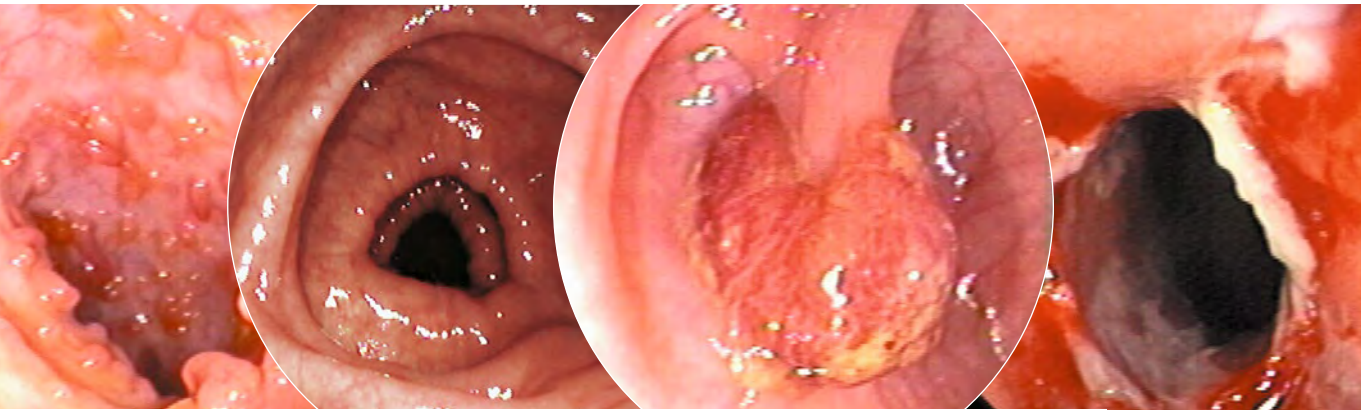
Inflammatory Bowel Diseases

Endoscopic Diagnostics



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Preface

Dear colleagues,

Endoscopies – in particular colonoscopies – are key to the diagnosis of inflammatory bowel disease. They allow us to inspect the affected areas of the intestine and to collect samples for histological confirmation of the diagnosis. Endoscopies are also a valuable tool for detecting and treating complications (e.g. stenosis, fistulae or cancer) and for evaluating the success of the treatment ("mucosal healing").

This brochure, "Inflammatory Bowel Diseases – Endoscopic Diagnostics", was first published in 1988 by Prof. Dr. Hans-Dieter Kuntz (Bochum) and my clinical instructor Prof. Dr. Burkard May (Bochum). After the untimely passing of H.-D. Kuntz, Dr. Dr. Herbert Falk entrusted me in 1998 with the work of continuing this treatise.

In the intervening years, the brochure has undergone a number of necessary changes in order to reflect developments in modern endoscopic technology and to summarise current European guidelines.

I hope that the redesigned edition of this work will once again be well received by a wide audience of interested observers and readers.

Andreas Tromm

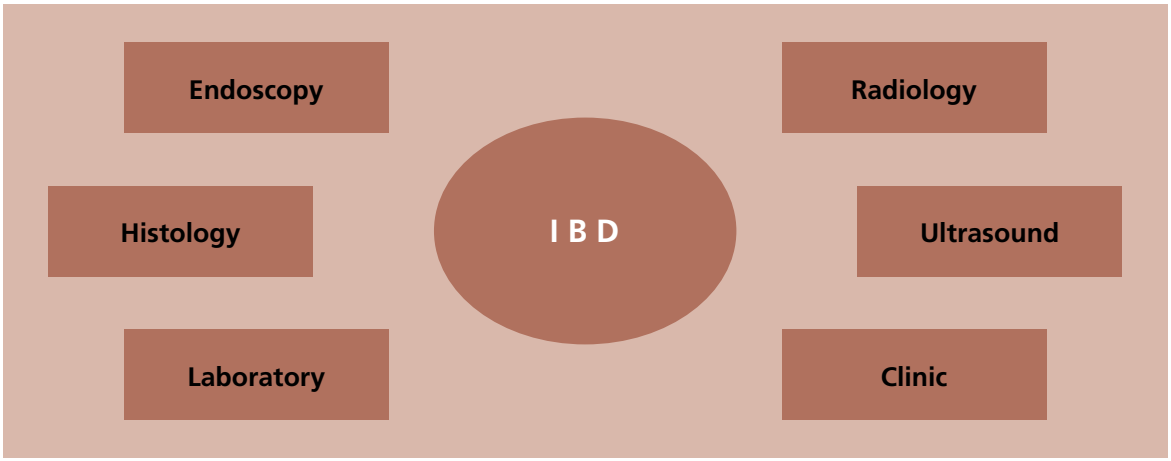
Hattingen (Germany), August 2026

General notes on colonoscopy

The diagnosis of Crohn's disease and ulcerative colitis is based on a combination of clinical symptoms, laboratory tests, endoscopy, histology and imaging. Within this multimodal approach, ileocolonoscopy remains a cornerstone investigation, as it allows direct visual examination of the rectal, colonic and terminal ileal mucosa and enables targeted biopsies for diagnosis, assessment of inflammatory activity, and differential diagnosing [1, 2].

Scope and role of endoscopy within multimodal assessment

The 2025 update to the European Crohn's and Colitis Organisation (ECCO) evidence-based guidelines recommends ileocolonoscopy with biopsies, together with cross-sectional imaging in the form of intestinal ultrasound (IUS) and/or magnetic resonance enterography (MRE) as first-line examinations when IBD is suspected. Unless contraindi-



Multimodal diagnosis of IBD

cated, the initial endoscopic examination should comprise a full colonoscopy with intubation of the terminal ileum. This recommendation is echoed in guidelines published by the British Society of Gastroenterology (BSG) which highlight ileocolonoscopy as a first-line investigation of suspected Crohn's disease, including ileocolonic biopsies and standardized endoscopic scoring. In Crohn's disease, the ECCO and BSG guidelines also recommend cross-sectional imaging and capsule endoscopy of the small bowel to assess clinically relevant disease beyond the reach of ileocolonoscopy [1, 2].

The choice of endoscopic procedure should be based on clear and careful framing of the clinical question. Both the ECCO and BSG guidelines stress that a full ileocolonoscopy should only be performed provided there is no contraindication, such as severe colitis or a tight stricture, and when it is clinically safe to do so [1, 2]. In acute severe ulcerative colitis, early flexible sigmoidoscopy is recommended during the initial phase, with a full ileocolonoscopy planned for later to determine disease extent [2]. Cross-sectional imaging is recommended in Crohn's disease to assess strictures and detect penetrating disease and intra-abdominal abscesses [1].

