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Evaluation of Minimal Change Lesion Using Linked Color Imaging in Non-Erosive Reflux Esophagitis Patients: A Prospective, Multicenter Analysis

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Background: The high prevalence of minimal change lesion (MCL) in non-erosive reflux esophagitis (NERD) patients is commonly recognized by many endoscopists. However, it is difficult to detect MCL with conventional white-light imaging (WLI) endoscopy. Linked color imaging (LCI), a novel image-enhanced endoscopy technologies with strong, unique color enhancement, was used for easy recognition of early gastric cancer and detection of H. pylori infection.

Aims: The aim of this study was to compare the efficacy of LCI and WLI endoscopy for evaluation MCL in NERD patients.

Methods: Totally 176 NERD patients were recruited in this study between 8/2018 and 10/2019. During upper gastrointestinal endoscopy, the distal 5 cm of the esophagus mucosal morphology at the squamo-columnar junction was visualized using WLI followed by LCI. MCL was defined as areas of erythema, blurring of the Z-line, friability, decreased vascularity, white turbid discoloration, and edema or accentuation of the mucosal folds. Three experienced endoscopists evaluated the color patterns for minimal change in collected WLI and LCI images in both groups. Two biopsies were taken from esophagus and stomach at esophagogastric junction. Histological slides were scored by a blinded pathologist. Histological parameters of esophagitis included basal zone thickening, infiltration with neutrophils and eosinophils, microvessel density and elongated papillae. Histological parameters of gastritis included atrophy, intestinal metaplasia, infiltration with neutrophils and lymphocytes.

Results: 1) The MCL detection rate using LCI images was significant higher than that using WLI images (122/176, 69.3% vs 57/176, 32.4%, P<0.001). In 118 NERD patients whose results were normal based on WLI images, MCL was observed in 69 patients using LCI images. 2) Microscopic score in distal esophagus was higher in MCL (+) patients than in MCL (-) patients using LCI images (6.14±0.51 vs. 3.93±0.20, P=0.004). There is no difference in microscopic score for gastric tissue between MCL (+) patients and MCL (-) patients (3.94±0.05 vs. 3.97±0.03, P＞0.05). 3) In all three readers, the detection rates of MCL using LCI images were greater than those using WLI images (P=0.01, 0.007, and 0.004 for readers A, B, and C, respectively)(Table 1). The kappa values for all pairs of three readers using LCI images were between 0.614-0.715, while those using WLI images were between 0.35-0.505.

Conclusion: LCI is more sensitive than WLI in detecting MCL by enhancing endoscopic images in NERD patients and may improve inter-observer agreement.

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Table 1 Intraobserver variability for the endoscopic diagnosis of minimal change using WLI images and LCL images.

		Reader A		Reader B		Reader C	
		LCI image					
	Grade	N	M	N	M	N	M
WLI	N	69	60	56	38	38	76
	M	0	46	0	81	0	69

N: normal; M: MCL

FUJIFILM SUMMARY

Many people have what is called nonerosive reflux disease, or NERD. With NERD, people experience typical GERD symptoms caused by acid reflux, but they do not have any visible esophageal injury. This study evaluated the impact of LCI to detect MCL (minimal change lesion) versus WLI (White Light Imaging).

Key Takeaways:

1. LCI showed significant improvement in the MCL detection rate 69.3% vs WLI of 32.4%.
    i. For all three endoscopists, the MCL detection rate was higher with LCI than WLI.

This study shows a novel use for LCI in MCL detection rate in NERD patients.