

Endoscopy in IBD: How far can you go!



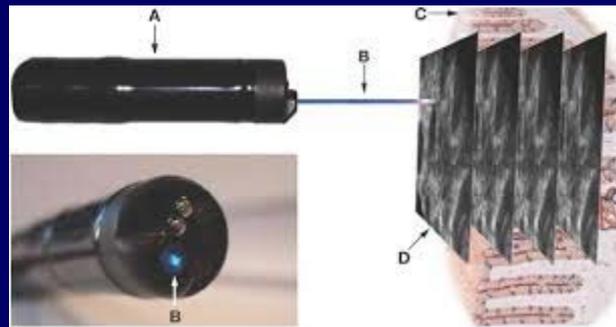
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How far can you go!



Introduction

- Endoscopy in IBD: crucial tool
 - Correct diagnosis
 - Adequate assessment of disease activity
 - Assessment of treatment success
 - Avoidance of surgery by endoscopic interventions
 - Effective cancer surveillance
- Traditional white light endoscopy
- Newer advances: endoscopic ultrasonography, magnification endoscopy, chromoendoscopy, optical endoscopy, and capsule endoscopy

White Light Endoscopy

- Ileocolonoscopy
- Sigmoidoscopy
- Enteroscopy: Push/Double or Single Balloon/ Spiral Enteroscopy
- Gastroduodenoscopy
- Capsule Endoscopy: Small Bowel or Colon Capsule



Correct Diagnosis

Endoscopy

- **Ileocolonoscopy: most important and potent tool in diagnosis of suspected IBD**
- **Endoscopy: direct visualization and obtaining of tissue**
- **No endoscopic features are specific for IBD but histopathological examination may help in correct diagnosis**
- **Flexible sigmoidoscopy with biopsy: Older age, severe disease, steroid use, female gender and endoscopic dilations**
- **Attempt to pass scope beyond inflamed segments**

Endoscopic Findings of UC

- Inflammatory changes begin just above anorectal junction and spread proximally in continuous fashion
- Clear demarcation between involved and normal areas
- Earliest endoscopically visualized changes are erythema and vascular congestion of mucosa
- As edema becomes prominent, small mounds form, resulting in granular appearance
- Mucosa might be friable and bleed with minor contact
- As inflammation become more severe, ulcerations form
- Ulcers always surrounded by inflamed and abnormal mucosa

Endoscopic Findings of UC

- Long standing disease:
 - loss of haustral folds and luminal narrowing
 - mucosal atrophy leads to pseudopolyps formation
 - swollen islands of edematous granulation tissue that can assume any shape as well as form mucosal bridges

None of these endoscopic features are specific for UC

Endoscopic Findings of Crohn's Disease

- Skip lesions, cobblestoning, aphthous ulcers, longitudinal ulceration, ileocecal involvement, and anal lesions suggest Crohn disease
- Biopsies from ulcer edge and aphthous erosions are more likely to demonstrate granuloma than normal-looking or cobblestoned mucosa