Technical execution of high-quality ileocolonoscopy

Planning and preparation

Prior to the ileocolonoscopy, the patient should be assessed with respect to physical status and current disease activity, including features suggesting an obstruction or penetrating disease. Optimal bowel preparation is required for the procedure to be successful; the ECCO guidelines recommend use of a split-dose polyethylene glycol (PEG)-based agent for optimal mucosal visualization and to facilitate chromoendoscopy. PEG-based preparations are preferred over sodium phosphate, since the latter have been linked with aphthous ulceration. The study data reviewed by ECCO indicated no significant difference in cleansing quality between low-volume PEG with an adjuvant and high-volume PEG, although low-volume regimens were more acceptable to patients [3].

According to the ECCO guidelines, the use of sedation should be guided by the pre-procedure assessment, local expertise, available resources and patient preference. Sedation may be administered by the endoscopist or with anesthesiology support, depending on local practice and procedural

complexity. Common approaches include benzodiazepine- and opioid-based sedation, typically using midazolam and fentanyl, as well as propofol-based sedation for routine, advanced or prolonged procedures [3–5].

To ensure high-quality endoscopy results, it is important to allocate adequate procedure time and appropriately trained staff. A 2019 IBD review of quality indicators for surveillance colonoscopy in IBD proposed a slot of at least 45 minutes [4]. A 2024 update of guidelines published by the European Society of Gastrointestinal Endoscopy (ESGE) stress that resources should be available for managing potential serious complications of colonoscopy including perforation and bleeding. The endoscopy facility should also be equipped to manage cardiovascular and pulmonary complications of prolonged sedation of patients with significant comorbidities [6].

Assessment and activity scoring

At the initial diagnosis of IBD, the ileocolonoscopy should include the rectum, all colonic segments and, unless contraindicated, the terminal ileum. Histological assessment is an integral part of the initial investigation of suspected IBD, even when the diagnosis appears endoscopically straightforward. Importantly, key differential diagnoses such as microscopic colitis may have a normal or near-normal endoscopic appearance and cannot be excluded by visual inspection alone. To optimize diagnostic accuracy, a minimum of two biopsy specimens each should be taken from the ileum and four different colonic segments, including the rectum, for the purpose of initial diagnosis and assessment. Intra-lesion biopsies should be taken from abnormal, non-ulcerated mucosa or, if no mucosal abnormality is visible in a segment, from normal-appearing mucosa. Specimens from different segments should be separated and labeled with the anatomical site. The pathology request should provide adequate clinical information, including the nature and duration of symptoms, relevant previous diagnoses, current endoscopic findings, and any systemic or topical treatment already received [1, 2, 7].

An endoscopic index should be used routinely to standardize reporting of disease activity. For ulcerative colitis, established and widely accepted instruments include the Mayo Endoscopic Score and the Ulcerative Colitis Endoscopic Index of Severity. For Crohn's disease, the Crohn's Disease

Endoscopic Index of Severity and the Simple Endoscopic Score for Crohn's Disease are validated and reproducible measures of luminal endoscopic activity [3].

Documentation and follow-up

The endoscopy report should provide sufficient detail to guide management and allow subsequent examinations to be compared reliably. It should state the most proximal extent reached and include photographic confirmation of key anatomical landmarks and representative inflammatory changes, strictures, postoperative anatomy and focal lesions. The ECCO guidelines suggest an electronic endoscopy reporting system that incorporates key quality indicators, preferably integrated with the hospital electronic patient record and including image documentation of key lesions. A list of proposed quality indicators for the endoscopy report include identifying the bowel preparation quality, sedation, extent of examination, disease extent and activity using a standardized score, lesions and their location, visualization and resection techniques, and the number and location of biopsies. Clear follow-up instructions should also be provided [3, 4].

Diagnosing inflammatory bowel disease

No single symptom, biomarker, endoscopic feature or histological finding can confirm ulcerative colitis or Crohn's disease in isolation. As outlined above, the IBD diagnosis rests on a combination of clinical presentation, laboratory tests, stool testing, ileocolonoscopy with systematic biopsies, and cross-sectional imaging. Unless contraindicated, the initial endoscopic assessment should be a full colonoscopy with intubation of the terminal ileum. Biopsies should be obtained from the terminal ileum and from each colonic segment, including the rectum, even when the macroscopic appearance seems characteristic [1, 2]. The diagnosis should integrate the endoscopic distribution and activity score with histology, biomarkers and imaging, acknowledging any inconsistencies rather than forcing them onto a specific label. Clear documentation of uncertainty makes subsequent review and reclassification safer and more informative [3].

Ulcerative colitis

Presentation and classification

Ulcerative colitis usually produces diffuse, continuous inflammation extending proximally from the rectum. Typical findings include erythema or granularity, loss of the normal vascular pattern, friability, superficial ulceration and a visible demarcation between involved and uninvolved mucosa. The distribution may be modified by treatment, and macroscopic inspection can underestimate the true extent, particularly in quiescent disease; segmental histology is therefore essential [1, 2].

The extent of ulcerative colitis should be classified using the Montreal criteria (Table 1). The classification should be based on the maximal endoscopically confirmed extent during follow-up even if the visible inflammation later regresses, since the disease extent has implications for prognosis and colorectal cancer risk [2, 8, 9]. In cases where acute severe colitis is the first presentation, an unprepared flexible sigmoidoscopy is preferred during the acute phase; a full colonoscopy to determine extent should be planned once it is safe [2].

Table 1. Montreal classification of extent of ulcerative colitis [8, 9]

E1	ulcerative proctitis	involvement limited to rectum (rectosigmoid junction)
E2	left sided (distal) ulcerative colitis	involvement limited to portion of colorectum distal to splenic flexure
E3	extensive ulcerative colitis (pancolitis)	involvement extends proximal to splenic flexure

Endoscopic diagnosis and activity scoring

The initial endoscopy assessment should identify the most proximal extent of continuous inflammation and describe any departure from the expected distribution. Relevant features include vascular-pattern loss, erythema or granularity, contact or spontaneous bleeding, friability, erosions and ulcers [1–3]. Endoscopic scoring systems commonly used in ulcerative colitis include the Mayo Endoscopic Score (MES) and the Ulcerative Colitis Endoscopic Index of Severity (UCEIS) (Table 2). These are established and widely accepted instruments; the MES is easy to use and widely implemented, but its categories overlap at the boundary between remission and mild activity, and it does not incorporate disease extent, whereas the UCEIS provides a more structured assessment and is validated, but it also omits anatomical extent and has no universally accepted definition of endoscopic remission within the score itself. Whichever system is selected, the same score should be used consistently during repeated examinations [2, 3, 10–12].

Routine capsule endoscopy or upper-gastrointestinal endoscopy is not part of the diagnostic pathway for an otherwise typical presentation of ulcerative colitis. The terminal ileum should nevertheless be examined during initial ileocolonoscopy, and small-bowel or upper-gastrointestinal investigation becomes relevant when the distribution is atypical and/or Crohn's disease remains a concern [1, 2].

