

ENDOSCOPIC EVALUATION OF INFLAMMATORY BOWEL DISEASE. WHAT TO USE, WHEN TO USE?

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Abstract: Inflammatory bowel disease (IBD) is a chronic affliction that requires careful regular monitoring and focused treatment, defined by remissions and flares, with frequent hospital admissions, surgical procedures in complicated cases and progression towards dysplasia in longstanding disease. The patient's quality of life is considerably affected by the disease per se but also by the frequent follow-ups and invasive procedures used for disease activity monitoring. The diagnosis of inflammatory bowel disease rests on symptoms, clinical signs, laboratory and imaging tests and is confirmed by biptic endoscopy with subsequent pathology examination. Endoscopy is an important tool not just for disease diagnosis but also for disease progression monitoring, early dysplastic lesions diagnosis and therapeutic intervention. Endoscopy offers a fast and straightforward evaluation of the colonic mucosa, enabling the description of the extent and severity of the intestinal lesions leading to the prediction of the disease's aggressive nature and the introduction of appropriate treatment. The ultimate goal when dealing with IBDs is to reach mucosal healing, thus ensuring a significant improvement of the quality of life and prognosis and a drop in hospitalization expenses and in the need for surgical measures. This paper aims to review the latest Gastrointestinal Endoscopy Society standards of practice guidelines so as to offer a useful algorithm for the use of endoscopy in patient care.

INTRODUCTION

Inflammatory bowel disease is a chronic illness of the gastrointestinal tract of unknown etiology, characterized by the involvement of the large intestine in ulcerative colitis or any part of the digestive tract in Crohn's disease (CD). The incidence of the disease is rising especially in developed countries, with a peak incidence in the third decade of life (19.2/100.000 ulcerative rectocolitis, 20.2/100.000 Crohn's disease).⁽¹⁾ The disease progression is difficult to anticipate and the actual degree of activity stage cannot be established without imaging assessment. Endoscopy is the main technique used when caring for IBD patients, offering the opportunity of an accurate diagnostic procedure, differentiation between the two types, disease activity and response to therapy assessment.

The role of endoscopy in IBDs

It has been 2 centuries since the first endoscope was invented. In 1806, Philipp Bozzinni used “Lichtleiter = light conductor”, since then it evolved rapidly from a rigid tube to a flexible videoendoscope.⁽¹⁾ The pre endoscope period was a very difficult and long one, as the correct evaluation of the disease was nearly impossible. Initial evaluation in IBD was based on clinical and biological exams; then, following the invention of the microscope and radiological techniques, the evaluation of the patients was possible and carried out through invasive techniques which allowed the biopsy harvesting.

Endoscopy is the most important tool when diagnosing and managing patients with IBDs, starting with the initial and differential diagnosis, the assessment of disease activity and extent, all the way through monitoring treatment results or adjusting the intensity of therapy, and finally when treating or preventing dysplasia by endoscopic means, or when postoperative surveillance is needed.⁽¹⁾ The therapeutic

armamentarium was vastly enriched by the advent of biologic therapy that can be used both for induction and maintenance of remission, with best results when introduced early in the course of the disease.⁽²⁾ Another important aspect is that the first endoscopic evaluation should be performed, when possible, before the institution of any treatment.⁽³⁾ The usefulness of endoscopy is also seen in all the studies performed, as a tool of evaluation and monitoring disease, studies that bring us important information regarding the etiology, the pathogenesis or the therapy used.^(4,5) Although the search is still on for the best predictors of IBDs progression, for now endoscopy and pathology allow us to identify those patients that will benefit most from swift interventions and complex treatment.⁽²⁾

The advantages of the endoscopic technique are a fast and precise diagnosis with minimal costs, an increase in the number of newly discovered cases due to the accessibility of the diagnostic procedure, the detection of dysplasia in longstanding disease at an early stage and the possibility of therapeutic intervention in selected cases.⁽²⁾ Among the disadvantages worth mentioning are: the impossibility of endoscopic evaluation in complicated cases and of establishing a correct diagnosis without a pathology examination. Selected cases not suitable for endoscopy can benefit from an evaluation with the endoscopy capsule or radiology imaging techniques.⁽³⁾

What to use when?