None of these endoscopic features are specific for CD







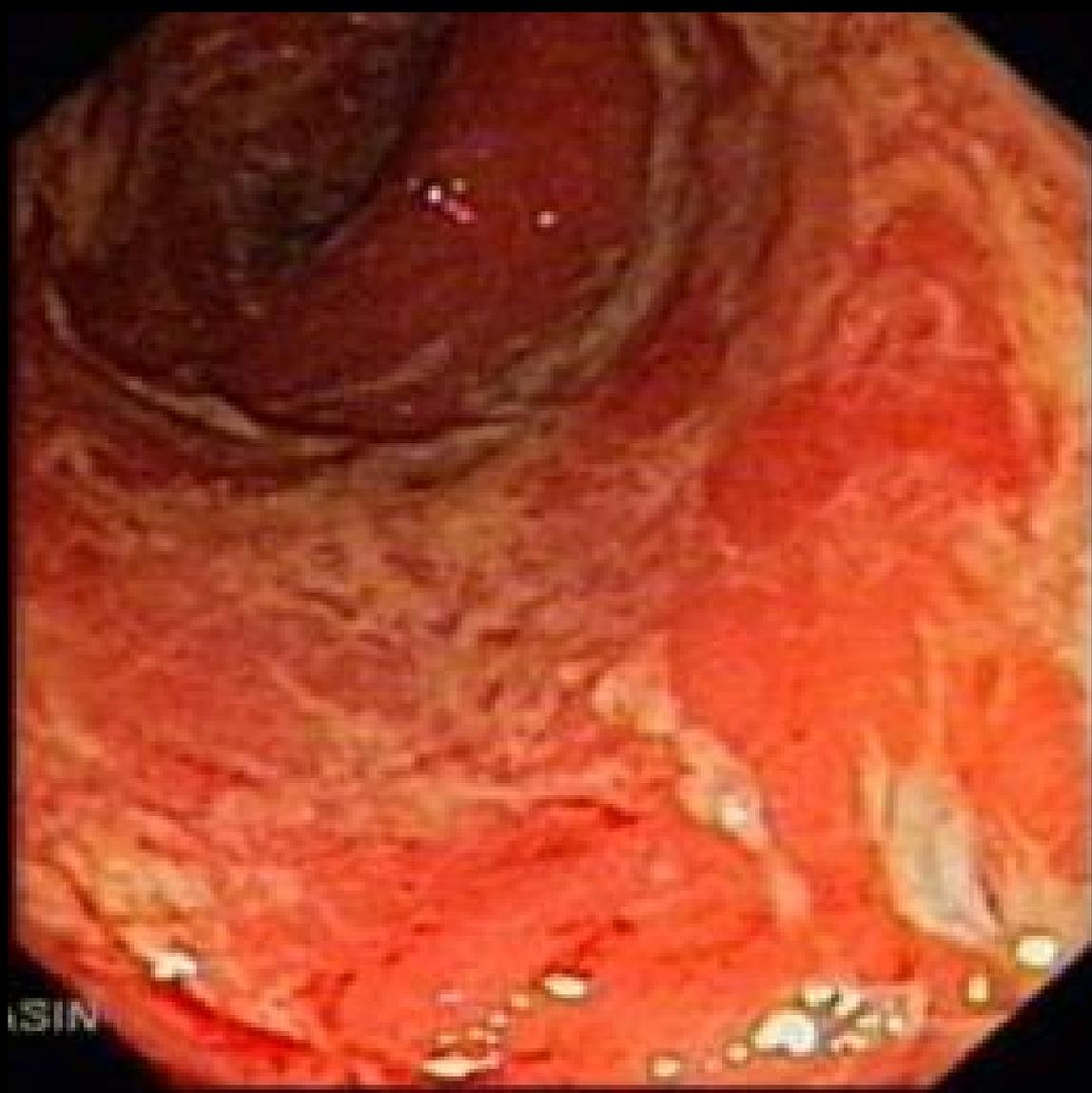


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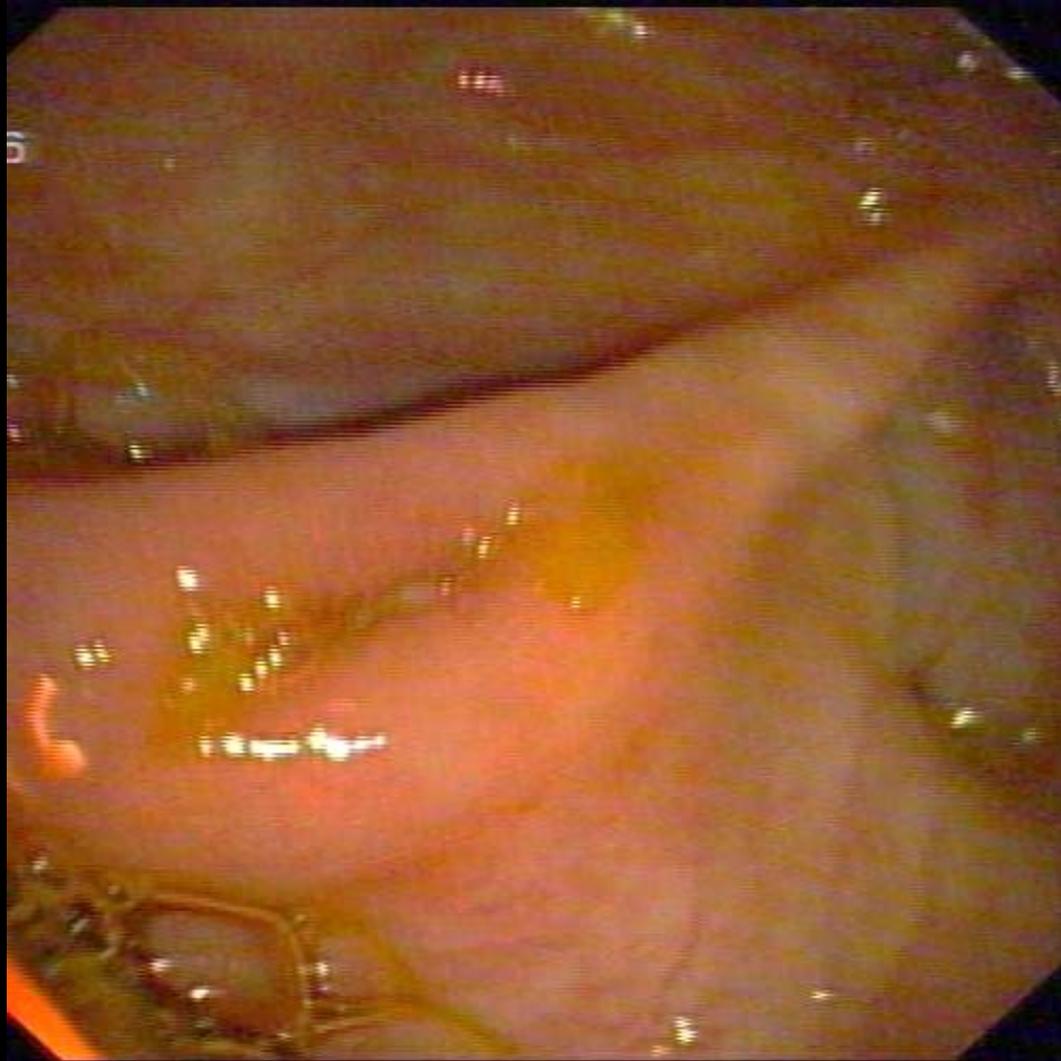
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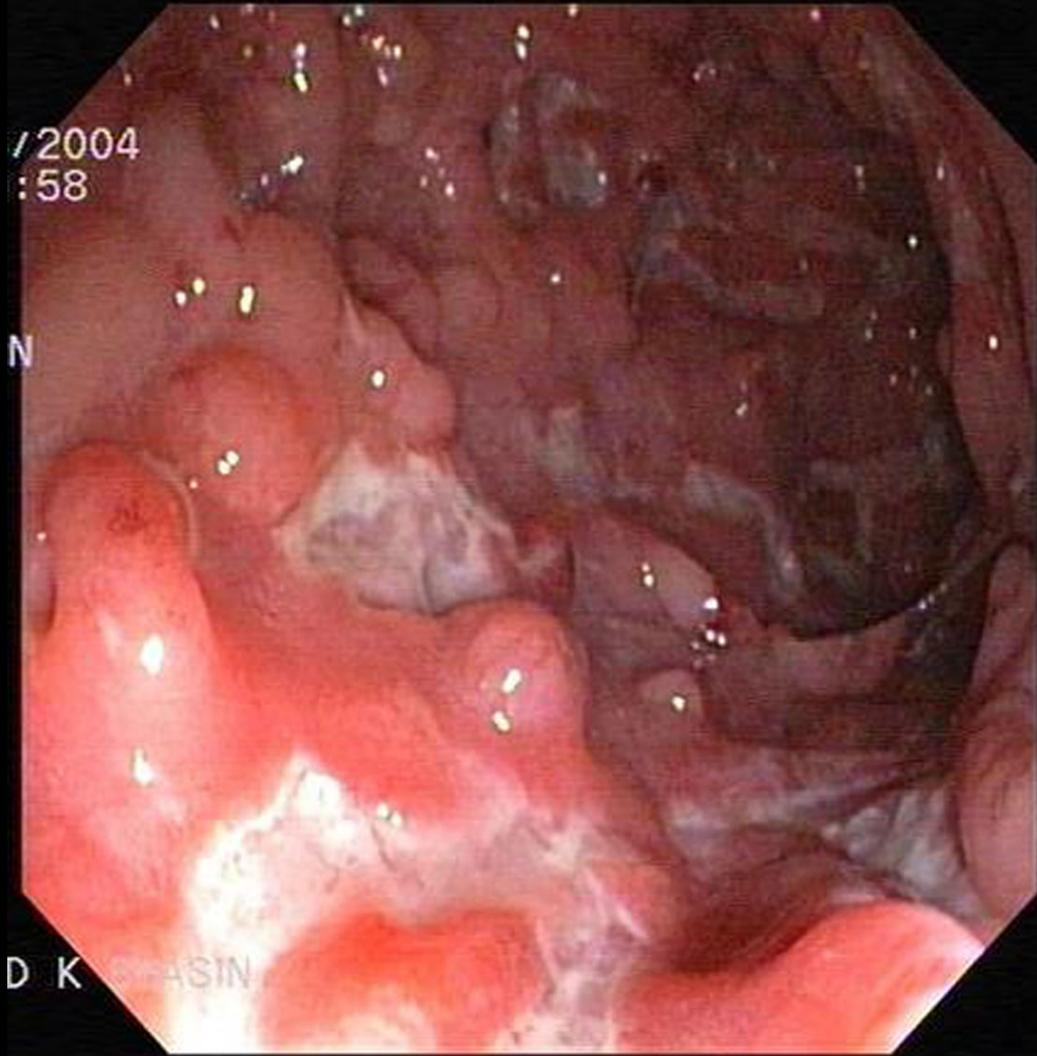
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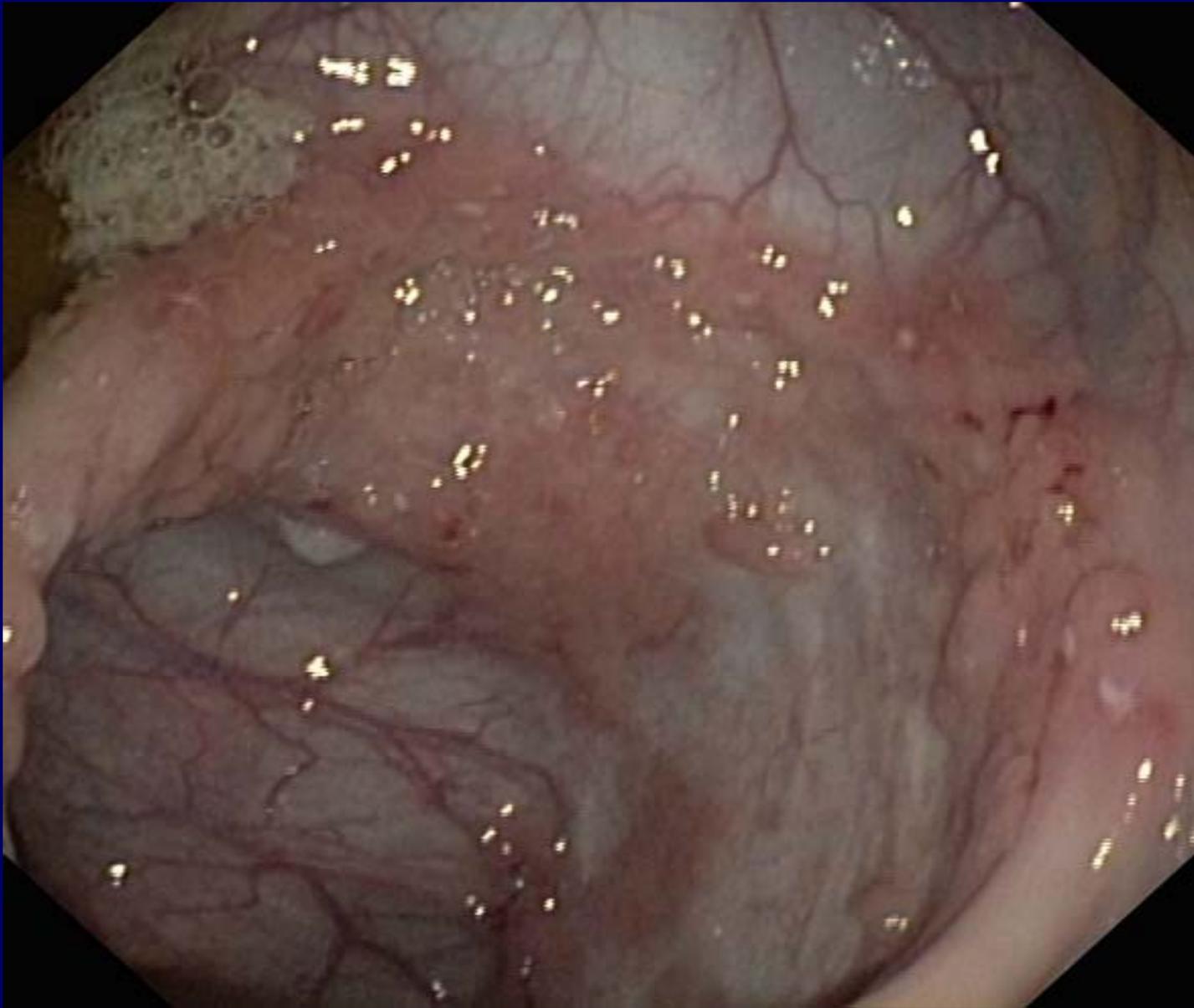
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Endoscopic Biopsy

- Can be decisive in achieving correct diagnosis
- Several precautions should be observed
- Utmost importance for pathologist to have access to patient's clinical history and endoscopic findings
- Information regarding type of bowel preparation and drugs
 - Sodium phosphate purgatives can result in focal inflammation or aphthous lesions
 - NSAIDs can produce ischemic changes

Endoscopic Biopsy

- Dehydration can lead on to hypoperfusion of colon that might result in ischemic changes
- Multiple biopsies should be sampled from each region examined
- 4 biopsies should be sampled from each inflamed segment and an equal number from each uninfamed segment within reach
- Diagnostic yield is maximized by orienting sample

Endoscopic Biopsy

- Sample areas that are not completely denuded to evaluate residual crypt epithelial architecture
- Source of biopsy identified by anatomic segment:
 - Normal cecal mucosa is characterized by widely spaced crypts and relative abundance of mononuclear inflammatory cells
 - Paneth's cells are normally limited to ascending colon
 - Biopsies of sigmoid might show IBD like inflammation if sampled from vicinity of diverticula
 - Mucosa approaching anorectal junction is distorted and IBD-like

Upper Gastrointestinal Endoscopy in IBD?

