North Carolina Society of Gastroenterology
2026 Annual Meeting

Postoperative Care in Crohn's Disease: How to Prevent Complications and Improve Outcomes

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Joint Providership

Wake Forest University
School of Medicine

The academic core
of Atrium Health

American Society for
Gastrointestinal Endoscopy

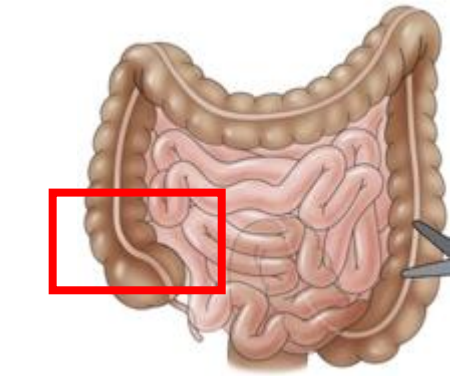
Disclosures: None

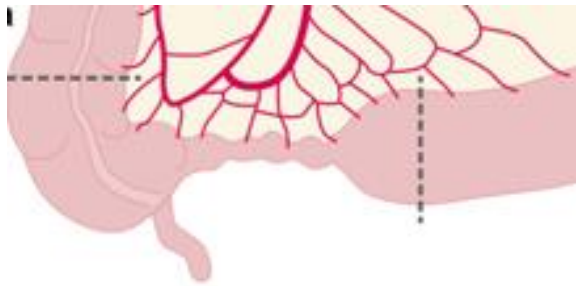
Objectives:

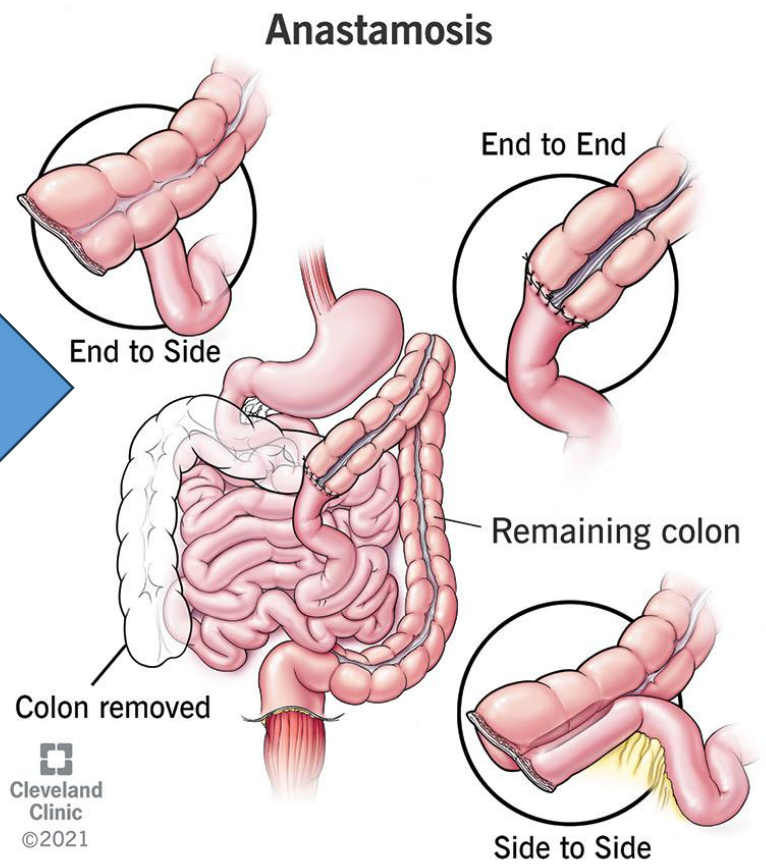
- *Optimize patients preoperatively to prevent postoperative complications and recurrence*
- *Initiate timely postoperative biologic prophylaxis in high- risk patients to prevent recurrence*
- *Monitor patients with fecal calprotectin, ileocolonoscopy +/- IUS to identify early postoperative recurrence*

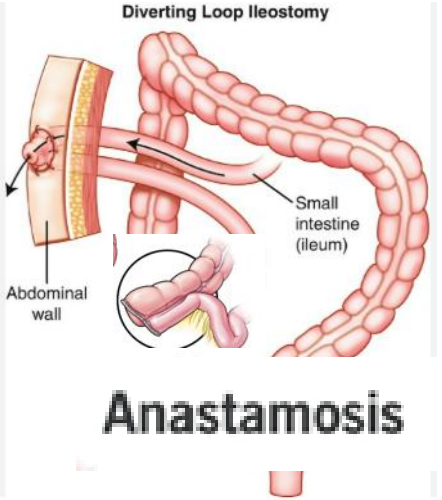
NCSG
North Carolina Society of Gastroenterology