Colonoscopy with ileoscopy must be used when first assessing a patient, enabling the examination and sampling of mucosa from at least 5 areas, including the ileum and the rectum, without major adverse events or the need for a preliminary natrium phosphate enema and without NSAIDs administration that could result in a confounding factor: changes similar to the ones in IBDs.^(6,7) Since clinical data are

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sometimes inconclusive and the macroscopical picture nonspecific, the sampling and pathological evaluation of mucosa allow us to exclude other possible differentials (infectious colitis, drug induced or ischaemic colitis, colitis caused by radiotherapy or diverticulosis).(8) It is important to distinguish between the two forms of disease because the treatment can influence the initial disease extension and distribution - in roughly 90% of cases of CD and ulcerative colitis (UC) we can tell them apart, the other 10% of cases left are classified as inflammatory bowel disease-undetermined (IBD-U) (type unclassified).(7) The advantage of colonoscopy with ileoscopy is that it offers a complete evaluation of the colon. The contraindication of using this technique is in severe colitis and toxic megacolon.(7) The endoscopic modifications found in ulcerative colitis are: continuous lesions starting from anorectal junction extended through colon, clear limits between the affected and non-affected zone, losing haustral, diffuse erythema, friability, granularity, vascular pattern decreased, linear superficial ulceration, pathological products in lumen, pseudo polyps and light reversible stenosis.(9) The most suggestive modifications for Crohn disease are the apparition of discontinuous, asymmetric lesions, with normal mucosa between the lesioned zones. The lesions can appear anywhere in the gastrointestinal tube starting with the oral to anal mucosa, without affecting the rectum, with perianal affection, abscess, fistula, fissures, deep aphthous and serpiginous ulcers, paved aspect of the mucosa, pseudo polyps, long severe and irreversible strictures, and fistula orifices.(10) Ileoscopy is essential when trying to distinguish between CD and UC with ileal involvement, given that 25% of the patients with pancolitis have backwash ileitis.(11) The endoscopic appearance in UC reveals a short mildly inflamed ileum as a continuation of the cecum colitis with minimal pathological findings (inflammatory infiltrate in the lamina propria, lacking distortion of the crypts, atrophy or epithelial changes), while in CD the inflammation is extensive but patchy, more severe than the cecal inflammation, with discrete ulcerations or strictures of the ileocecal valve.(12) The pathological finding of granuloma, although suggestive for CD, is nevertheless not pathognomonic, since it can also be found in UC (as occult involvement) in the setting of tuberculosis, bacterial or fungal infections, sarcoidosis or foreign body reactions.(13) In order to increase the chances of detecting a granuloma, one must sample the edges of ulcers or aphthous lesions, otherwise the sensitivity ranges from 13.6 to 55.6%.(14) Although the detection of perianal changes, fistulas or stenoses increases the suspicion of Crohn's disease, colonoscopy should still be done with the same indications to exclude other UC overlaps or neoplastic changes.(15)

Referring to health technology assessment (HTA), the studies show the economic advantage of the colonoscopy as a periodical method of evaluation of patients with IBD, and foremost at ones with risk of developing a neoplasia.(16)

Sigmoidoscopy plays a very important part in those cases where colonoscopy would be too high-risk: in cases of fulminant colitis, cases with overlapping infectious colitis (cytomegalovirus - CMV, Clostridium difficile), in ischaemic colitis or when symptoms persist or reoccur in spite of the treatment instituted.(6,17) The main disadvantage is the impossibility of diagnosing the colitis in the proximal affected zones, or the incorrect diagnostic in the absence of ileoscopy.(7) When the sigmoidoscopy is not possible, the rectoscopy should be done along with targeted biopsy and add other imagistic techniques, echo endoscopy, resonance magnetic imaging - IRM, computed tomography-TC.(7)

Upper gastrointestinal endoscopy is useful when diagnosing IBDs, when assessing patients with CD or

indeterminate colitis. If at least 2 samples are taken from the esophagus, stomach or duodenum, the chances of detecting granulomas range from 40 to 68%, superior to intestinal biopsies.(18)

Data from the literature in terms of superior digestive tract manifestations are limited to adults, based on Vienna classification in 1998 and later Montreal in 2005, representing changes of proximal ileum with the symbol L4 with an incidence of about 3%.(19,20) Instead, in the case of pediatric population, endoscopy is performed with a higher frequency than colonoscopy, so a 30% incidence is obtained from endoscopic examination, and the histopathological value reaches approximately 60%.(21) Upper tract damage is associated with ileo-colon locations, usually the prevalence of isolated damage being 0.7%.(22) The endoscopic changes in upper tract in CD are: erythema, inflammation, erosions, ulcerations, altered or deformed duodenum and granulomas, strictures; nonetheless, one must keep in mind that minimal changes of gastritis or diffuse duodenitis with villous atrophy but no aphthous ulcerations can be found in UC as well.(23,24)