Table 2. Endoscopic scoring systems used in ulcerative colitis [10–12]

Mayo Endoscopic Score

Score	Disease activity	Endoscopic features
0	normal or inactive	none
1	mild	erythema, decreased vascular pattern, mild friability
2	moderate	marked erythema, lack of vascular pattern, friability, erosions
3	severe	spontaneous bleeding, large ulcerations

Ulcerative Colitis Endoscopic Index of Severity

Descriptor (score of most severe lesions)	Likert scale anchor points	Definition
Vascular pattern	Normal (0)	Normal vascular patterns with arborization of capillaries clearly defined or with blurring or patchy loss of capillary margins
	Patchy obliteration (1)	Patchy obliteration of vascular pattern
	Obliterated (2)	Complete obliteration of vascular pattern
Bleeding	None (0)	No visible blood
	Mucosal (1)	Some spots or streaks of coagulated blood on the surface of the mucosa ahead of the scope, which can be washed away
	Luminal mild (2)	Some free liquid blood in the lumen
	Luminal moderate or severe (3)	Frank blood in the lumen ahead of endoscope or visible oozing from mucosa after washing intraluminal blood, or visible oozing from a haemorrhagic mucosa
Erosions and ulcers	None (0)	Normal mucosa, no visible erosions or ulcers
	Erosions (1)	Tiny (≤ 5mm) defects in the mucosa, of a white or yellow color with a flat edge
	Superficial ulcer (2)	Larger (>5 mm) defects in the mucosa, which are discrete fibrin-covered ulcers in comparison with erosions, but remain superficial
	Deep ulcer (3)	Deeper excavated defects in the mucosa, with a slightly raised edge

Crohn's disease

Presentation and classification

Crohn's disease is suggested by a discontinuous distribution of inflammation, skip lesions, rectal sparing, terminal ileal involvement, aphthous or deep ulcers, serpiginous ulceration and cobblestoning. These features should be considered in the context of histology and imaging findings: superficial ileocolonoscopy cannot define the full thickness of inflammation or reliably identify all extramural disease, and the absence of granulomas does not exclude Crohn's disease [1, 2].

The initial assessment should establish age at diagnosis, disease location and disease behavior using the Montreal classification (Table 3). This classifi-

Table 3. Montreal classification for Crohn's disease [8, 9]

Age at diagnosis	A1	16 years or younger
	A2	17–40 years
	A3	over 40 years
Location	L1	terminal ileum
	L2	colon
	L3	ileocolon
	L4	upper gastrointestinal tract*
Behavior	B1	non-stricturing, non-penetrating
	B2	stricturing
	B3	penetrating
	p	perianal disease modifier†

*added to L1–L3 when concomitant upper gastrointestinal disease is present
†added to B1–B3 when concomitant perianal disease is present

cation describes the presenting phenotype, rather than fixed disease states. Location is generally recorded according to the maximal extent identified before the first resection, while behavior should be reviewed over time because less severe disease may progress to a stricturing or penetrating phenotype [2, 8, 9].

Endoscopic diagnosis and activity scoring

When Crohn's disease is suspected, the initial ileocolonoscopy assessment should focus on describing the examined segments, including the terminal ileum, in terms of the distribution and size of ulcers, the proportion of mucosa affected, skip areas, cobblestoning, and any narrowing. For a stricture, the location, estimated length, degree of narrowing, traversability, ulceration and biopsy findings should be documented; cross-sectional imaging remains necessary to characterize mural and extramural disease. Perianal findings should be recorded separately from luminal disease [1–3]; because fistulizing disease may represent the initial manifestation of Crohn's disease, the ECCO guidelines emphasize that patients presenting with isolated perianal fistulas should undergo ileocolonoscopy and small-bowel imaging if their clinical history is consistent with IBD or there are fistula features suggestive for CD [1].

The Crohn's Disease Endoscopic Index of Severity (CDEIS; Table 4) and Simple Endoscopic Score for Crohn's Disease (SES-CD; Table 5) are validated and reproducible measures of luminal activity. The CDEIS is detailed and reliable but requires precise recording and training, which limits its practicality in routine care. The SES-CD is simpler and more widely applicable, although it can be less sensitive to subtle or mild disease and has limitations in isolated small-bowel disease [3, 13, 14].

All patients with newly diagnosed Crohn's disease should undergo small-bowel assessment with cross-sectional imaging, to detect mural and extramural disease beyond the reach of ileocolonoscopy. In cases where Crohn's disease remains suspected despite normal or inconclusive ileocolonoscopy and cross-sectional imaging, small-bowel capsule endoscopy may be considered as this provides direct mucosal views and may detect subtle or proximal lesions that are less conspicuous on cross-sectional imaging [1–3]. Device-assisted enteroscopy should be reserved for selected patients when direct biopsy of a small-bowel lesion is needed, when capsule or imaging findings require

Table 4. The Crohn's Disease Endoscopic Index of Severity [13]

	Rectum	Sigmoid and left colon	Transverse colon	Right colon	Ileum	Total score	
Deep ulceration *If present score 12* *If absent score 0*							
Superficial ulceration *If present score 6* *If absent score 0*							
Surface involved by the disease (cm)							
Ulcerated surface (cm)							
					Total		A
					Number of segments totally or partially explored (1–5)		n
					Total A divided by n		B
					Ulcerated stenosis *If present anywhere score 3* *If absent score 0*		C
					Non-ulcerated stenosis *If present anywhere score 3* *If absent score 0*		D
					Total B + C + D		

Table 5. Simple Endoscopic Score for Crohn's Disease (SES-CD) [14]

Variable	0	1	2	3
Size of ulcers	None	Aphthous ulcers (0.1–0.5 cm)	Large ulcers (0.5–2 cm)	Very large ulcers (> 2 cm)
Ulcerated surface	None	< 10 %	10 –30 %	> 30 %
Affected surface	Unaffected	< 50 %	50 –75%	> 75 %
Presence of narrowings	None	Single, can be passed	Multiple, can be passed	Cannot be passed

clarification, or when an endoscopic intervention, such as balloon dilation of a stenosis, is considered [1, 2].

Upper-gastrointestinal endoscopy should be considered in newly diagnosed Crohn's disease, especially when symptoms suggest involvement of the esophagus, stomach, and duodenum [1, 2]. When upper-gastrointestinal endoscopy is performed, biopsies may help determine the presence and severity of inflammation. Histological changes are often non-specific; however, in a patient with known or suspected Crohn's disease, granulomas strongly support upper gastrointestinal involvement. In the same way as in the large bowel, a normal upper-gastrointestinal endoscopy does not exclude small-bowel Crohn's disease [1].

IBD unclassified

Some patients present with overlapping clinical, endoscopic and pathological features and cannot initially be classified with any degree of certainty as Crohn's disease or ulcerative colitis. The term IBD unclassified (IBDU) is applicable in this situation. Before a diagnosis of IBDU is proposed, the biopsy specimens should be reviewed by an experienced gastrointestinal pathologist with access

to the clinical, endoscopic, imaging and treatment history. If uncertainty persists, and reclassification may have an impact on for example the management of treatment-refractory disease and/or surgery decision, further assessments may include repeat ileocolonoscopy with biopsies, upper-gastrointestinal endoscopy, small-bowel imaging and capsule endoscopy. The diagnosis and phenotype should be revisited rather than treated as permanently fixed [1].