Ileocolonic Resection +/- Ileostomy







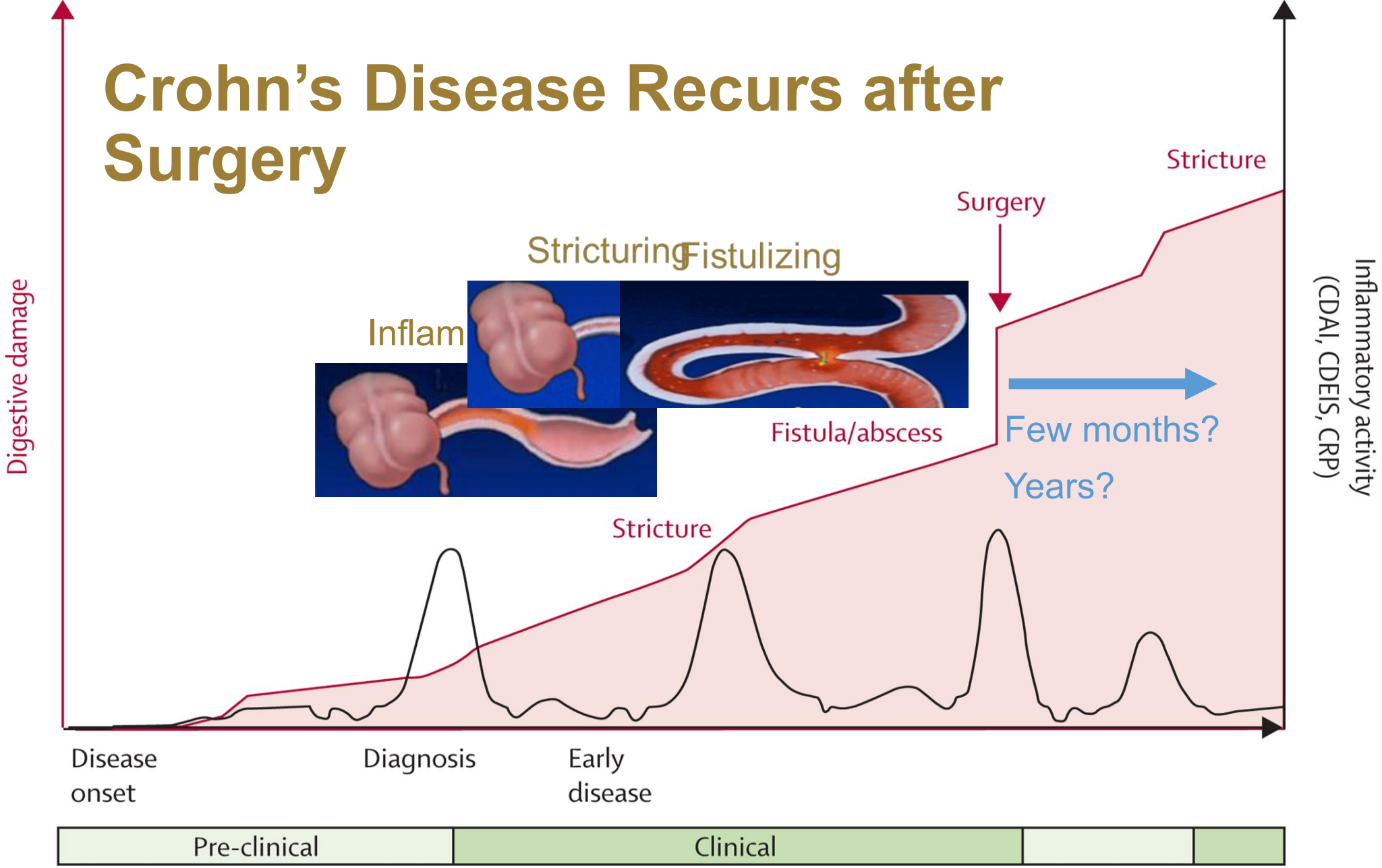


Common Reasons:

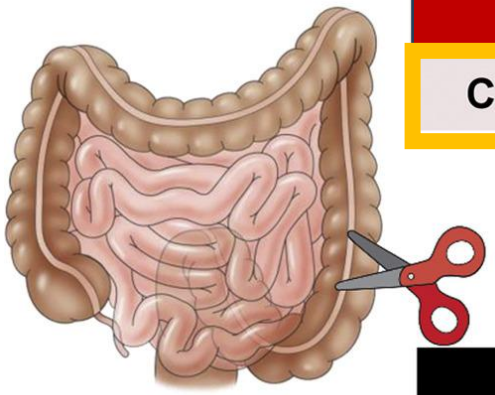
- Chronic steroid use
- Smoking
- Malnourishment
- Obesity
- Infection

