Endoscopy of Aberrant Crypt Foci: The Expert Approach

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Abstract

Aberrant crypt foci (ACF) were found to be possible precursors of adenoma and cancer, as well as useful surrogate lesions for chemoprevention of colorectal cancer. The aberrant crypts are stained more darkly with methylene blue and have a thicker epithelial lining and a larger pericryptal zone than normal crypts. Recently, advanced endoscopic imaging techniques have been found to be more helpful to improve detection and characterization of ACF in the colon. For inspection of ACF, optimal bowel preparation and a high-resolution endoscope equipped with a magnifying function is required. After spraying plenty of methylene blue, the mucosal surface should be washed with plenty of water to remove the sticky mucus. Once the dark blue spot is recognized with low magnification, zooming up to the maximum point should be performed. This article is part of an expert video encyclopedia.

Keywords

Aberrant crypt foci; Choromoendoscopy; Magnifying endoscopy; Standard endoscopy; Video.

Video Related to this Article

Video available to view or download at doi:10.1016/S2212-0971(13)70156-0

Technique

Methylene blue spray and digital image enhancement with magnifying endoscopy.

Materials

- Endoscope: CF H260AZI and LUCERA CLV-260NBI; Olympus, Tokyo, Japan.
- Solution: 0.25% methylene blue.

Background and Endoscopic Procedure

Aberrant crypt foci (ACF) were described as lesions consisting of large, thick crypts in methylene blue-stained specimens of colon from mice treated with a carcinogen (azoxymethane). ACF similar to those in rodents have also been reported in colonic mucosa in humans, and have been found to be possible precursors of adenoma and cancer, as well as useful surrogate lesions for chemoprevention of colorectal cancer.1–3 However, studies of ACF have mainly analyzed surgical specimens from patients with colon cancer or dissected colonic tissues obtained at autopsy with stereoscopic microscopy. Endoscopy with methylene blue staining reveals a small focus consisting of some crypts with semicircular or oval lumens. The aberrant crypts are stained more darkly and have a thicker epithelial lining and a larger pericryptal zone than normal crypts. Recently, advanced imaging techniques are found to be more helpful to improve detection and characterization of ACF in the colon.

For inspection of ACF, optimal bowel preparation is needed. Careful inspection using high-resolution endoscopes equipped with magnifying function is required. The bowel preparation should be performed by prescribing purgative medicine. It is also important for the endoscopists to wash the mucosal surface with a detergent like simethicone, which has been proven as a good antifoam agent to remove mucus and bubbles. Methylene blue (0.25%) should be sprayed with the spray catheter gently but efficiently to all the targeted areas. After spraying plenty of dye, the endoscopists should wait for more than 2 min until the mucosa is stained sufficiently. Subsequently, they should wash the mucosal surface again with plenty of water to remove the sticky mucus until the real stained mucosa is revealed. Then they should look for dark blue spots with low magnification, because ACF are tiny. Once the dark blue spot is recognized, zooming up to the maximum point should be performed. Narrow band imaging (NBI) could be also useful to detect and differentiate ACF.

Key Learning Points/Tips and Tricks

- Take your time for optimal preparation to remove mucus.
- Gentle and efficient spray of methylene blue.
- Look for slight darker spot with low magnification.
- Use NBI or other digital enhancement technology if available.

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A 68-year-old male with colon cancer was examined. Endoscopists should wash the mucosal surface with a detergent to remove mucus and bubbles.

Then, 0.25% methylene blue should be sprayed with the spray catheter. Wait for at least 2 min until the mucosa is sufficiently stained.

Subsequently, the mucosal surface should be washed again with plenty of water to remove the sticky mucus, until the real stained mucosa is revealed.

Then, look for a dark blue spot with low magnification because ACF are tiny. Once the dark blue spot is recognized, zoom to maximum. The aberrant crypts are stained more darkly and have a thicker epithelial lining and a larger pericryptal zone than normal crypts.