Differential diagnosis of inflammatory bowel disease

No endoscopic appearance is diagnostic of IBD in isolation. Infection, drug-induced injury, vascular disorders, diverticular disease, diversion proctocolitis, radiation damage, immune disorders and neoplasia may all resemble ulcerative colitis or Crohn's disease. Some may also coexist with established IBD. The differential diagnosis should be addressed by integrating clinical history, endoscopic distribution, histology, microbiology and cross-sectional imaging rather than reliance on a single lesion, biomarker or histological finding. A full clinical and exposure history is central to this assessment, including the onset and duration of symptoms, current and recent medications, antibiotic and non-steroidal anti-inflammatory drug (NSAIDs) exposure, travel, tuberculosis risk, sexual history, immune status, previous abdominal or pelvic radiotherapy and gastrointestinal surgery. The pathology request should include information on whether IBD is newly suspected or previously treated, together with symptoms, endoscopic distribution, and other relevant conditions and systemic or topical therapies, since treatment can alter both the anatomical distribution and the microscopic features of IBD [1, 2, 15].

Differential diagnosing remains relevant even after the IBD diagnosis has been confirmed. New-onset diarrhea or bleeding may indicate active IBD, but could also stem from a superimposed infection, medication-related injury, or another gastrointestinal disorder. Symptoms may also persist without any objective signs of inflammation. Reassessment should be proportionate to severity and may combine ileocolonoscopy with biomarkers and cross-sectional imaging as appropriate. When clinical, endoscopic and histological findings remain contradictory, this uncertainty should be recorded, rather than pushing for a diagnosis of Crohn's disease or ulcerative colitis. Biopsy review by an experienced gastrointestinal pathologist, with access to the full clinical and endoscopic information, may clarify the diagnosis. Repeat ileocolonoscopy, small-bowel imaging, capsule endoscopy or targeted enteroscopy should be selected only when the result is likely to change classification or management [1, 2, 15].

Differential diagnoses of ulcerative colitis

Infective colitis

Gastrointestinal infection should be excluded at the initial assessment and whenever a patient with confirmed IBD develops a symptomatic flare. The ECCO guidelines recommend microbiological stool analysis for pathogens that can mimic IBD, including *Clostridioides difficile*, *Shigella*, *Campylobacter jejuni*, *Escherichia coli* and *Yersinia enterocolitica*, as appropriate according to the clinical and epidemiological context and local practice [1, 2, 15].

Acute bacterial enterocolitis commonly produces non-specific endoscopic inflammation, whereas chronic infection, infection in an immunocompromised patient and infectious proctitis may be more difficult to separate from IBD. An infection with *C. difficile* is especially challenging, since it may present like active colitis and may coexist with IBD. In ulcerative colitis with new or worsening gastrointestinal symptoms, alternative causes including *C. difficile* should be excluded before symptoms are attributed solely to inflammatory activity. In acute severe colitis, stool culture and *C. difficile* testing should be obtained promptly alongside the initial limited colonoscopy [1, 2, 15].

Cytomegalovirus-associated colitis

Cytomegalovirus (CMV) should be considered in acute severe colitis and steroid-refractory ulcerative colitis, particularly in hospitalized or immunocompromised patients. Endoscopic appearances range from normal mucosa or erosions to large, deeply infiltrating ulcers. Flexible sigmoidoscopy allows assessment of severity and collection of tissue for CMV evaluation. The ECCO guidelines recommend tissue polymerase chain reaction (ideally in combination with a blood-based test) or immunohistochemistry as the preferred tissue-based tests; blood samples may be supportive but cannot replace tissue findings in a clinical context [1, 2, 15].

Drug-induced colitis

Drug-related mucosal injury can mimic IBD endoscopically and histologically, and drugs may also trigger symptoms in established disease. Endoscopic findings are usually non-specific and may include erythema, edema, erosions and ulcers. Histology can resemble patterns including microscopic, ischemic, pseudomembranous, eosinophilic or IBD-like colitis. An increasingly prevalent example is immune checkpoint inhibitor-associated

enterocolitis, where diffuse distal disease or pancolitis may resemble ulcerative colitis, whereas patchy disease or ileitis may resemble Crohn's disease [2, 15].

Ischemic colitis

Ischemic enterocolitis is suggested by sudden-onset abdominal pain, rectal bleeding or bloody diarrhea, particularly in older patients with cardiovascular comorbidity or following a vascular event. In younger patients, drug exposure and vasculitis are relevant considerations. Endoscopy may show petechial hemorrhage, edema, friability, segmental erythema, scattered erosions, longitudinal ulcers and sharply demarcated segments, typically affecting the left colon. Findings should be interpreted alongside histology and cross-sectional or vascular imaging [2, 15].

Diverticulitis

Diverticular colitis, also termed segmental colitis associated with diverticulosis (SCAD), may closely resemble IBD. The characteristic distribution is inflammation of the interdiverticular mucosa, usually with sparing of the diverticular orifices and rectum. Endoscopic severity ranges from mild erythema and edema to loss of vascular pattern, erosions and ulceration. The distribution of diverticula and inflammation should be documented, and the rectum should be examined and biopsied separately because histology alone may not distinguish diverticular colitis from IBD [15].

Microscopic colitis

Microscopic colitis is a relevant differential diagnosis for patients presenting with chronic watery, typically nocturnal, non-bloody diarrhea that persists despite a normal or almost normal endoscopic appearance. Microscopic colitis is diagnosed from histology; European evidence-based guidelines published in 2020 recommend ileocolonoscopy with biopsies from at least the right and left colon; a macroscopically normal colon does not constitute complete diagnostic assessment of chronic diarrhea [7].

Differential diagnosis of Crohn's disease

Infection in the ileum or small bowel

Infective ileitis or enterocolitis may resemble the symptoms, endoscopic inflammation and histological changes typically associated with Crohn's disease. *Y. enterocolitica* and *Y. pseudotuberculosis* characteristically affect the ileocecal region and may cause aphthoid or irregular ulcers, lymphoid hyperplasia and granulomatous inflammation. Architectural disturbance and basal plasmacytosis point toward IBD, but histology and microbiological testing remain essential [1, 2, 15].

Intestinal tuberculosis

Intestinal tuberculosis most often affects the ileocecal region and can closely mimic ileocolonic Crohn's disease. Transverse or circumferential ulcers, a patulous ileocecal valve, a thickened fibrotic wall and luminal narrowing suggest tuberculosis, whereas longitudinal ulcers, cobblestoning and perianal disease favor Crohn's disease. Assessment should combine exposure and travel history, endoscopy, biopsies, culture, polymerase chain reaction (PCR), and imaging [1, 2, 15].