The main disadvantage of the technique is that is not sufficient to diagnose and evaluate the disease activity.(23)

Capsule Endoscopy is of great use in the minimally invasive evaluation of the small intestine mucosa in patients with suspected IBDs or with an established diagnosis of CD. The technique has 83% sensitivity of detecting minimal lesions, compared to CD enterography, but a low specificity of only 53%; still, it can help reclassify a significant number of IBD-U patients as CD patients.(25,26) The major disadvantages of the CE appraisal of the small intestine are the lack of precise diagnostic criteria, the impossibility of obtaining bioptic material or performing interventions and the risk of capsule retention.(27) The diagnosis of CD cannot be based on the detection of lesions on the small intestine mucosa, since these can be caused by other pathologies, or in 14% of cases, there can be incidental findings in healthy subjects.(28)

Enteroscopy plays a major role in those cases with mucosal changes revealed through minimally invasive techniques (radiology or endoscopic capsule-CE). It offers an endoscopic and histologic view of lesions, as well as the possibility of therapeutic interventions - hemostasis, stricture dilation, or removal of foreign bodies.(29) The techniques used in CD are push enteroscopy or device assisted enteroscopy (single or double balloon) and intraoperative enteroscopy.(29) Although it is not used as the initial diagnostic technique in patients with diagnosis by default, and it has proven its worth in the therapeutic management decisions (step up or step down) 74% of patients, thus obtaining clinical remission for 88% of the patients.(30)

The main disadvantages are that the techniques are invasive, with long time evaluation and adverse possible effects (perforation, pancreatitis, aspire pneumonia).(31)

Endoscopic Ultrasound plays a well-established role in the appraisal of perianal extension of CD - fistulas, fissures or abscesses, but also in discriminating between UC and CD and when assessing the activity of UC. Patients with active disease develop mucosal thinning, with thickening of the submucosa and paracolic hypoechoic adenopathies.(6) The studies done so far have shown that endoscopic ultrasonography (EUS) examination compares favorably to the MRI investigation of fistular anatomy and the local assessment under anesthesia; nevertheless, the ECO consensus guidelines recommend the use of pelvic MRI for the initial purposes of diagnosis, followed by EUS for monitoring medical and surgical therapy.(32) Using this technique doctors can make an accurate assessment of perianal damage, and a score of severity-grading perianal disease

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activity index (PDAI).(33) The disadvantage of the technique is the impossibility to harvest biopsy and do a complete evaluation, as well of affecting of some therapeutic interventions.(7)

Ileal pouch endoscopy

In complicated ulcerative colitis cases, unresponsive to medical treatment, the therapeutic solution to improving the patient's quality of life is surgery. Although the latest studies showed a 50% incidence of colectomy among ulcerative colitis patients recently there has been a drop in the number of cases owing to the emergence of biological therapy.(34)

Ileal pouch anal anastomosis is the favored procedure in those cases in need of curative colectomy, but there is a possibility of postoperative complications. Immediately after, or in the long run, patients can develop pouch abscesses, pouchitis, cuffitis, irritable pouchitis syndrome or CD of the pouch with pouch failure recorded in 3.5 to 15% of cases.(34) The most frequent complication is long term pouchitis, which develops in approximately 50% of patients after 10 years.(35) The endoscopic assessment should preferably be done with a gastroscope so as to be able to evaluate both the pouch and the corresponding small intestine loop. The biopsy of the anastomotic line is best avoided due to the risk of erroneous diagnosis of granuloma, in case of suture pseudogranuloma.(36)

The endoscopic aspect in the pouch is as the eritomatosa mucosa, edematosa, with friability and granulometry, that leads to slight bleeding with erosions and ulcerations, and the differential diagnostic must be done with CD of the pouch, ileitis from other cause, infections or ischemia.(36) Except for possible complications described above, the endoscopic evaluation of these patients is appropriate, considering the immunosuppressive treatments carried out with their possible long-term adverse effects, but also periodically preventive screening.(37)

Colonoscopy after partial colectomy or ileocelectomy

Patients with Crohn's disease require in 75% of the cases a partial colectomy or ileocelectomy during their lifetime. The most frequent complications leading to this type of surgical procedure are stenoses, fistulae, abscesses, fissures or significant bleeding.(40) Postresection evolution is unpredictable, but the most frequent is recurrence of CD at the site of the anastomotic or at the new terminal ileum.(38) This occurs in 70 to 90% of all patients in the first postoperative year. The endoscopic assessment must be timely and coupled with the use of the Rutgeerts score for determining patients at risk, because the endoscopic changes precede the onset of clinical symptoms.(39)

Statistics show that a Rutgeerts score of 3 or 4 indicates a risk of recurrence of the disease in the coming years in about all patients and the need for new surgery in one third of patients over the next 3 years.(40)

What to do when the going gets tough?