- Upper gastrointestinal (UGI) tract inflammation: increasingly recognized, even in absence of symptoms
- Involvement of stomach and the duodenum: up to 3% of adult patients with ileocolonic disease
- Pediatric population with IBD: UGI endoscopy mandatory as UGI involvement may reach up 50%



Disease Activity and Extent

Introduction

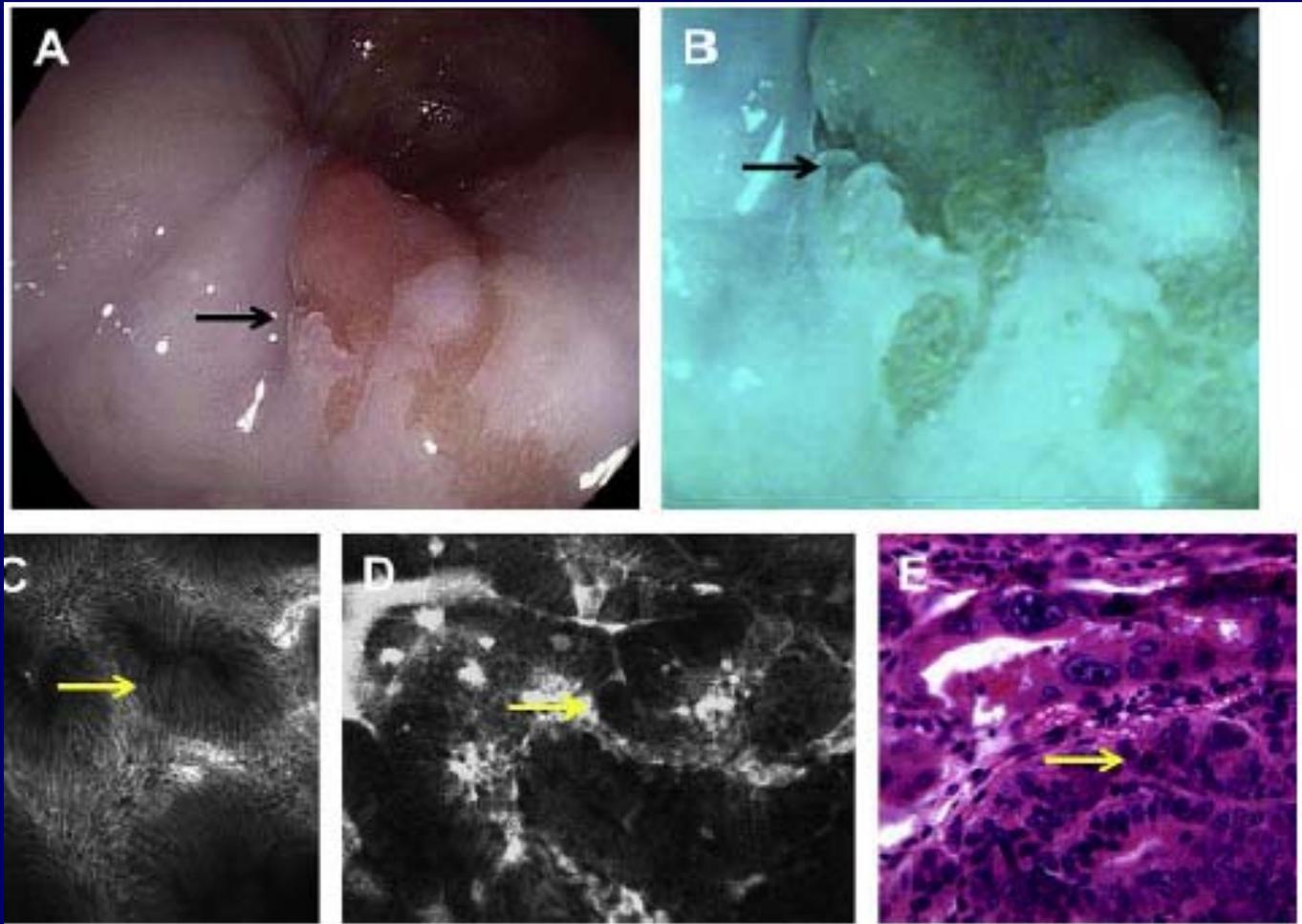
- **Disease Activity:** Symptoms compatible with irritable bowel syndrome common in IBD patients in remission
- **Disease Extent:** Location of inflammation relevant for choice of drugs (systemic vs. topical)
- **Video capsule endoscopy:** valuable in symptomatic Crohn's disease patients for evaluation of suspected small bowel lesions that are not visible on small bowel radiographs
- **Assessment of mucosal healing during therapy**

Clinical, Endoscopic and histopathological parameters at presentation that predict the need for long-term immunosuppression in ulcerative colitis

Ranjit K. Sreerama, Puneet Chhabra, Vishal Sharma, Ritambhra Nada¹, Ravi Sharma, Chalapathi Rao, Rajesh Gupta², Lileswar Kaman², Surinder S. Rana, Deepak K. Bhasin

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metaplasia, and the presence of neuronal cells were similar in the two groups. **Conclusion:** Of the clinical, biochemical, endoscopic and histological features at presentation only the presence of pancolitis predicts the need for long term immunosuppressants in ulcerative colitis.



Newer Endoscopic Techniques

Limitations of Endoscopy

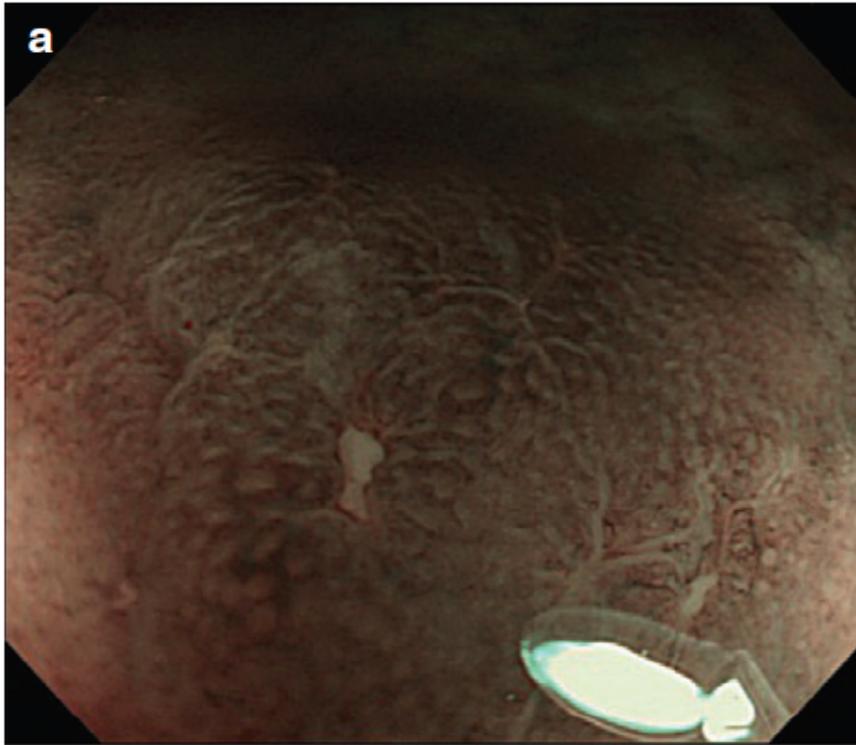
- Underestimates extent of disease compared to histology
- Assessment of inflammation activity is inaccurate in prediction of acute inflammation in some cases
- Surveillance of patients with ulcerative colitis consists of taking targeted and random biopsies

Dye Less Chromoendoscopy

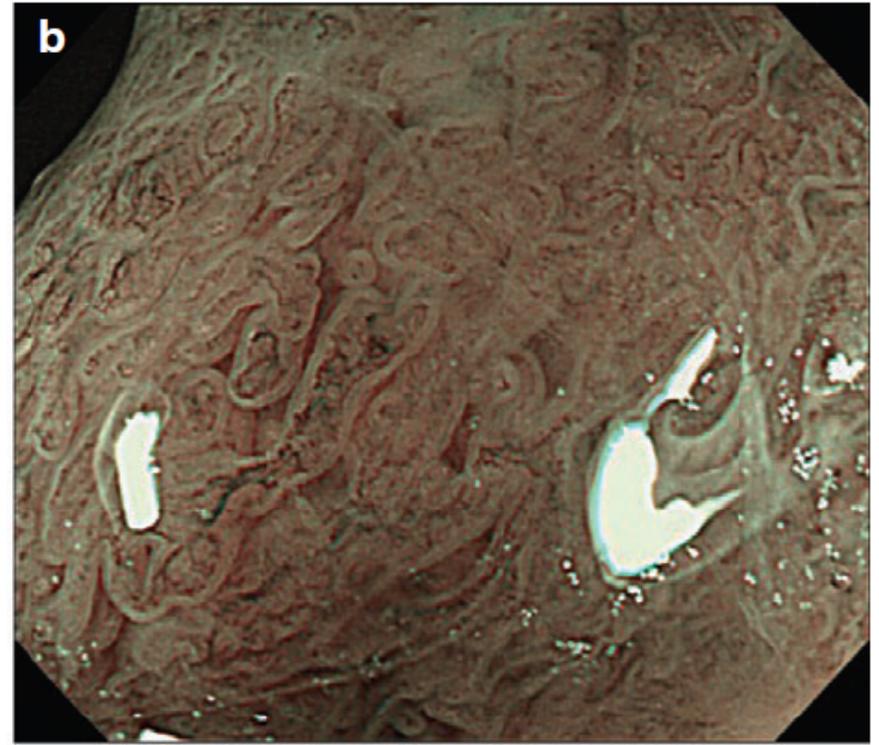
- Virtual chromoendoscopy
- Optical chromoendoscopy or Filter based:
 - Narrow band imaging
- Post image acquisition techniques or Digital chromoendoscopy
 - i scan or FICE