NSAID-associated enteropathy

NSAID-associated injury is an important alternative explanation for small-bowel erosions or ulceration. Aside from diaphragm disease, which strongly suggests NSAID injury, no macroscopic or microscopic feature reliably separates NSAID enterocolitis from IBD; a comprehensive medication history is therefore essential. Severe architectural distortion, basal plasmacytosis, marked inflammation or classic transmural lymphoid aggregates favor IBD or another diagnosis. The ECCO guidelines recommend that NSAIDs should be avoided for at least four weeks before capsule endoscopy; chronic NSAID use is also recognized as a risk factor for capsule retention [3, 15].

Neoplasia and focal or stricturing disease

A mass, focal narrowing or obstruction should not routinely be interpreted as inflammatory or fibrostenotic Crohn's disease. Small-bowel lymphoma, colorectal carcinoma and other mass lesions can mimic IBD clinically, radiologically or histologically. Endoscopic biopsies should be integrated with cross-sectional imaging; if superficial sampling is non-diagnostic and uncertainty would

alter treatment, repeat targeted sampling or device-assisted enteroscopy may be advisable in selected patients [2, 3, 15].

Colorectal carcinoma may coexist with, complicate or be mistaken for colonic IBD. At the point of diagnosis, any suspicious lesion or stricture should be clearly documented and sampled for subsequent correlation with imaging and histology. Excluding malignancy at diagnosis is distinct from subsequent colorectal cancer surveillance and dysplasia management [2, 15].

Monitoring inflammatory bowel disease

Once IBD has been diagnosed, subsequent disease monitoring should combine symptoms and patient-reported outcomes with biomarkers and objective assessment of intestinal inflammation. Symptoms alone may not reflect endoscopic activity, particularly in Crohn's disease, and clinical remission does not necessarily mean that mucosal inflammation has resolved. Endoscopy remains the standard of care for assessing luminal disease activity and healing, but should be used in the context of a multimodal approach rather than as a single monitoring modality [1–3].

Ulcerative colitis

After treatment initiation or optimization following a diagnosis of ulcerative colitis, ECCO recommends early assessment of clinical, biochemical and endoscopic or ultrasonographic response within 12 weeks. The disease activity and extent should be described systematically and graded with a validated score, such as the MES or UCEIS. In clinical practice, the exact endoscopic timing depends on the treatment and clinical need; many induction studies assess endoscopic remission at approximately three months. In stable remission, patient-reported outcomes, biomarkers such as fecal calprotectin and C-reactive protein, and/or IUS may be used for risk-stratified monitoring. Endoscopy outside colorectal cancer surveillance is generally reserved for situations in which objective findings are discordant, relapse is suspected, a substantial treatment change is being considered or confirmation of disease control would alter management [1].

Crohn's disease

In Crohn's disease, ECCO recommends clinical, biochemical and cross-sectional imaging assessment within 12 weeks of a treatment change, with endoscopic response assessed within 12 months. Endoscopic activity should be recorded using a validated index, most commonly the SES-CD or the CDEIS. Since endoscopy can assess the mucosal surface but not the full transmural or extraluminal burden of Crohn's disease, cross-sectional imaging should complement endoscopy when stricturing, penetrating, small-bowel or perianal disease is relevant. In clinical remission, ECCO advises pro-

active assessment for subclinical inflammation with patient-reported outcomes, biomarkers and cross-sectional imaging every 6–12 months; endoscopy is then indicated when results are discordant, when treatment withdrawal or a major change in treatment is contemplated, or when direct mucosal assessment is otherwise likely to influence management [1].

Postoperative Crohn's disease

For Crohn's disease patients who have undergone ileocecal resection, ileocolonoscopy assessment of the anastomosis and neo-terminal ileum is recommended within the first postoperative year. The ECCO guidelines specify 6–12 months after surgery, whereas the BSG describes assessment at six months as current best practice. ECCO points out that while non-invasive monitoring based on biomarkers and cross-sectional imaging at 3–6 months may help detect earlier recurrence and guide the need for further investigation, endoscopy remains the gold standard for postoperative monitoring of Crohn's disease [1, 2].

Colorectal cancer surveillance

A screening colonoscopy should be performed 8 years after the onset of IBD symptoms to reassess disease extent and exclude dysplasia. Patients with disease confined to the rectum and no previous or current proximal inflammation, and those with isolated small-bowel disease, do not require an additional IBD-specific surveillance program; instead, national colorectal cancer screening guidelines should be followed. In patients with primary sclerosing cholangitis (PSC), annual surveillance should begin when PSC is diagnosed, irrespective of the duration, extent or activity of ulcerative colitis, and should continue after liver transplantation [1, 2, 16].

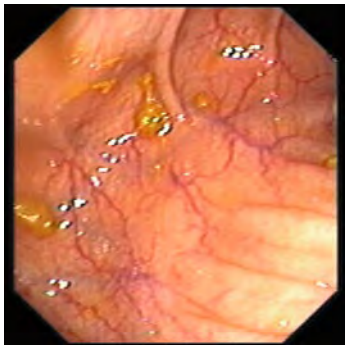
Subsequent intervals should reflect the risk of colorectal cancer: annual surveillance for high risk, 2–3 years for intermediate risk, and 5 years when neither category applies. High-risk features include PSC, a colonic stricture or dysplasia, colorectal cancer in a first-degree relative aged ≤ 50 years, and extensive colitis with severe active inflammation. Whenever possible, surveillance should be performed when inflammation is controlled, as active disease can impair lesion detection and

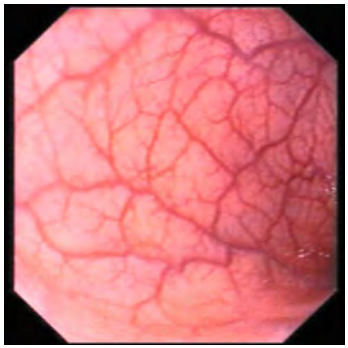
histological interpretation. Whenever possible, advanced endoscopy methods such as chromoendoscopy with high-definition endoscopy should be used for surveillance colonoscopy, to improve dysplasia detection and facilitate targeted biopsies. Random biopsies may still have a role in selected high-risk patients, such as those with PSC or a history of dysplasia. Any diagnosis of dysplasia should be confirmed by an expert gastrointestinal pathologist, and subsequent endoscopic or surgical management should be agreed through an experienced multidisciplinary team [1, 2, 16].

Normal endoscopic findings

Image atlas

The endoscopic images in this atlas are provided by the author and reproduced with the patients' permission.





Figures 1 and 2: Normal colonic mucosa, with a smooth, glistening surface and clearly visible vascular pattern.

Figure 3: Normal colonic flexure.

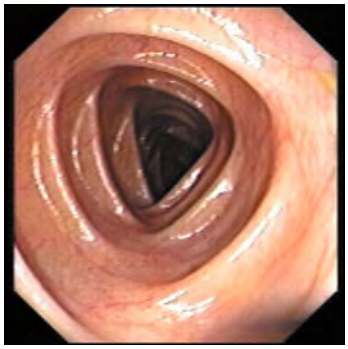


Figure 4: Normal transverse colon, showing the triangular lumen formed by the haustral folds.