Another very important aspect of this illness is the fact that in longstanding cases it can lead to malignant (dysplasia, cancer) or benign (stenoses, polyps, adenomas) complications, thus making close follow up according to established protocols a prerequisite for morbidity and mortality reduction.

Cancer, dysplasia and strictures- the guidelines recommendations are clear when it comes to screening for cancer in patients with longstanding or extensive disease, those diagnosed at an early age, those with personal or familial history of colorectal cancer or primary sclerosing cholangitis.(6) Since a recent pathology study found that in 17-35% of patients cancer diagnosis was delayed or missed under late screening (at 8-10 or even 15 years), the current recommendations are not to wait any longer than 8 years after the onset of symptoms.(41) Biopsies

are taken both from involved areas and normal appearing areas, in order to detect potential dysplastic invisible (flat) lesions - tissue from all four quadrants, every 10 cm is sampled, reaching from the rectum to the caecum a total of at least 33 samples) in the case of pancolitis, or limited to the maximal disease extension area, when previously defined histologically.(42) The latest advances in this field concern the usefulness of image-enhanced endoscopy, as well as chromoendoscopy in the early detection of dysplastic lesions in IBDs, that previously could be found only through fortuitous random sampling.(43) With the help of the agents used (methylene blue, lugol, toluidine, congo red or indigo carmine) chromoendoscopy enlarges and reveals areas of mucosal nodularity, elevated or depressed dysplastic lesions, with the option of performing sometimes curative endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD).(44) If chromoendoscopy is unavailable, or if its efficiency is reduced (due to inadequate preparation, areas difficult to examine, neighboring inflammation or pseudopolyps), random sampling must be performed, apart from biopsies from suspicious lesions.(44) Randomized studies have shown the benefits of using chromoendoscopy not only to increase dysplasia detection by 4-5 times / lesion with greater sensitivity and specificity than large excision with random biopsies, but also in cost-effective ratio.(45) Even when no lesions are detected, two biopsies should be taken from each intestinal segment so as to document the actual extent and activity of the disease.(36,46)

Unlike chromoendoscopy, narrow band imaging (an optical technique that employs filters in order to enhance the contrast between mucosa and vasculature) has not proven of use in the early detection of dysplasia.(47) The therapeutic role of endoscopy includes besides the polyps resection, dysplastic lesions and dilatation or endoprosthesis of strictures, as well as the direct application of the medicine in the inflammation zone and management of abscess and fistula. Following the complete removal of polypoid or non-polypoid dysplastic lesions, endoscopic evaluation must be performed every 6 months in the first year, and long term endoscopic surveillance should be instituted.(48) Proctocolectomy is the procedure of choice in cases with unresectable lesions or with residual dysplasia at the base of the lesion, or with areas of high grade dysplasia or multifocal local dysplasia made apparent with chromoendoscopy.(48)

A colonic stricture detected in a patient with UC should be viewed as malignant until proven otherwise, therefore surgical intervention should follow, especially when a biopsy is inconclusive or cannot be obtained.(49) In patients with CD, most strictures are located on the ileocolonic anastomosis (66%) and those smaller than 4 cm can be endoscopically dilated. In approximately half of those cases a repeat endoscopic intervention will be needed, and 25% of them will require surgical intervention in 6 years' time.(50) In the case of gastroduodenal strictures, the benefits of dilation are insignificant due to the high resistance, fibrotic nature of the tissues - echoendoscopy can be used in assessing the structure of the digestive tract wall and the adjacent ulcerations in order to select those cases that could undergo dilation without any risks.(51) The data related to the use as methods of treatment of the dilatation with the endoscopic balloon or the injection of steroids into the strictures, or the use of metal stents, are conflicting, the answers to varying treatment depending on the form of the disease, stricture, localization and patient's condition.(7) The studies related to the efficiency of direct application of micro particles with anti-inflammatory medication, at the level of the inflamed tissue, regarding the mucosae healing, are still in progress.(52) In the CD case with