NBI in Ulcerative Colitis

Mildly Active Disease



Crypt opening type



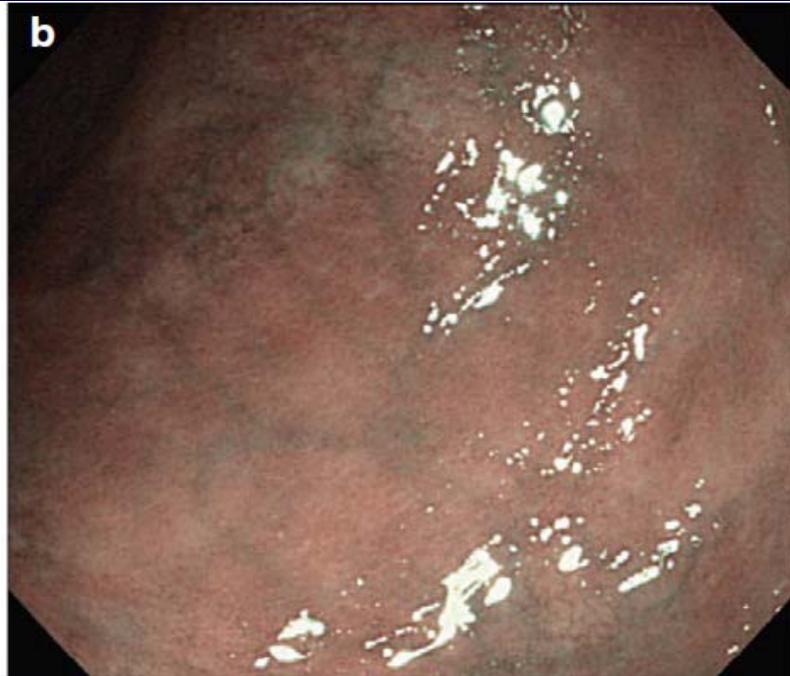
Villous type

NBI in Ulcerative Colitis

Inactive Disease



*Clear mucosal venous pattern
(MVP)*



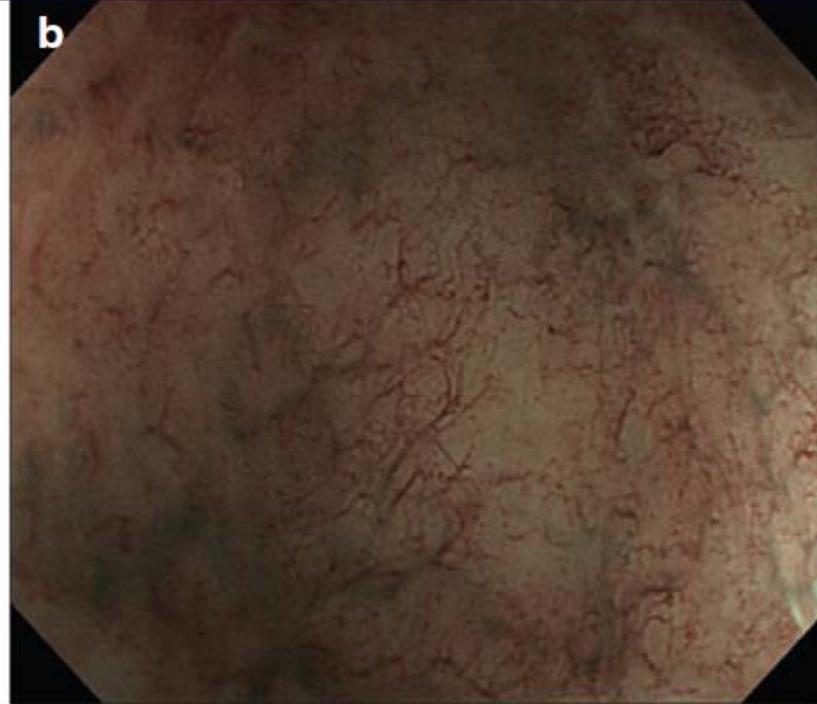
Obscure MVP

NBI in Ulcerative Colitis

Inactive Disease



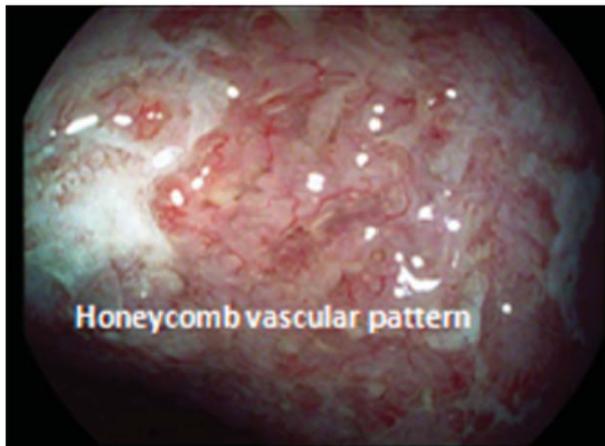
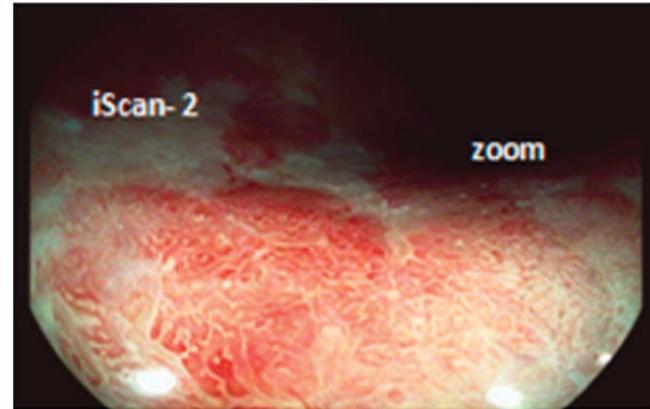
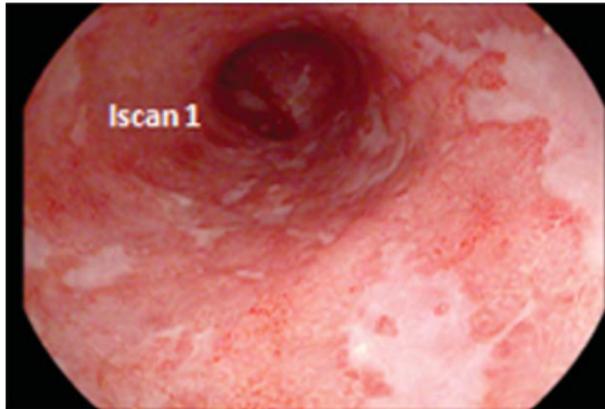
Honey Comb MVP



Irregular MVP

Magnification Endoscopy

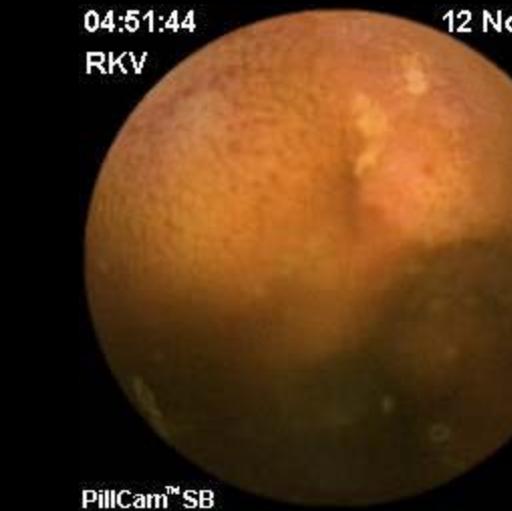
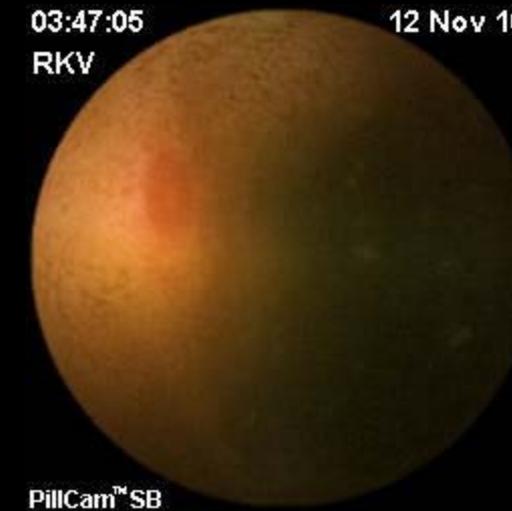
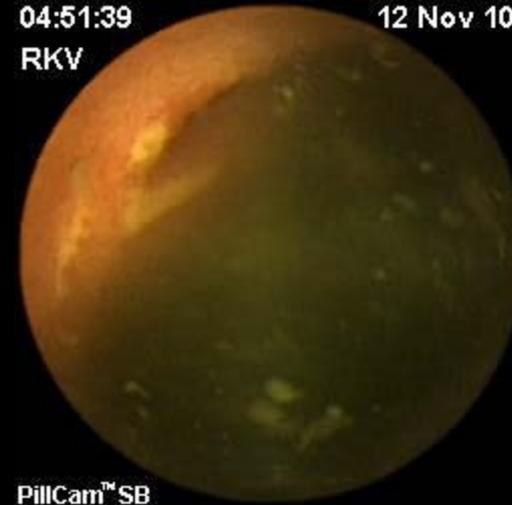
i-Scan Severe Ulcerative Colitis



Capsule Endoscopy

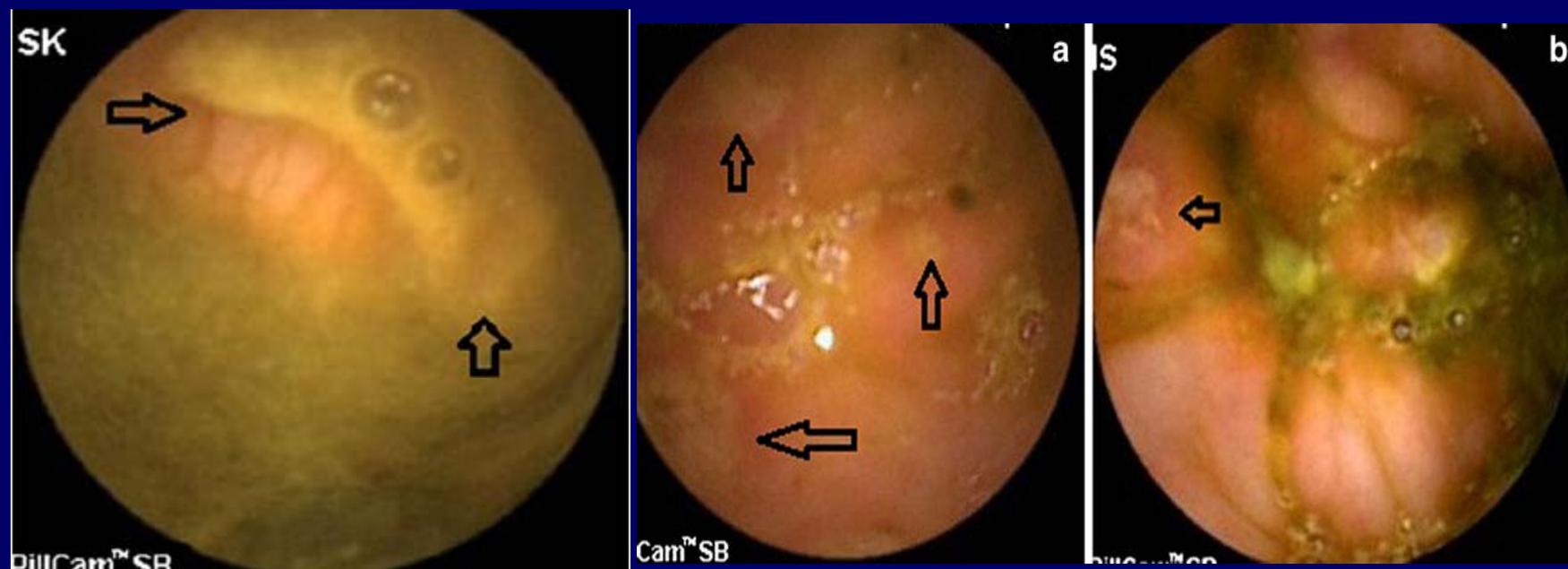
- Advances in miniaturization and efficiency of semiconductor technology
- Technology of Future

