Optical diagnosis and image enhancement

Optical diagnosis and image enhancement

With the assistance of advanced imaging techniques, endosco - pists are now able to characterise colorectal polyps with high diagnostic accuracy . This begins with a white light assessment: polyps larger than 2 /uni00A0 cm with a large sessile component or a depressed region have the highest risk of containing cancer. Application of advanced imaging tec hniques can improve diagnostic accuracy further (Figure 9.15). Dye-based chromoendoscopy involves topical application of stains or pigments to improve mucosal characterisation. Several agents have been described, which can broadly be cate - gorised as absorptiv e (vital) stains, such as methylene blue, and contrast (reactive) stains, such as crystal violet and indigo car - mine. These highlight the mucosal pits, which can aid optical diagnosis; di ff erent lesions demonstrate specific pit patterns. Dye c hromoendoscopy is still widely used and remains the recommended method of dysplasia detection in inflammatory bowel disease . - Narrow band imaging (NBI; Olympus) relies on opti - cal filter technology that radically improves the visibility of

(a) and,

capillaries, veins and other subtle tissue structures by optimis ing the absorbance and scattering characteristics of light. NBI uses two discrete bands of light: one blue at 415 /uni00A0 nm and one green at 540 /uni00A0 nm. Narrow band blue light displays superficial capillary netw orks, whereas green light displays subepithelial vessels; when combined they o ff er an extremely high contrast image of the tissue surface. Similar modalities such as i-Scan (Pentax) and Blue Light Imaging (BLI; Fujifilm) are also avail able. Dye-based and digital enhancement, particularly when combined with magnification endoscopy , can di ff erentiate between hyperplastic, serrated, adenomatous and malignant pathology . Combining this with a detailed white light assess - ment allows endoscopists to determine endoscopic resectabil - ity , avoiding more extensive surgery in some cases.

(b) (c) Figure 9.15 Endoscopic diagnostic accuracy can be improved by novel endoscopic

techniques. This duodenal adenoma can be seen with conventional white light (a) (arrow), but its full extent is more clearly delineated using narrow band imaging (b) or chromoendos copy with indigo carmine (c) . (b) Figure 9.16 Colonoscopy is the most appropriate investigation to detect colonic polyps (a) , which can be removed by snare polypec

tomy during the same procedure, leaving a clean polyp base (b) .

Optical diagnosis and image enhancement

With the assistance of advanced imaging techniques, endosco - pists are now able to characterise colorectal polyps with high diagnostic accuracy . This begins with a white light assessment: polyps larger than 2 /uni00A0 cm with a large sessile component or a depressed region have the highest risk of containing cancer. Application of advanced imaging tec hniques can improve diagnostic accuracy further (Figure 9.15). Dye-based chromoendoscopy involves topical application of stains or pigments to improve mucosal characterisation. Several agents have been described, which can broadly be cate - gorised as absorptiv e (vital) stains, such as methylene blue, and contrast (reactive) stains, such as crystal violet and indigo car - mine. These highlight the mucosal pits, which can aid optical diagnosis; di ff erent lesions demonstrate specific pit patterns. Dye c hromoendoscopy is still widely used and remains the recommended method of dysplasia detection

in inflammatory bowel disease . - Narrow band imaging (NBI; Olympus) relies on opti - cal filter technology that radically improves the visibility of

(a) and,

capillaries, veins and other subtle tissue structures by optimis ing the absorbance and scattering characteristics of light. NBI uses two discrete bands of light: one blue at 415 /uni00A0 nm and one green at 540 /uni00A0 nm. Narrow band blue light displays superficial capillary netw orks, whereas green light displays subepithelial vessels; when combined they o ff er an extremely high contrast image of the tissue surface. Similar modalities such as i-Scan (Pentax) and Blue Light Imaging (BLI; Fujifilm) are also avail able. Dye-based and digital enhancement, particularly when combined with magnification endoscopy , can di ff erentiate between hyperplastic, serrated, adenomatous and malignant pathology . Combining this with a detailed white light assess - ment allows endoscopists to determine endoscopic resectabil - ity , avoiding more extensive surgery in some cases.

(b) (c) Figure 9.15 Endoscopic diagnostic accuracy can be improved by novel endoscopic techniques. This duodenal adenoma can be seen with conventional white light (a) (arrow), but its full extent is more clearly delineated using narrow band imaging (b) or chromoendos copy with indigo carmine (c) . (b)

Figure 9.16 Colonoscopy is the most appropriate investigation to detect colonic polyps (a) , which can be removed by snare polypec

tomy during the same procedure, leaving a clean polyp base (b) .

Optical diagnosis and image enhancement

With the assistance of advanced imaging techniques, endosco - pists are now able to characterise colorectal polyps with high diagnostic accuracy . This begins with a white light assessment: polyps larger than 2 /uni00A0 cm with a large sessile component or a depressed region have the highest risk of containing cancer. Application of advanced imaging tec hniques can improve diagnostic accuracy further (Figure 9.15). Dye-based chromoendoscopy involves topical application of stains or pigments to improve mucosal characterisation. Several agents have been described, which can broadly be cate - gorised as absorptiv e (vital) stains, such as methylene blue, and contrast (reactive) stains, such as crystal violet and indigo car - mine. These highlight the mucosal pits, which can aid optical diagnosis; di ff erent lesions demonstrate specific pit patterns. Dye c hromoendoscopy is still widely used and remains the recommended method of dysplasia detection in inflammatory bowel disease . - Narrow band imaging (NBI; Olympus) relies on opti - cal filter technology that radically improves the visibility of

(a) and,

capillaries, veins and other subtle tissue structures by optimis ing the absorbance and scattering characteristics of light. NBI uses two discrete bands of light: one blue at 415 /uni00A0 nm and one green at 540 /uni00A0 nm. Narrow band blue light displays superficial capillary netw orks, whereas green light displays subepithelial vessels; when combined they o ff er an extremely high contrast image of the tissue surface. Similar modalities such as i-Scan (Pentax) and Blue Light Imaging (BLI; Fujifilm) are also avail able. Dye-based and digital enhancement, particularly when combined with magnification endoscopy , can di ff erentiate between hyperplastic, serrated, adenomatous and malignant pathology . Combining this with a detailed white light assess - ment allows endoscopists to determine endoscopic resectabil - ity , avoiding more extensive surgery in some cases.

(b) (c) Figure 9.15 Endoscopic diagnostic accuracy can be improved by novel endoscopic techniques. This duodenal adenoma can be seen with conventional white light (a) (arrow), but its full extent is more clearly delineated using narrow band imaging (b) or chromoendos copy with indigo carmine (c) . (b) Figure 9.16 Colonoscopy is the most appropriate investigation to detect colonic polyps (a) , which can be removed by snare polypec

tomy during the same procedure, leaving a clean polyp base (b) .

Revision #1
Created 2025-12-31 15:32:08 UTC by Omar Ayman
Updated 2025-12-31 15:32:08 UTC by Omar Ayman