Normal endoscopic findings

Figure 5: Appendiceal orifice.

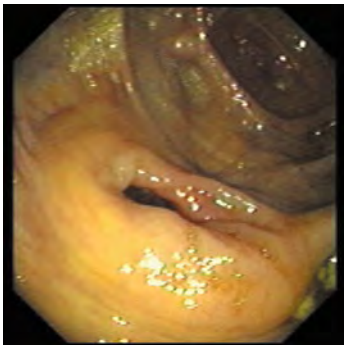


Figure 6: Ileocecal valve.

Figure 7: Normal terminal ileal mucosa.

Ulcerative colitis

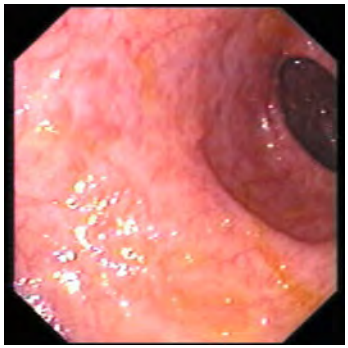


Figure 8: Mildly active ulcerative colitis, with loss of the vascular pattern and fine mucosal granularity producing an uneven light reflex.

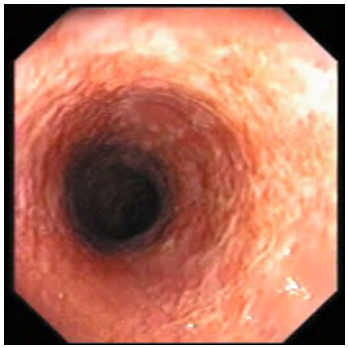
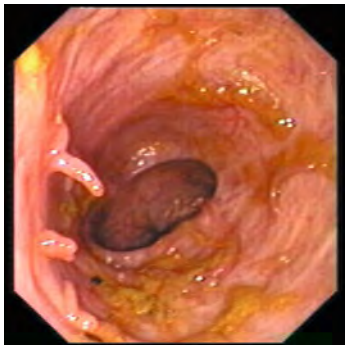
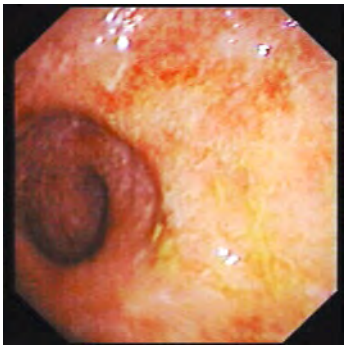


Figure 9: Loss of haustration resulting in a featureless colon in long-standing ulcerative colitis.

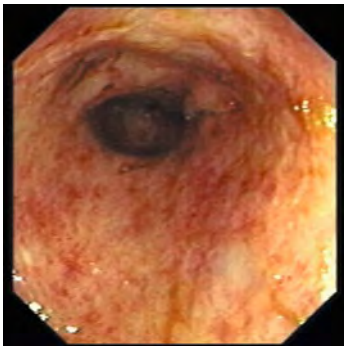


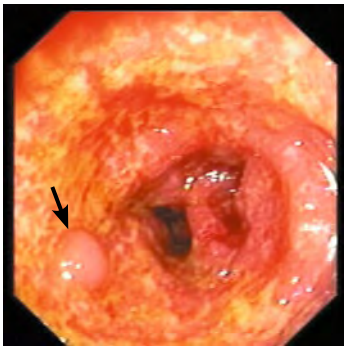
Figures 10 and 11: Post-inflammatory scarring and pseudopolyps in ulcerative colitis.

Ulcerative colitis

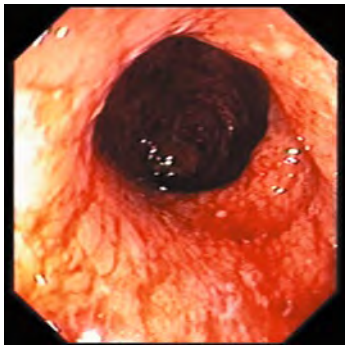


Figures 12 and 13: Active ulcerative colitis with mucosal friability and contact bleeding.

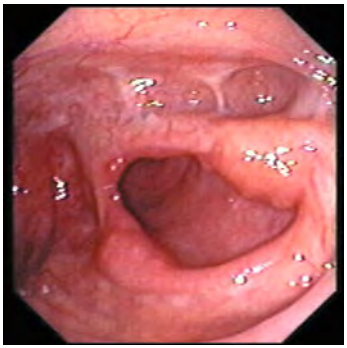




Figures 14 and 15: More severe active ulcerative colitis with marked mucosal bleeding; the arrow indicates a small pseudopolyp.



Figures 16 and 17: Severely active ulcerative colitis with spontaneous bleeding and ulceration



Figures 18 and 19: Postoperative ileocolonic anastomosis following ileocecal resection.

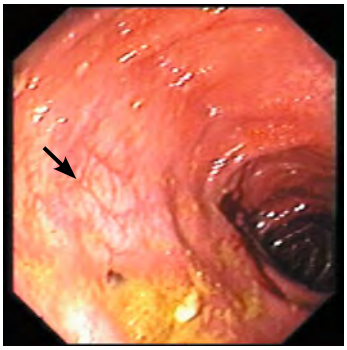
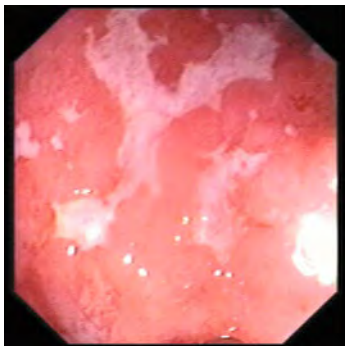


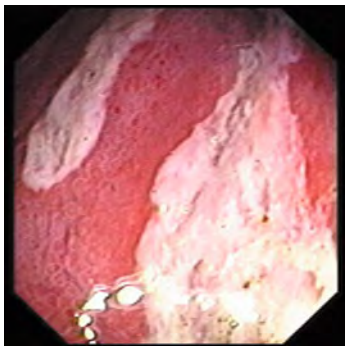
Figure 20: Patchy colonic inflammation in Crohn's disease, with adjacent areas of preserved vascular pattern (arrow).

Figure 21: Crohn's ileitis in endoscopic remission.

Figure 22: Aphthous ulceration, an early but non-specific endoscopic finding in Crohn's disease.

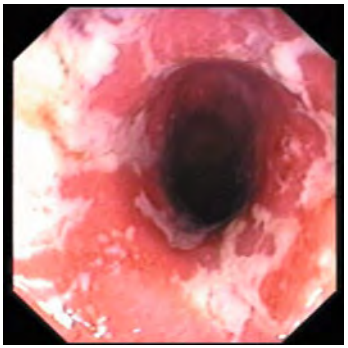
Figure 23: Longitudinal ulcer in Crohn's disease.