	PillCam SB2	EndoCapsule	MiroCam	OMOM	PillCam Colon 2	PillCam ESO2
Photo						
Diameter	11 mm	11 mm	11 mm	13 mm	11.6 mm	11 mm
Length	26 mm	26 mm	24 mm	27.9 mm	31.5 mm	26 mm
Weight	3.4 g	3.8 g	3.4 g	6 g	2.9 g	3.4 g
Frame rate	2 fps	2 fps	3 fps	0.5–2 fps	4–35 fps	18 fps
Image sensor	CMOS	CCD	CCD	CCD	CMOS	CMOS
Field of view	156°	145°	150°	140°	2 × 172°	2 × 169°
Illumination	6 white LEDs	6 white LEDs	6 white LEDs	6 white LEDs	2 × 6 white LEDs	2 × 6 white LEDs
Antennas	8	8	9	14	8	8
Real-time view	RT viewer	VE-1 viewer	Microviewer	RT monitoring	No	No
Recording time	8 h	9 h	11 h	7–9 h	10 h	30 min
FDA approval	Yes (2005)	Yes (2007)	No	No	No	Yes (2007)



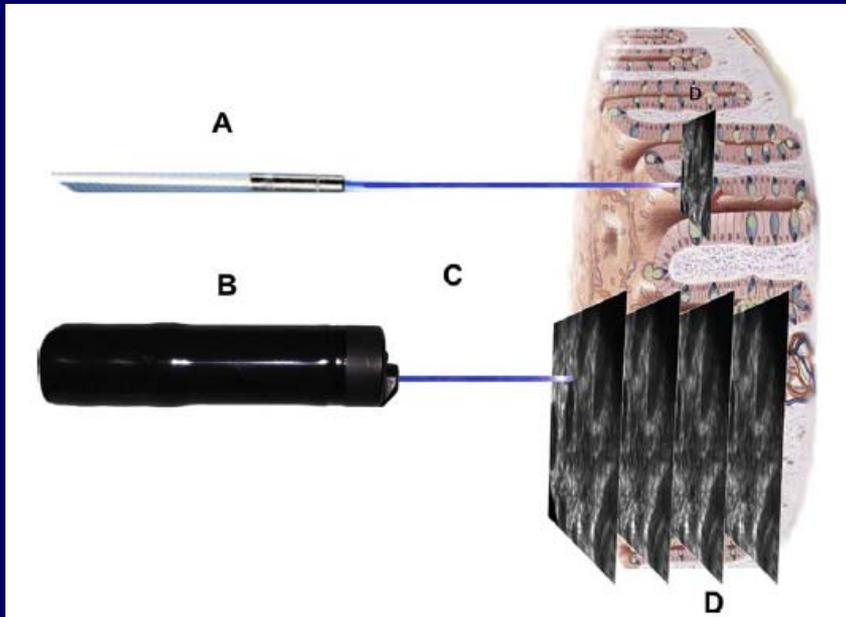
Colonic lesions in patients undergoing small bowel capsule endoscopy

Surinder S. Rana · Deepak K. Bhasin · Kartar Singh

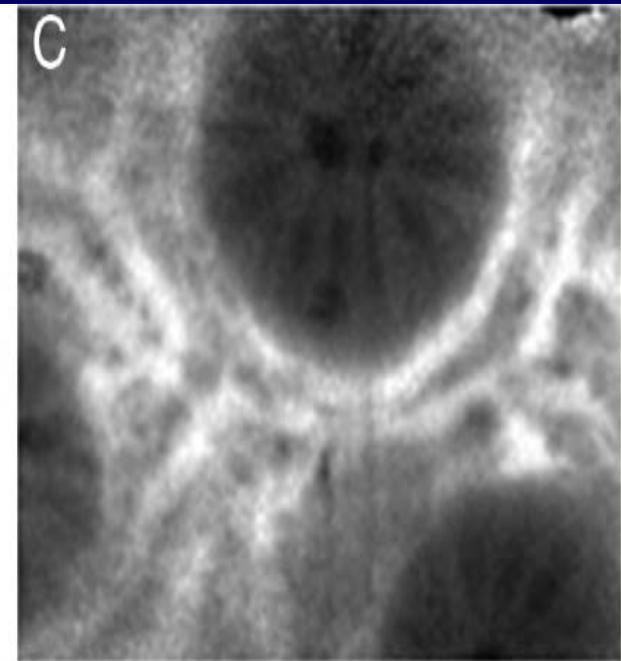
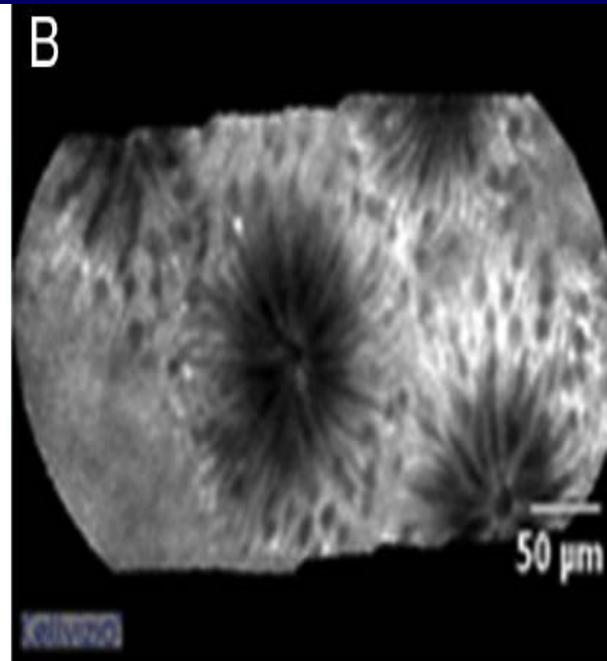


Confocal Laser Endomicroscopy

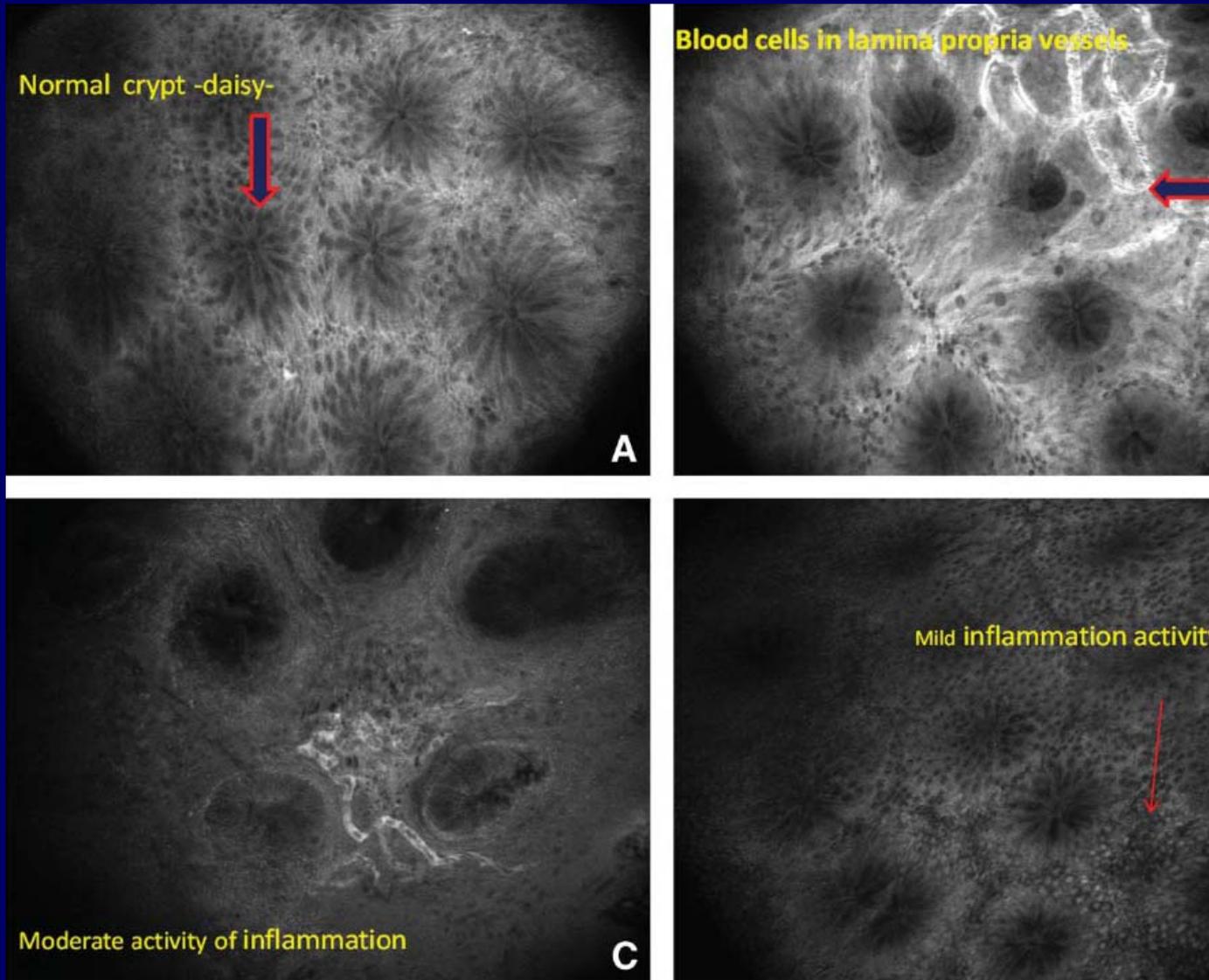
- Two types:
 - eCLE (endoscope-based CLE): measurement system integrated inside flexible endoscope
 - pCLE (probe-based CLE): measurement system introduced through operative channel of endoscope



