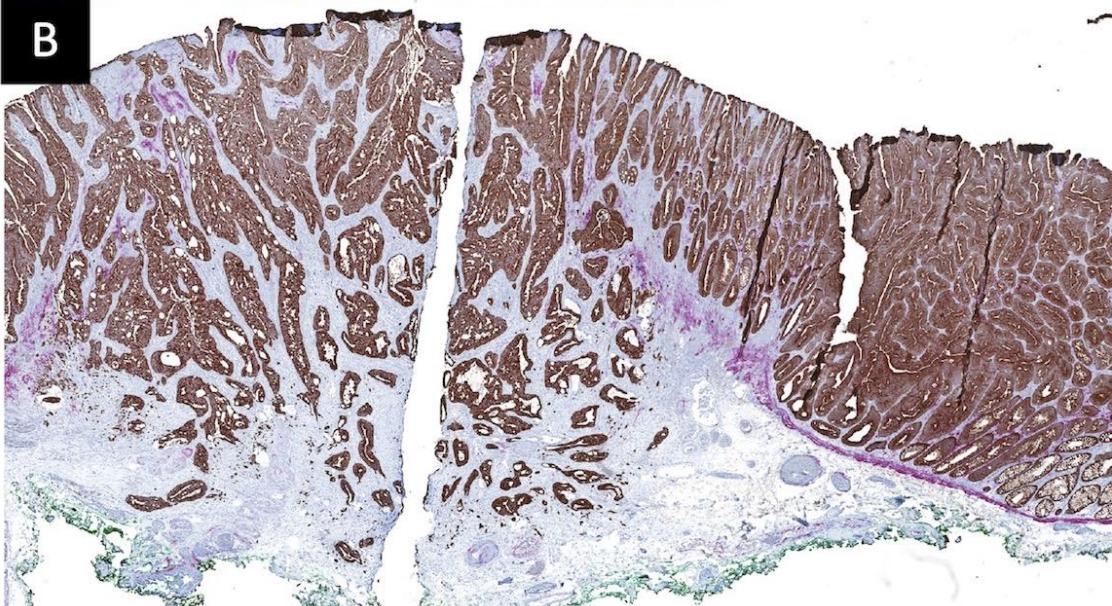
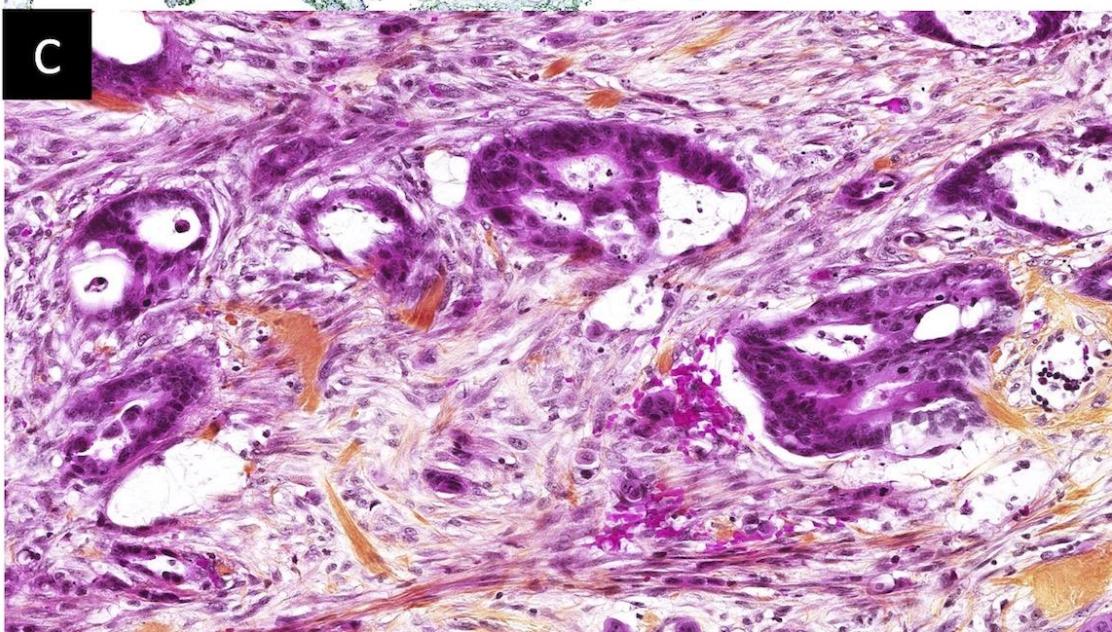
A**B****C**

Figure 4: Microscopic examination of the resection specimen containing invasive cancer. At low power, the colic mucosae is completely destroyed (A x2). Invasive cancer cells, underlined by cytokeratin AE1/AE3 staining, are spreading through the submucosae (B x2, in brown). The invasion into the submucosae is associated with the disappearance of the muscularis mucosae, expressing desmine (B x2, in red). At higher magnification, cancer cells form polyadenoid or cribriform formations and present moderate cyto-nuclear atypia with increased number of mitosis (C x 20).

Video 1: Endoscopic examination of the four colorectal lesions with focal malignancies

Video Text:

- First lesion: granular LST in the sigmoid
- TXI view of the suspicious area (reddish)
- NBI view of the green demarcated area
- Second lesion: non-granular LST in the sigmoid
- NBI view of the central suspicious area demarcated in green
- TXI view of the area (reddish)
- Third lesion: pseudo-depressed polyp in the right colon
- NBI green demarcated area
- Last lesion: granular LST of the caecum
- View of the macronodule
- NBI green demarcated area