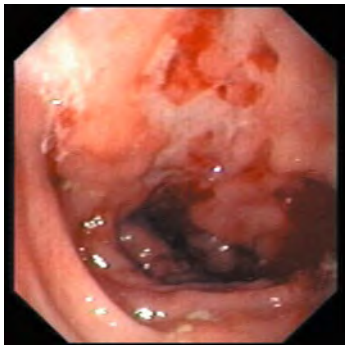




Figures 24 and 25: Geographic ulceration of the colon in Crohn's disease.

Crohn's disease





Figures 26 and 27: Geographic ulceration of the colon in Crohn's disease.

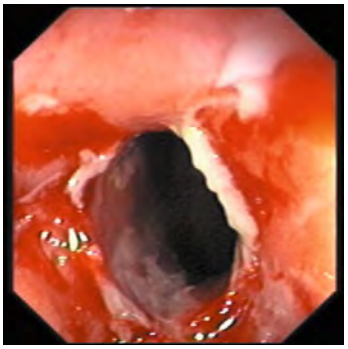


Figure 28: Ulcerated ileocolonic anastomosis with spontaneous bleeding.

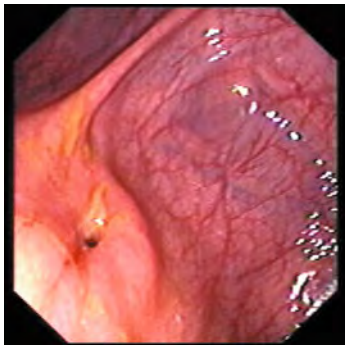


Figure 29: Stricture of the ileocecal valve.

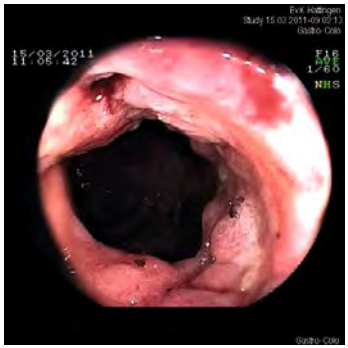


Figure 30: Traversable malignant colonic stricture in a patient with long-standing Crohn's disease.

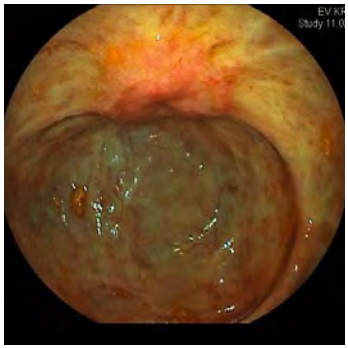


Figure 31: Cecal carcinoma in a patient with long-standing Crohn's disease.

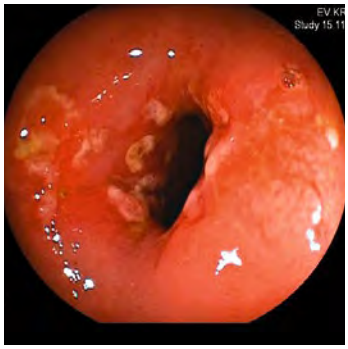


Figure 32: Short, mildly ulcerated stricture of the ascending colon.

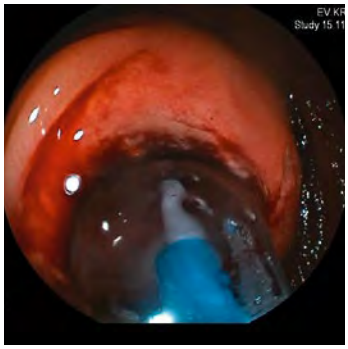
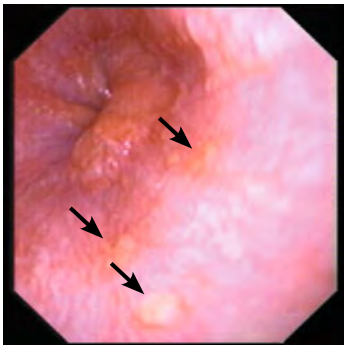
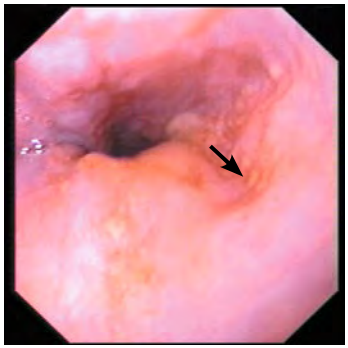


Figure 33: Endoscopic balloon dilatation of the stricture shown in Figure 32.

Crohn’s disease





Figures 34 and 35: Esophageal Crohn’s disease with small ulcers (arrows).

Figure 36: Gastric ulcer in a patient with Crohn’s disease.

Figure 37: Small ulcer in the duodenal bulb in a patient with Crohn’s disease.

Figures 38 and 39: Duodenal Crohn's disease with small longitudinal ulcers.

Differential diagnoses and other endoscopic findings

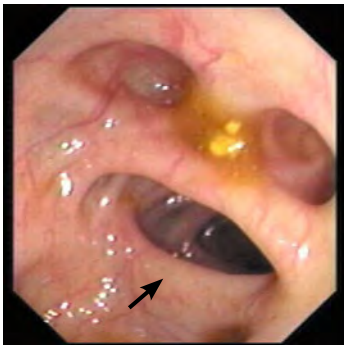


Figure 40: Large colonic diverticulum adjacent to the true colonic lumen (arrow). Careful identification of the luminal axis is required during scope advancement.

Figure 41: Colonic diverticulum containing fecal material.

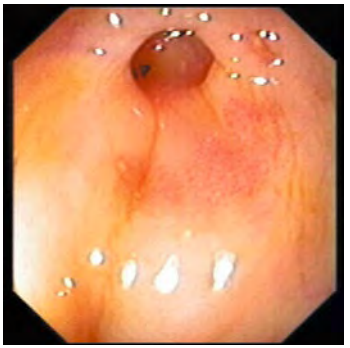


Figure 42: Peridiverticular inflammation, with punctate erythema surrounding the diverticular orifice.

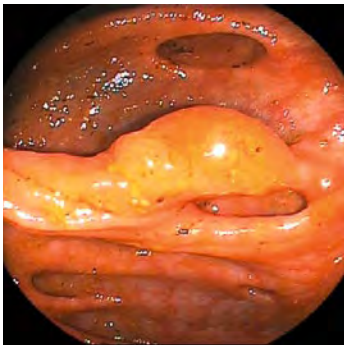
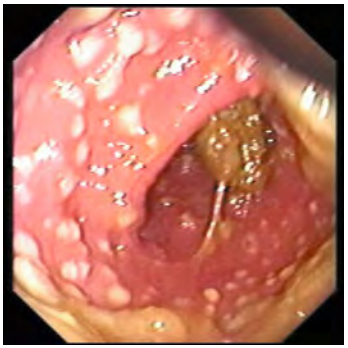
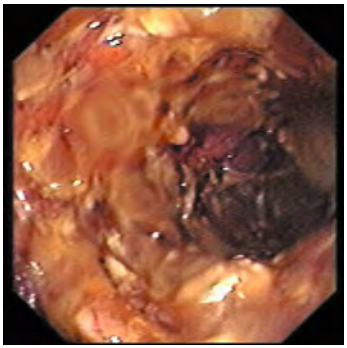
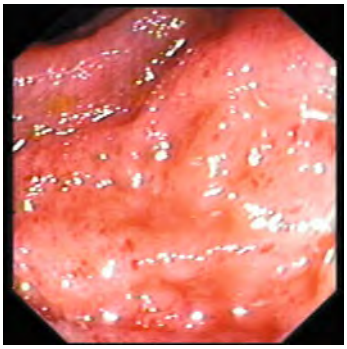


Figure 43: Colonic polyp immediately adjacent to a diverticulum.