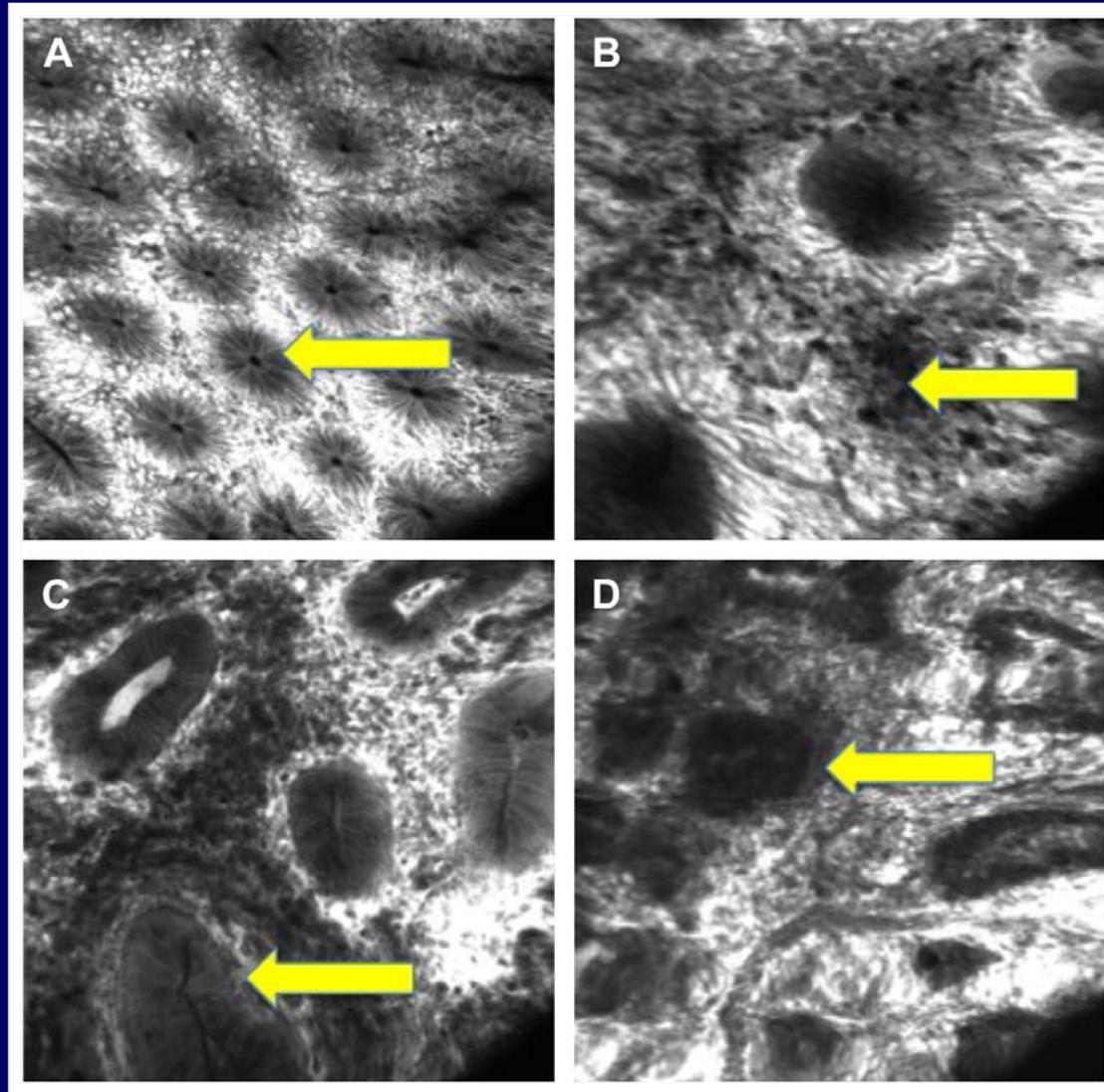
Confocal Endoscopy in Ulcerative Colitis



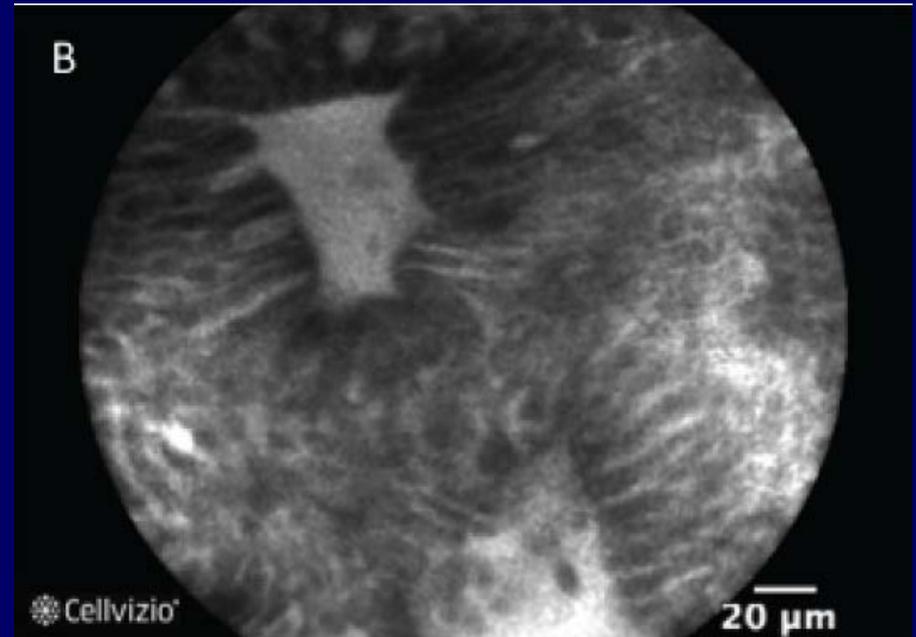
Confocal Endoscopy in Ulcerative Colitis