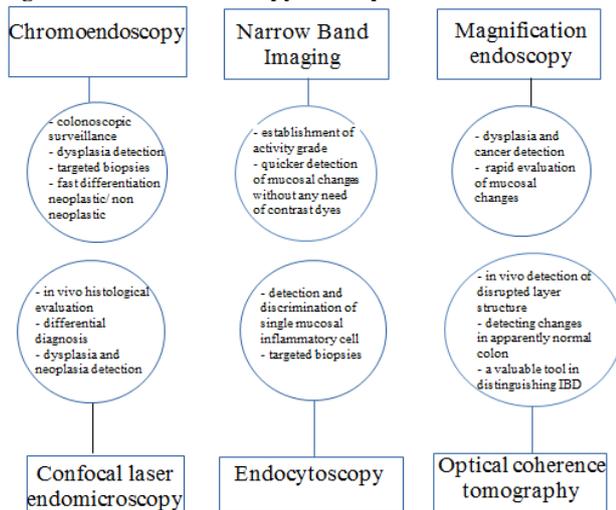
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perianal affectation, the therapeutical role of endoscopy regarding the fistula and abscess (endoscopic fistulotomy, closing the fistula with clips or fibrin, stenting and abscess evacuation) has offered an alternative to surgery.(53)

The tough gets going!

New endoscopy techniques (figure no. 1.)- in the past 2 centuries endoscopy has gone through a remarkable development from the first endoscope (a rigid probe with a mirror system and dim light) to the extremely flexible video endoscope with multiple options. Traditional white light video endoscopy allows the visualization of mucosa and vessels with a low magnification, while submucosa and even deeper structures cannot be examined. Newer techniques have profoundly impacted the medical approach and surveillance of colon pathology through precise observation of mucosal details, microscopic features of tissues, and cellular and even biochemical changes.(54)

Figure no. 1. New endoscopy techniques



* **Chromoendoscopy** uses different staining techniques and the digital processing of optical information to obtain an enhanced view of mucosa and submucosal vessels. It can be a dye based (DBC) or a dye less (DLC) imaging technique. DBC uses topical staining agents released through sprays or catheters, but it has the disadvantages of long procedures, high cost and the loss of visualization of subepithelial vessels.(55) DLC can be an optical chromoendoscopy (NBI) or a virtual chromoendoscopy (I-scan and FICE - Fujinon intelligent color enhancement). NBI uses a filter for the light source of the endoscope, which narrows the transmission spectrum band (red-green-blue) and simultaneously magnifies the vascular pattern (blue). By comparison, the virtual techniques do not require filters, since they can modify the endoscopic images captured by increasing the intensity of the blue light and decreasing that of red and green light, with a real time virtual image result.(56) Compared with chromoendoscopy, NBI has the advantage of fast evaluation of lesions and a quick switch between the classic endoscopic image and NBI, with no need for contrast or enhancement spray, which might result in unequal distribution of the staining agent.(54) However, following the studies with different techniques for early detection of dysplasia, the general recommendation is to use methylene blue or indigo carmine chromoendoscopy during control colonoscopies with targeted biopsies from suspicious areas or lesions.(56) There are also negative aspects of the technique, as the long time needed to investigate, reduced availability in the medical centers, not trained medical personnel, increased equipment costs, and, as

regards the technique, the paint not covering all the surfaces and not allowing observing subepithelial circulation.(55,56) Despite all these negative points, chromoendoscopy was evaluated as more cost efficient, compared to the classic histological examination.(57)

* **Magnification endoscopy** offers a 150x magnification that enables a detailed analysis of mucosal surfaces and dysplastic lesions. Combined with chromoendoscopy, it can evaluate inflammatory activity, disease extension and it can help in cancer screening based on targeted biopsies.(58) The specificity obtained in this combination was 96% in the correct detection of neoplastic changes, compared to 89% pure chromoendoscopy and 84% classic endoscopy.(59) The main disadvantage is the long time and the complexity of the investigation.(54)

* **Spectroscopy** modalities range from fluorescence, reflectance and light scattering spectroscopy to optical coherence tomography. Depending on the wavelength of the light used and the characteristics of the examined tissue, different spectrum data specific to certain inflammatory, ischemic or dysplastic lesions are obtained.(54) Fluorescence endoscopy with 5 aminolevulinic acid has been used in detecting intraepithelial dysplastic lesions in UC patients, with encouraging results.(55)