Figures 44 and 45: Pseudomembranous colitis following antibiotic exposure. Raised, adherent plaques are characteristic.



Figures 46 and 47: Diffuse hemorrhagic colitis associated with *Salmonella enteritidis* infection.

Figure 48: Endoscopic appearance in *Yersinia* infection, with petechial hemorrhage at the ileocecal valve.

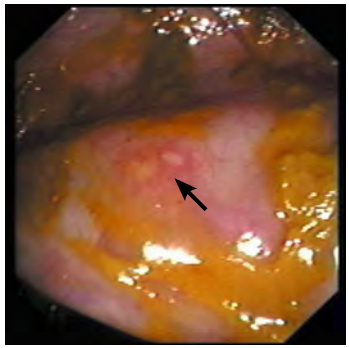


Figure 49: Aphthous ulcers (arrow) in otherwise normal colonic mucosa.

Figure 50: Polypoid rectal carcinoma with friable mucosa.

Figure 51: Pedunculated colonic polyp.

Figure 52: Pedunculated colonic polyp with a broad stalk.

Figure 53: Submucosal injection of the polyp stalk with saline and dilute adrenaline (1:10,000).

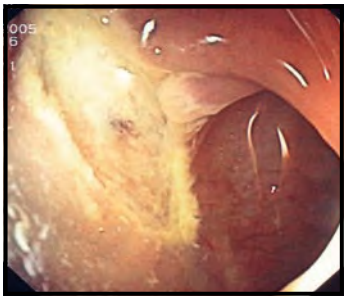


Figure 54: Large post-polypectomy mucosal defect following hot-snare resection of the polyp shown in Figures 52 and 53.

Figure 55: Clip closure of the post-polypectomy site.

Figure 56: Pedunculated colonic adenoma with a broad stalk; histology showed low-grade dysplasia.

Figure 57: Flexible spectral imaging color enhancement (FICE) view of the polyp shown in Figure 56.

Figure 58: Polypectomy, step 1: pedunculated colonic polyp with a broad stalk.

Figure 59: Polypectomy, step 2: injection of saline and dilute adrenaline (1:10,000) into the polyp stalk.

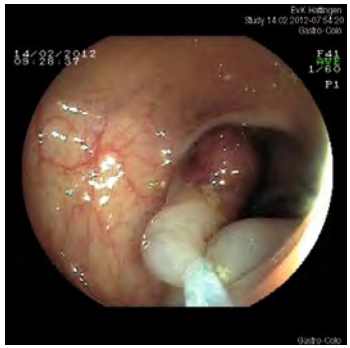


Figure 60: Polypectomy, step 3: hot-snare resection following injection of the polyp stalk.

Figure 61: Polypectomy, step 4: clip closure of the post-polypectomy site.

Figure 62: Polypectomy, step 5: resected polyp specimen.

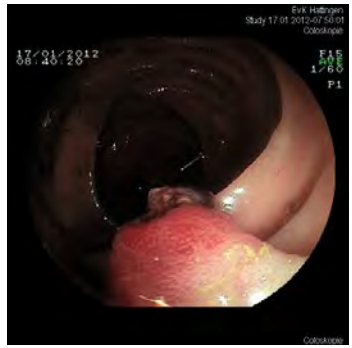


Figure 63: Inflammatory pseudopolyp with a vascular stalk in a patient with diverticular disease.

Differential diagnoses and other endoscopic findings

Figure 64: Iatrogenic colonic perforation following polypectomy.

Figure 65: Endoscopic clip closure of the perforation shown in Figure 64.

Figure 66: Inflammatory ileal pseudo-polyp in a patient with Crohn's disease.

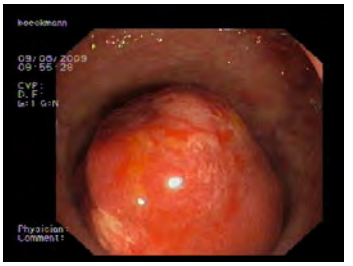


Figure 67: Inflammatory ileal pseudopolyp prolapsing through the ileocecal valve into the caecum.

Figure 68: Circumferential sigmoid ulcer associated with NSAID exposure.

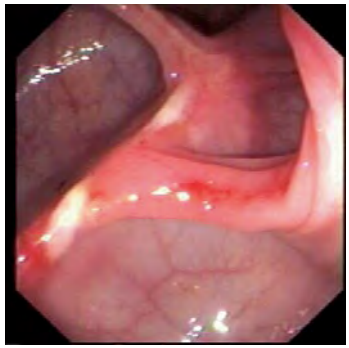


Figure 69: Two small longitudinal ulcers associated with NSAID exposure.

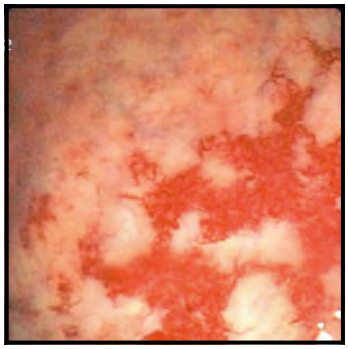


Figure 70: Extensive rectal angioectasia.

Figure 71: Focal cecal angioectasia.

Differential diagnoses and other endoscopic findings

Figure 72: Chronic radiation proctitis following prostate radiotherapy, showing mucosal telangiectasia.

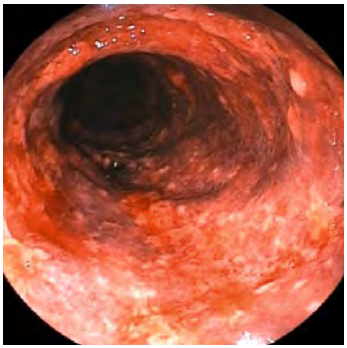


Figure 73: Ischemic colitis.

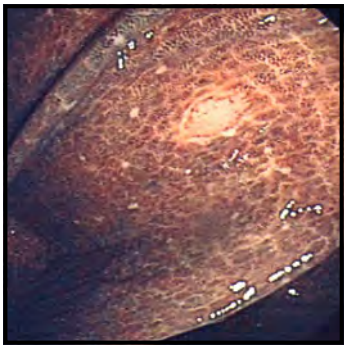


Figure 74: Melanosis coli associated with long-term laxative use; a small polyp appears pale against the pigmented mucosa.

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