Confocal Endoscopy in Ulcerative Colitis

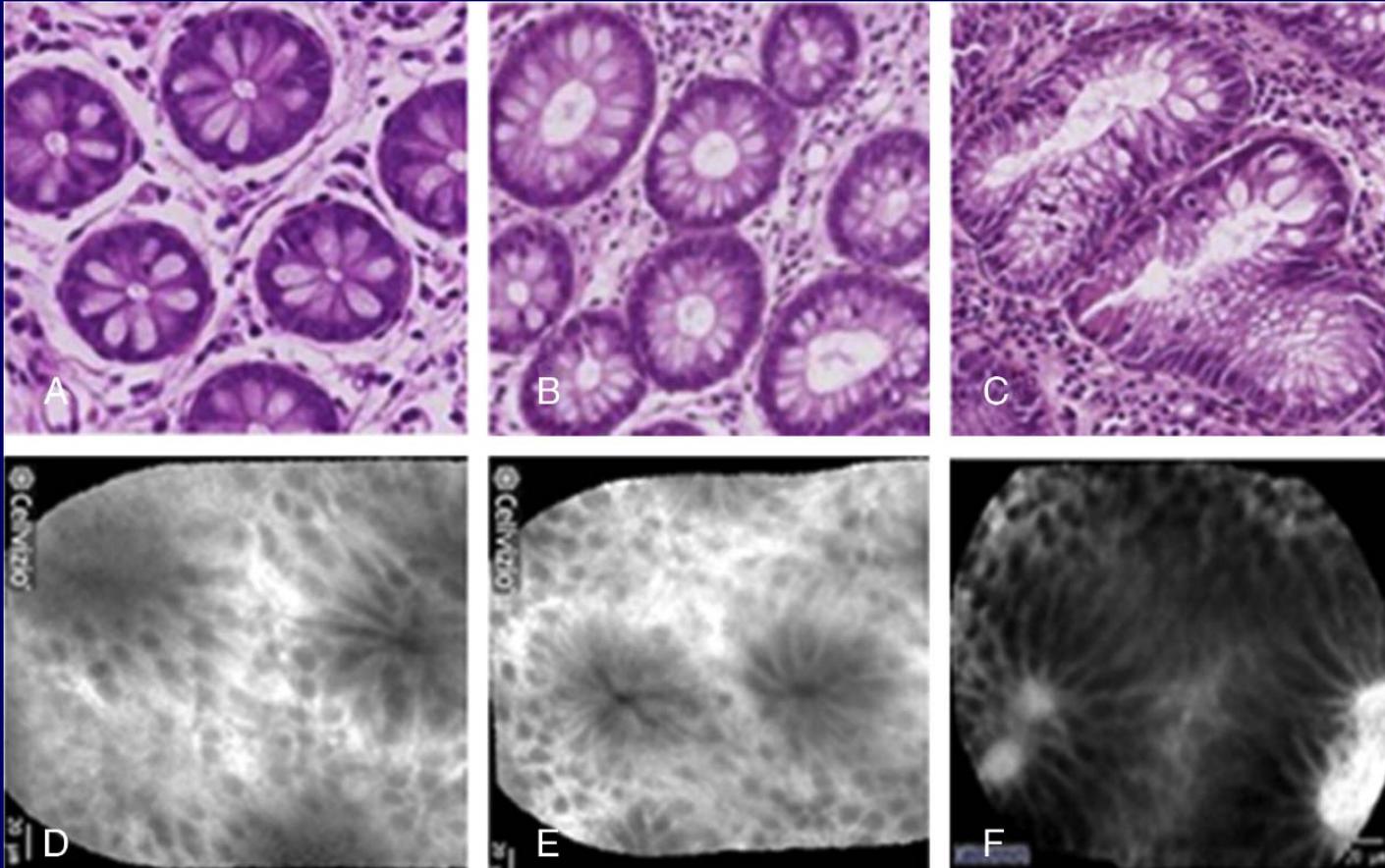


Confocal Endoscopy in Ulcerative Colitis

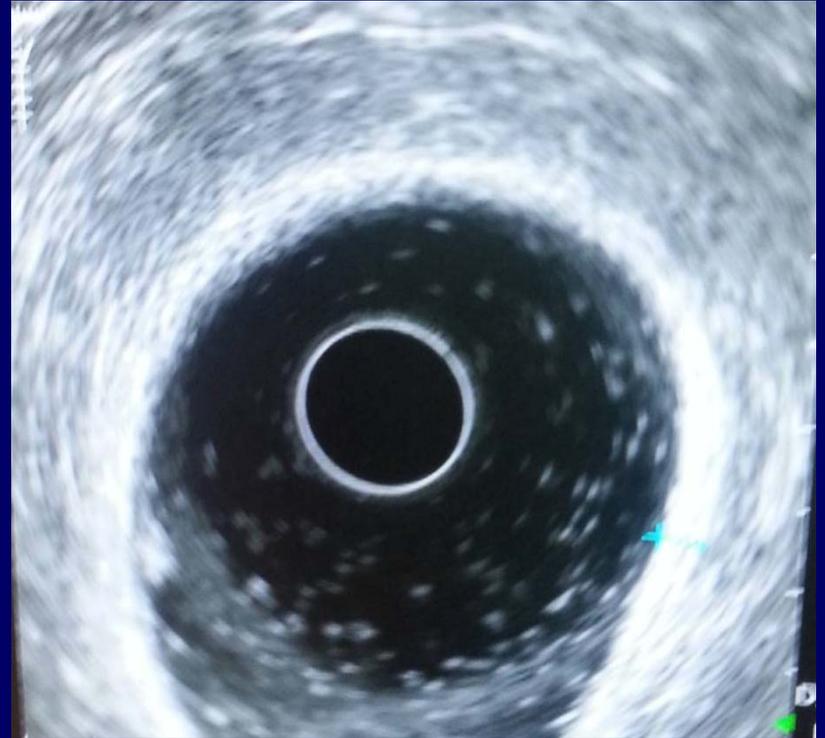
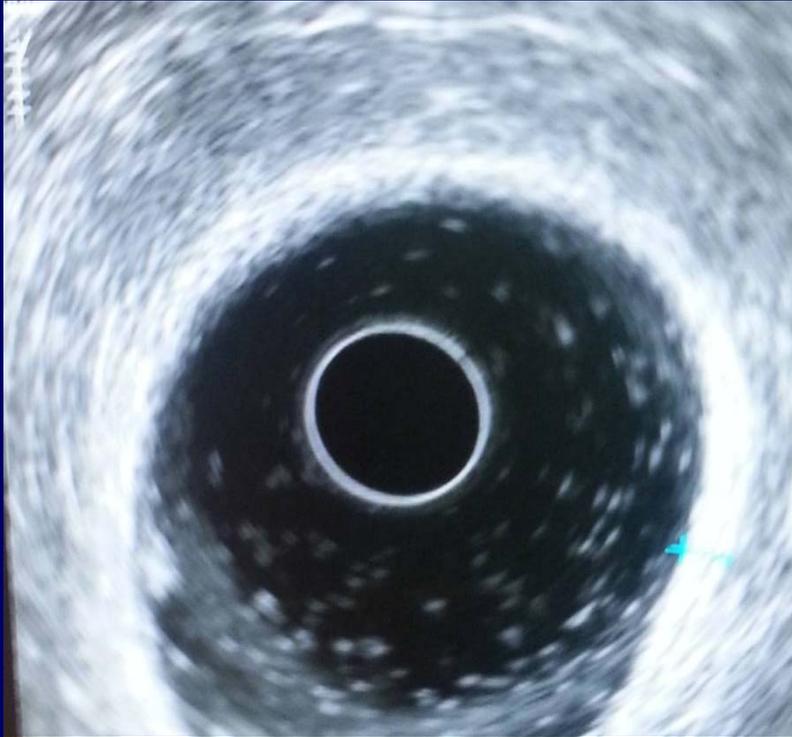


Confocal laser endomicroscopy for prediction of disease relapse in ulcerative colitis: A pilot study

Andrea Buda^{a,*}, Giorgia Hatem^a, Helmut Neumann^f, Renata D' Incà^a,
Claudia Mescoli^b, Pierluca Piselli^c, John Jackson^d,
Marco Bruno^e, Giacomo Carlo Sturniolo^a



EUS in IBD





Therapeutic Endoscopy

Therapeutic Endoscopy in IBD

- Endoscopic management of:
 - Strictures
 - Fistula
 - Perforations
 - Anastomotic leaks
 - Early cancers

Strictures

- Abnormal area of narrowing of intestinal lumen

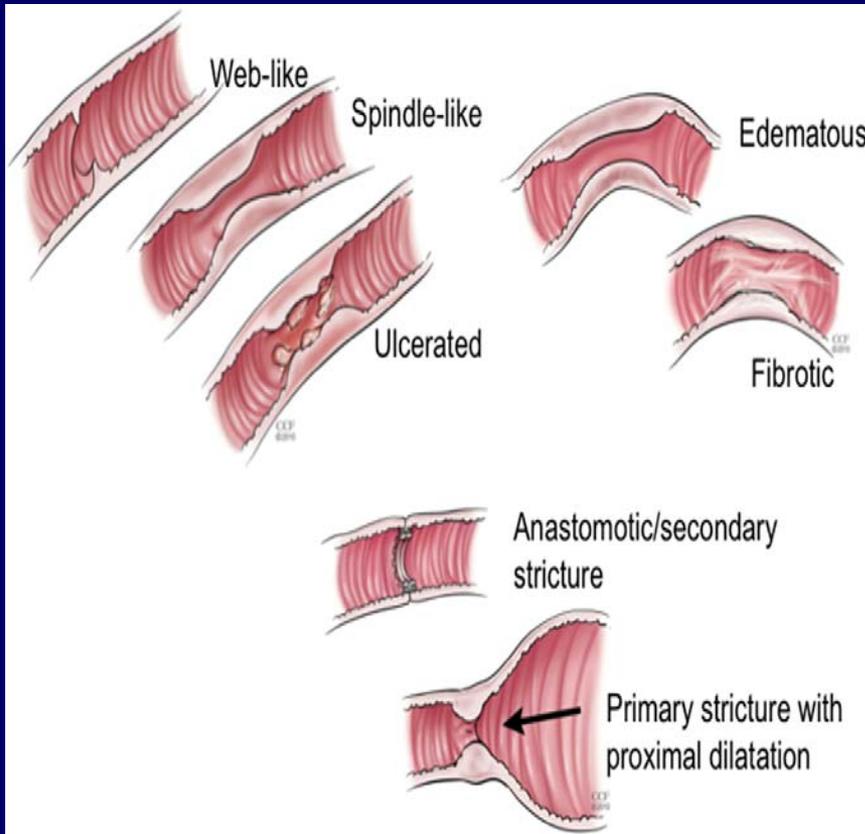


TABLE 2. Proposed classification of strictures in inflammatory bowel disease

Criteria	Classification
Etiology	Primary vs secondary (anastomotic); benign vs malignant
Number	Single vs multiple
Degree	High-grade vs low-grade
Shape	Web-like vs spindle-shaped; circumferential vs asymmetric
Length	Short vs long
Location	Esophagus, pylorus, small bowel, ileocecal valve anastomosis, colon, rectum, anus
Associated conditions	Fibrosis, edema, proximal dilation, ulceration, fistula with or without abscess, angulated, prior stricturoplasty

Strictures

- Endoscopic management:
 - Balloon dilatation
 - Intralesional steroid/infliximab injection
 - Needle knife stricturotomy
 - Stent placement

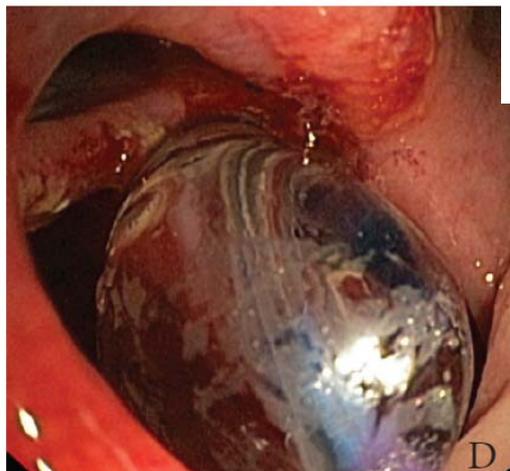
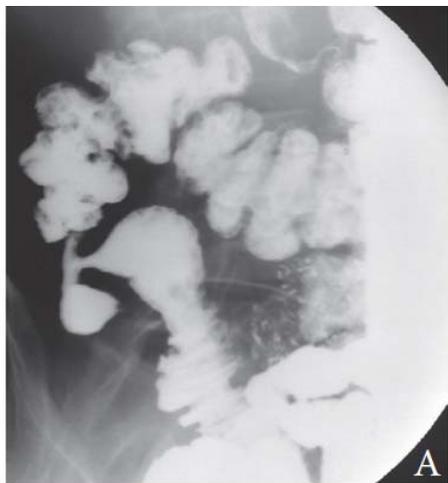
Balloon Dilatation



Tubercular *versus* Crohn's ileal strictures: role of endoscopic balloon dilatation without fluoroscopy