* **Confocal laser endomicroscopy** captures laser light reflection from the surface of the mucosa, refocused through a pinhole confocal aperture, with imaging results comparable to histology and good discrimination between the CD stages.(60) The histological changes most often assessed pertain to the crypts architecture - irregularities, dilations, destructions, fusions and abscesses, to vascular changes - destructions, dilations or branching and to dysplastic lesions - mucin depletion, goblet cells destruction.(60) The studies and scoring systems developed for the in vivo evaluation of the histological activity of IBDs have proven the usefulness of this technique in predicting disease course and response to therapy.(61) Studies on various groups of patients resulted in 99.4% specificity in detection of neoplastic lesions and sensitivity of 97.4%.(62) The technique has the advantage of the capacity of associating it with any type of endoscope (narrow band imaging-NBI, colangioscope) and that of getting images at a speed of 12 frames/sec, but also the disadvantage of a lower resolution.(56)

* **Endocytoscopy** is a new imaging modality that enables visualization of intestinal mucosa with a 1,400x magnification, by using a contact optical microscope attached to the distal end of the endoscope, or, alternately, as a probe introduced into the accessory channel of the endoscope.(63) This technique requires preliminary staining of the tissues with contrast agents - methylene blue or toluidine. Studies have shown a remarkable 100% correspondence with histology when evaluating disease activity, with the advantage of less need for sampling tissue.(63) The disadvantage is the long time needed and the necessity to previously prepare the mucosa with coloring agents.(55)

Classifications and scoring systems

Scoring systems stemmed from the need to remove the variability of interobserver assessment, thus creating a general and easily interpreted system for medical practice and clinical studies. In the past few years, numerous activity scores were developed based on symptomatology, clinical signs or endoscopic changes, but their correlation, or the correlation between clinical and endoscopic remission are sometimes

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weak.(64) Scoring systems have proven useful in assessing activity and response to treatment, but, since none has been selected as the standard, every medical practitioner has multiple options to choose from.

The extent of endoscopic involvement in UC can be classified according to the Montreal Classification as proctitis E1, left-sided colitis E2 or extensive colitis E3, or it can be classified as one of the four Mayo stages of disease activity.(65) Other classifications currently in use are Baron (0-3), Powel Tuck (0-2), Sutherland (0-3), Feagan (0-4), Rachmilewitz (0-3), Matts (0-4), Blackstone, Sigmoidoscopy index, (0-3) UCEIS and UCCIS.(3) The Pediatric UC Activity Index correlates well with the colonoscopy findings in pediatric patients; nevertheless, endoscopic evaluation becomes mandatory in those cases requiring biological therapy or immunosuppressants.(66)

Based on age, location and disease progression, the Montreal Classification used in CD comprises different categories.(65) CD endoscopic index of severity and Simple endoscopic scoring system for CD are two correlated scoring systems that assess basic lesions - size and shape of ulcers, of ulcer ridden areas or of areas with strictures.(6)

The Lewis score - CE scoring index and CE CD activity index enable a 5-grade classification of disease severity, based on inflammation, disease extension and strictures, and pertaining to the proximal or distal region.(67)

The Rutgeerts Anastomotic score is used during the first postoperative year in the evaluation of ileocolic involvement in CD, thus identifying patients at considerable risk for disease recurrence and unfavorable prognosis.(40) CDEIS and Rutgeerts scores are the gold standard in the evaluation of mucosal healing, in spite of their complexity that presupposes a good deal of experience in the assessment and discrimination of the lesions under scrutiny.(68)

Endoscopy is considered the essential investigation needed to establish the degree of activity in inflammatory bowel diseases based on existing mucosal changes, while endoscopy scoring systems can turn these changes in objective elements that can be quantified. Endoscopy scores aid in anticipating a patient's evolution and can therefore determine the need to escalate or not therapeutic approaches.(64)

