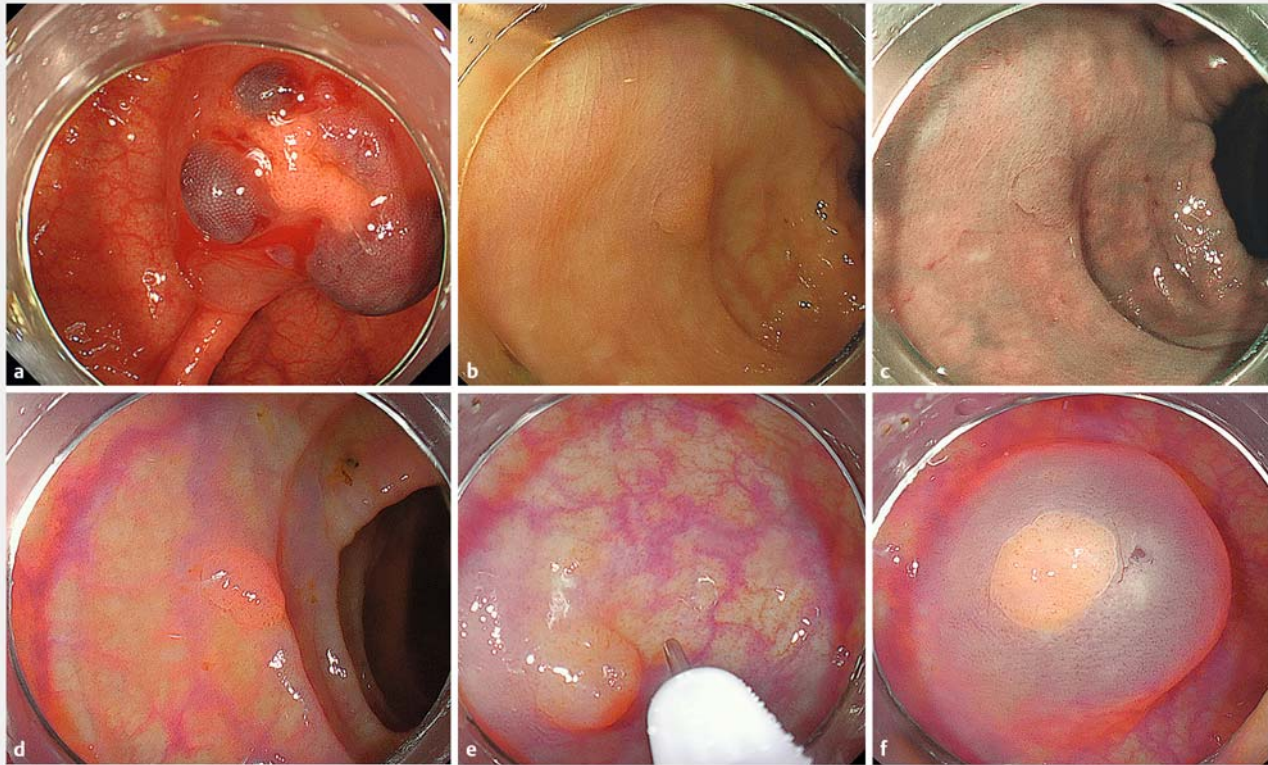


Therapeutic application of linked color imaging for colorectal endoscopic mucosal resection



► **Fig. 1** Endoscopic images illustrating the advantages of linked color imaging (LCI) during endoscopic mucosal resection. **a** Improper injection can induce hematoma formation. **b** Superficial vessels around a colorectal polyp are invisible with white-light imaging. **c** Superficial vessels are also unclear with bright-light imaging. **d** LCI shows the orientation of vessels around the polyp. **e** The injection needle pinpoints a site lacking vessels. **f** Unnecessary hematoma formation and bleeding can be avoided during mucosal injection.

Linked color imaging (LCI; Fujifilm Co., Tokyo, Japan) is a newly developed image-enhanced technique that has shown high diagnostic performance in the field of gastrointestinal endoscopy. LCI enhances color separation of the mucosal layer, making red regions redder and white regions whiter. This contributes to the detection of gastric cancer [1], ulcerative colitis [2], colorectal polyps [3,4], and other lesions. Although the diagnostic productivity is steadfast, the treatment benefit of LCI remains unclear or limited [5]. We herein introduce an advantage of LCI with respect to increasing the safety of endoscopic mucosal resection (EMR),

illustrating the efficacy of LCI in the treatment field.

Compared with white-light imaging, narrow-band imaging, and bright-light imaging, the view of the blood vessels in the superficial layer is much more conspicuous when obtained by LCI. When performing EMR, local injection is the first crucial step and the basis of later procedures such as polyp removal by snaring. However, injury to the superficial vessels invisible with white light sometimes induces hematoma formation, making subsequent snaring difficult (► **Fig. 1 a**). LCI can more precisely reveal the running of the superficial ves-

sels around a colorectal polyp than can white light imaging (► **Fig. 1 b**) and bright-light imaging (► **Fig. 1 c**). LCI enhances the reddish, glaring characteristics of the vessels, pinpointing safe sites for needling (► **Fig. 1 d**). Consequently, the clinician can avoid needling blood vessels near the polyp (► **Fig. 1 e**) and prevent unnecessary bleeding and hematoma formation (► **Fig. 1 f**), leading to secure completion of EMR.

White-light imaging, bright-light imaging, and LCI for EMR local injections are compared in ► **Video 1**. Only LCI shows the reddish network pattern of the superficial blood vessels. This leads



Video 1 White-light imaging only ambiguously shows the blood vessel routes, whereas linked color imaging (LCI) indicates the vessels clearly as a vivid reddish color. From injection to snaring, LCI allows the clinician to avoid unnecessary bleeding.

- [3] Yoshida N, Naito Y, Murakami T et al. Linked color imaging improves the visibility of colorectal polyps: a video study. *Endosc Int Open* 2017; 6: E518–E525
- [4] Min M, Deng P, Zhang W et al. Comparison of linked color imaging and white-light colonoscopy for detection of colorectal polyps: a multicenter, randomized, crossover trial. *Gastrointest Endosc* 2017; 86: 724–730
- [5] Sun XT, Min M, Bi YL et al. Endoscopic submucosal dissection of a rectal neuroendocrine tumor using linked color imaging technique. *Chin Med J (Engl)* 2017; 9: 1127–1128

Bibliography

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to sufficient swelling of the submucosal layer and appropriate removal of colorectal polyps.

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Competing interests

None

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References

- [1] Ono S, Abiko S, Kato M. Linked color imaging enhances gastric cancer in gastric intestinal metaplasia. *Dig Endosc* 2017; 29: 230–231
- [2] Uchiyama K, Takagi T, Kashiwagi S et al. Assessment of endoscopic mucosal healing of ulcerative colitis using linked colour imaging, a novel endoscopic enhancement system. *J Crohns Colitis* 2017; 11: 963–969

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