Surinder Singh Rana, Deepak Kumar Bhasin, Chalapathi Rao, Kartar Singh

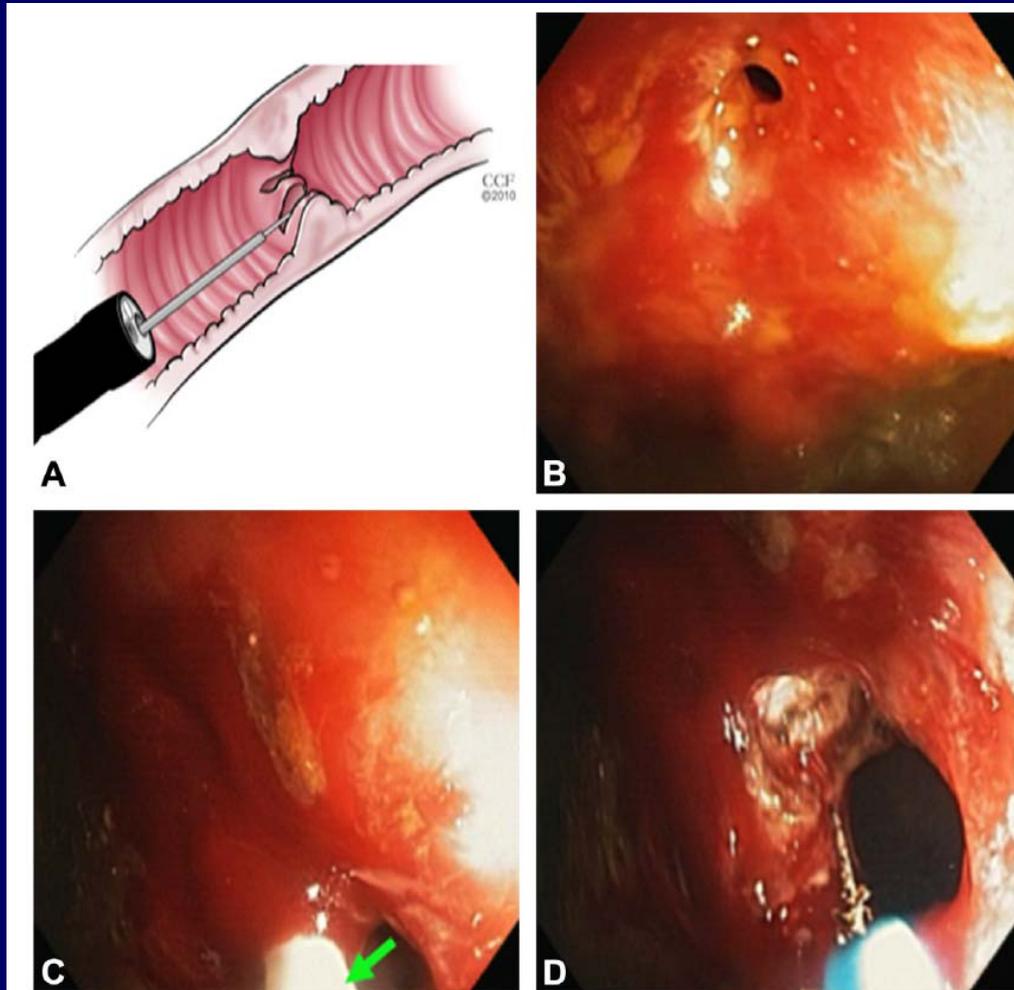
Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

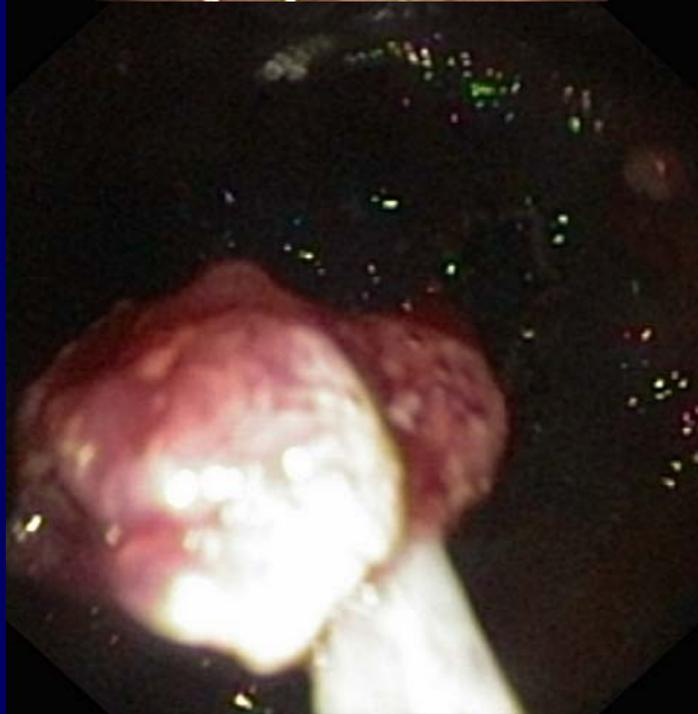
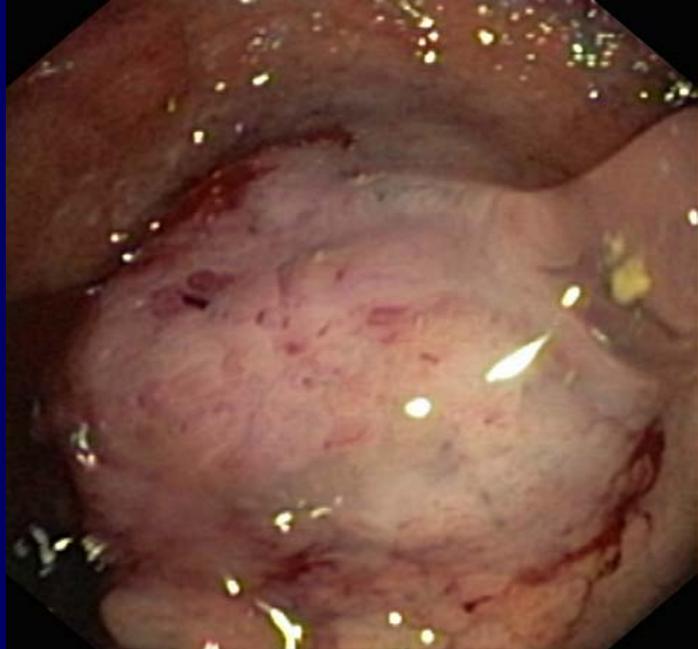


What the new findings are:

- EBD using a 15 mm balloon without fluoroscopy is an effective, safe, and minimally invasive treatment modality for benign ileal strictures of various etiologies including both Crohn's disease and tuberculosis
- Patients with Crohn's disease needed more number of endoscopic sessions as compared to patients with tuberculosis

Needle knife stricturotomy





Dysplasia & Colorectal Cancer Surveillance

- Risk for CRC is increased in active and extensive disease, severe disease, longer disease duration, young age of onset, backwash ileitis, family history of CRC, and with concurrent PSC
- Annual surveillance:
 - after 8 years of disease duration for patients with extensive colitis
 - after 15 years for those with isolated left-sided disease or patchy colitis

Dysplasia & Colorectal Cancer Surveillance

- High risk features (stricture or dysplasia detected within past 5 years, PSC, extensive colitis with severe inflammation or family history of CRC in first degree relative at <50 years): next surveillance colonoscopy scheduled for 1 year
- Intermediate risk factors: extensive colitis with mild or moderate active inflammation, post inflammatory polyps or family history of CRC in first degree relative at >50 years. Surveillance colonoscopy scheduled for 2 to 3 years
- No intermediate nor high risk features: next surveillance colonoscopy scheduled for 5 years

Dysplasia & Colorectal Cancer Surveillance

- Endoscopically: dysplasia either flat or elevated
- Flat dysplasia difficult to detect macroscopically
- Four quadrant biopsies should be taken from every 10 cm of colon

Contraindications and Complications

- **Contraindications: toxic megacolon and severe colitis**
- **Complications: perforation, bleeding and sedation related complications**

Conclusions

- Endoscopy has a major role in diagnosis of IBD, assessment of its extent, treating strictures, assessing success of various treatments, and as predictor of disease course
- Ileocolonoscopy with biopsies is preferred procedure
- CE has a high positive predictive value in patients with suspected Crohn's disease with normal capsule exam virtually excluding Crohn's disease
- Device-assisted enteroscopy is a complementary tool in cases where there is need of biopsies or dilatation of strictures
- Newer imaging modalities especially confocal endoscopy holds considerable promise as tool for real time in vivo histology

Endoscopy in IBD: How Far One Can Go!

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Endoscopy is a very important tool in managing patients with inflammatory bowel disease. It plays an important role in achieving correct diagnosis, adequately assessing the extent as well as activity of the disease and plays an important role in effective cancer surveillance. Therapeutic endoscopy is also an important tool for avoiding surgery by effectively treating complications and early cancers by endoscopic interventions. Traditionally endoscopy has been done with white light endoscopy but recent advances like endoscopic ultrasonography, magnification endoscopy, chromoendoscopy, optical endoscopy, and capsule endoscopy have expanded the endoscopic armamentarium.

White light endoscopy is the most important investigation for achieving correct diagnosis of IBD by directly visualising the inflamed tissue as well as obtaining specimen for histological evaluation. Although none of the endoscopic features are specific for ulcerative colitis (IUC) or Crohn's Disease (CD), but inflammatory changes beginning just above anorectal junction and spreading proximally in continuous fashion with clear demarcation between involved and normal areas suggests UC and presence of skip lesions, cobble stone appearance, aphthous ulcers, longitudinal ulceration, and anal lesions suggest CD. During ileocolonoscopy or sigmoidoscopy multiple biopsies should be taken from each region examined with at least 4 biopsies from each inflamed segment and an equal number from the normal segment within the reach. Newer imaging modalities especially confocal endoscopy holds considerable promise as tool for real time in vivo histology but further studies are needed before it can be incorporated in routine clinical practice.

Endoscopy is also an important tool for adequately assessing the extent as well as activity of the disease as the symptoms compatible with irritable bowel syndrome common in IBD patients in remission and endoscopy can help in differentiating the two. The location of disease is also important for deciding the route of administration. Capsule endoscopy (CE) is also an important tool for evaluating suspected small bowel lesions in Crohn's disease patients that are not visible on small bowel radiographs/cross sectional imaging.

Endoscopic interventions can also effectively treat various complications like strictures, fistula, perforations, anastomotic leaks and early cancers and thus avoid surgery. The various endoscopic interventions available for treatment of strictures in IBD include balloon dilatation, intralesional steroid/infliximab injection, needle knife stricturectomy and stent placement. Endoscopic polypectomy, mucosal resection and sub mucosal dissection are important therapeutic interventions for treatment of early colorectal cancers.

Endoscopy, although a safe technique is occasionally associated with complications like perforation, bleeding and sedation related complications. It should be avoided in patients with toxic megacolon and severe colitis to avoid complications.

Suggested reading:

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2. Chan G, Fefferman DS, Farrell RJ. Endoscopic assessment of inflammatory bowel disease: colonoscopy/esophagogastroduodenoscopy. *Gastroenterol Clin North Am*. 2012 Jun;41(2):271-90.
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5. Annese V, Daperno M, Rutter MD, et al; European Crohn's and Colitis Organisation. European evidence based consensus for endoscopy in inflammatory bowel disease. *J Crohns Colitis*. 2013 Dec 15;7(12):982-1018.
6. Paine E, Shen B. Endoscopic therapy in inflammatory bowel diseases (with videos). *Gastrointest Endosc*. 2013 Dec;78(6):819-35.