Table no. 1. Endoscopic disease activity indices for ulcerative colitis

Endoscopic score	Score 0	Score 1	Score 2	Score 3	Score 4
Mayo , Schroeder KW, Tremaine WJ, Ilstrup DM ,New Engl J Med 1987	Normal or inactive disease	Mild disease-erythema, decreased vasc pattern, mild friability	Moderate disease – marked erythema, absent vasc pattern, friability, erosions	Sever disease-spontaneous bleeding, ulceration	-
Baron , Baron JH, Connell AM, Lennard-Jones JE.Br Med J 1964	Normal mucosa	Abnormal but not hemorrhagic- somewhere between “0” and “2”	Moderate bleeding – to light touch but not spontaneous	Severely hemorrhagic – spontaneous bleeding and to light touch	-
Feagan Modified Baron , Feagan BG, Greenberg GR, Wild G, et al. N Engl J Med 2005	Normal mucosa	Hyperemic, granular mucosa, with loss of vascular pattern	Hyperemic, granular, friable mucosa, loss of vascular pattern	Hyperemic, granular, friable mucosa, loss of vascular pattern, spontaneous bleeding	Hyperemic, granular, friable mucosa, loss of vascular pattern, spontaneous bleeding, ulcerated and denuded mucosa
Powell tuck , Powell-Tuck J, Day DW, Buckell NA, et al.Dig Dis Sci 1982	Non- hemorrhagic - on light touch or spontaneously	Hemorrhagic – bleeding on light touch but not spontaneously	Hemorrhagic – spontaneous bleeding and to light touch	-	-
Rachmilewitz , Rachmilewitz D. <i>BMJ</i> 1989;	Normal mucosa	Mild changes-granulation 2, faded vascular pattern 1, contact bleeding 2, slight mucosal damage 2	Moderate- sever changes – absent vascular pattern 2, spontaneous bleeding 4, pronounced mucosal damage 4	Total score = changes in mucosa, vascular pattern, bleeding and ulcers	
Matts , Matts SG. Quarterly Journal of Medicine 1961	-	Normal mucosa	Mild mucosal granulation, mild bleeding and friability	Significant mucosal granularity, edema, spontaneous bleeding	Severe mucosal ulceration, hemorrhage
Blackstone ,Blackstone MO,New York: Raven Press, 1984		Quiescent disease – abnormal vascular pattern or granularity	Mild disease – focal or continuous erythema or light touch bleeding	Moderate disease – mucopurulent exudate or less than 10 ulcers <5mm per 10 cm	Severe disease – ulcers > 5mm more than 10 /segm or spontaneous bleeding
Sutherland ,Sutherland LR, Martin F, Greer S, et al. Gastroenterology 1987	Normal mucosa	Mild friability	Moderate friability	Spontaneous bleeding, exudation	-
Sigmoidoscopic UCEIS , Travis SP, Schnell D, Krzeski P, Abreu MT, Altman DG, Colombel JF, et al. Gut 2012	Normal pattern, no bleeding, no erosions or ulcers	Patchy loss of pattern 1, mucosal bleeding- spots or streaks 1, erosions < 5mm 1	Obliterated vascular pattern 2, luminal mild bleeding 2, superficial ulcer >5mm 2	+ Severe luminal bleeding 3, deep ulcer 3	Total score = sum of vascular pattern, bleeding and erosions, ulcers
UCCIS , Samuel S, Bruining DH, Loftus EV Jr, et al. Clin Gastroenterol Hepatol 2013	Normal pattern, no granularity, no ulceration or bleeding or quiescent	Mild erythema, decreased vascular pattern, fine granularity, no friability or bleeding	Moderate friability -loss of vascular pattern , coarse granularity, erosions or pinpoint ulcerations, light touch bleeding	Severe disease – spontaneous bleeding or gross ulcers	Total score = vascular pattern x3,1 + granularity x3,6 + ulceration x3,5 + bleeding x2,5 for rectum, sigmoid, descending, transverse and ascending, cecum

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Table no. 2. Endoscopic disease activity indices for Crohn's disease

	Score 0	Score 1	Score 2	Score 3	Score 4	Score 5	
S CDEIS , Daperno M, D'Haens G, Van Assche G, et al. <i>Gastrointest Endosc</i> 2004	Normal mucosa	Aphthous ulcer 0,1-0,5 cm; ulcerated surface<10%; affected surface<50%; single stricture	Large ulcer 0,5-2cm; ulcerated surface 10-30%; affected surface 50-75%; multiple stricture	Very large ulcer>2cm; ulcerated surface>30%; affected surface>75%; multiple stricture obstructive			Total score= ileum+right colon+transverse+left colon+rectum
CDEIS, Mary JY, Modigliani R. (GETAID). Gut 1989	Deep ulcerations 12 if present superficial ulcerations 12 if present surface involved by disease (cm) surface involved by ulcerations (cm)		Total1 Total 2 Total 3 Total 4	Total A= Total 1+2+3+4 for rectum, sigmoid and left, transverse, right colon and ileum ; Total B = Total A/n (number of segments explored) CDEIS = Total B + C + D ; C, D = ulcerated/non ulc stenosis add 3			
Rutgeerts . Rutgeerts P, Geboes K, Vantrappen G, Beyls J, Koremans R, Hiele M. <i>Gastroenterology</i> 1990	No lesions	≤ 5 aphthous lesions	> 5 aphthous lesions with normal mucosa between or lesions confined to ileocoloic anastom < 1cm length	Diffuse aphthous ileitis with diffusely inflamed mucosa	Diffuse inflammation with large ulcers, nodules and/or narrowing		
Lewis -CESI , Lewis BS, Gralnek JM, Defranchis R, Seidman E et al. <i>Aliment Pharmacol Ther</i> 2008	Erythema and edema – localized 1, patchy 2, diffuse 3, short segment 1, long 2, whole region 3 Nodularity – single 1, few 2, multiple 3; localized 1, patchy 2, diffuse 3, short 1, long 2, whole 3 Ulcer single 3, few 5, multiple 7; localized 3, patchy 5, diffuse 7; short 1, long 2, whole 3; circular 3, linear 5, irregular 7 ; <1/4 3, ¼ – ½ 5, >1/2 7 Stenosis none 0, single 10, multiple 20; traversed 10, non-traversed 20; ulcerated 10, non-ulcerated 5			Total score= score for every region (duodenum, jejunum, proximal ileum and distal ileum) by adding points listed for every lesion by number, distribution pattern, longitudinal extent, shape and size (by circumference)			
CE CDAI , Gal E, Geller A, Fraser G., Levi Z., Niv Y Dig Dis Sci 2008	Normal mucosa	Mild- moderate edema, hyperemia, denudation; focal disease- single segment; 1 stricture passed	Severe edema, hyperemia, denudation; patchy disease-2-3 segments, multiple stricture passed	Bleeding, exudate, aphthae, erosion, ulcer<5mm; > 3 segm involved; stricture obstructive	Moderate ulcer 0,5-2 cm, pseudopolyp	Large ulcer >2cm	A=inflammation B=extent C=stricture Segmental score=(AxB)+C Total score= proximal+distal
PDAI , Irvine EJ. <i>J Clin Gastroenterol</i> 1995	No discharge, pain, restriction, skin tags, induration	Minimal discharge, mild discomfort, slight restriction of SA, anal fissure/mucosal tear, minimal induration	Moderate mucous or purulent discharge, discomfort, some limitations, moderate limitations of SA, < 3 perianal fistulae, moderate induration	Gross faecal soiling, marked discomfort and limitations, marked limitations of SA, >= 3 perianal fistulae, substantial induration	Severe pain and limitations, unable to engage in SA, anal sphincter ulcerations or fistulae, gross fluctuance/abscess	Categories affected by fistulae : discharge, pain/restriction of activities, restriction of sexual activity, type of perianal disease, degree of induration	

CONCLUSIONS

Inflammatory bowel disease is a chronic idiopathic illness, with a rising incidence, that in spite of multiple current treatment lines places a heavy burden upon the patients themselves and their doctors. The difficulty of this disease lays in its array of symptoms as well as in the frequent necessary monitoring by means of invasive techniques- sometimes insufficient or hard to conduct, all leading to a decrease in the patient's quality of life and increasing healthcare costs.

Endoscopy is the best standard in the diagnosis and evaluation of patients with IBDs, leading to a fast therapeutic decision. Until new medical therapies appear, more efficient, or some new noninvasive markers, and based on our clinical experience, we highlight the importance of repeating the endoscopy in the management of the patient with IBD, as well as obtaining as much of biopsy evidence, oriented or random. Likewise, the endoscopy has a major role in screening the patients for dysplasia.

Chromoendoscopy, NBI and confocal laser endomicroscopy (CLE) are extremely useful in the early detection of dysplastic changes, a major complication of longstanding disease. The goal of the ideal colonoscopy is virtual histology, namely the in vivo, "online", histological analysis of the mucosa, that enables the endoscopist to detect and remove the lesion without the need for an ex vivo biopsy.

Chromoendoscopy, NBI and magnification endoscopy can reveal surface features, while CLE and endocytoscopy are the two techniques that come closest to a virtual histological analysis of the cellular structures.

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