https://my.clevelandclinic.org/health/treatments/24035-anastomosis

Crohn's Disease Recurs after Surgery

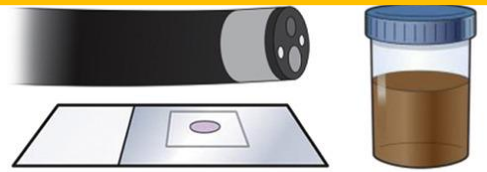


Rates of surgery for Crohn's disease are decreasing in the modern management era

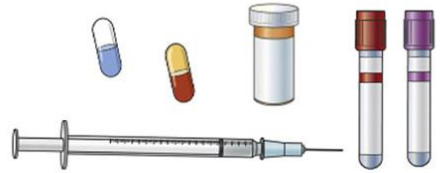


Before 2000

	1-y risk of surgery	5-y risk of surgery	10-y risk of surgery
Crohn's disease	23.6% (18.3-29.9)	35.7% (29.2-42.9)	46.5% (36.7-56.6)



Improved management

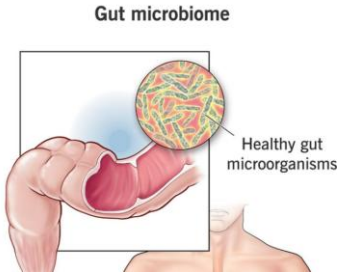


After 2000

	1-y risk of surgery	5-y risk of surgery	10-y risk of surgery
Crohn's disease	12.3% (10.8-14.0)	18.0% (15.4-21.0)	26.2% (23.4-29.4)

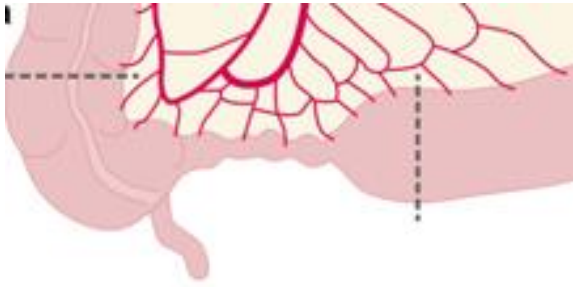
Clinical Gastroenterology and Hepatology

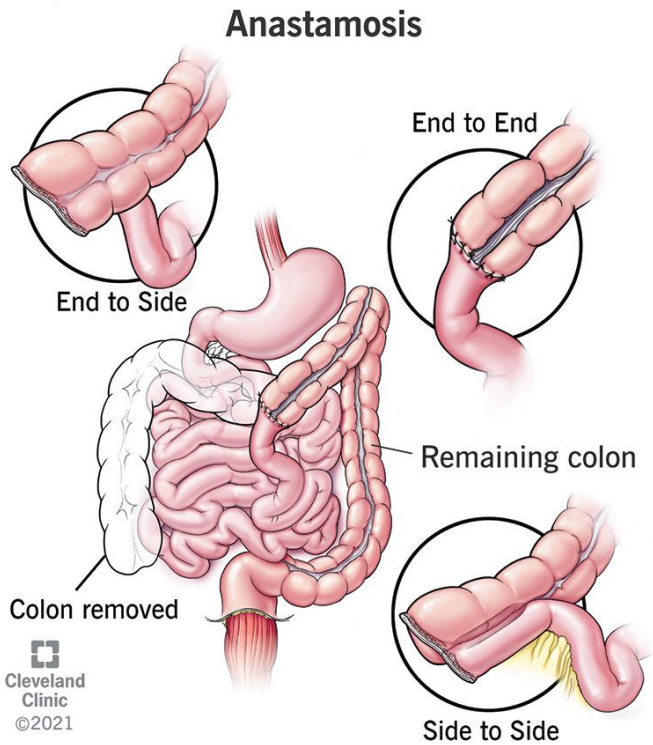
Pathophysiology of Postoperative Crohn's Disease



MICROBIOME

- Removal of IC Valve → Colon contents reflux to neoterminal ileum
- Bile acid exposure
- Dietary/nutritional alterations





MESENTERY

- Creeping fat (hyperplastic mesenteric adipose) wraps around the bowel

IMMUNE SYSTEM

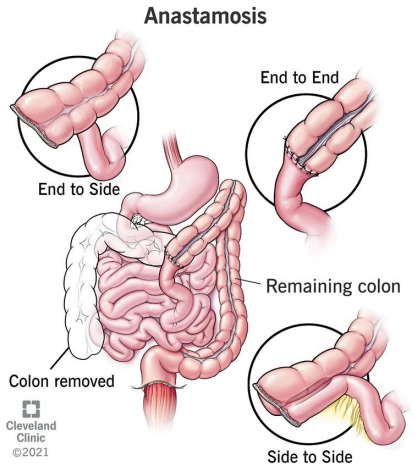
- T Cell Clonality
- Cytokines
- Glial cells

GENETICS

Horisberger K et al.
Riviere et al.
https://my.clevelandclinic.org/health/treatments/24035-anastomosis

Key Takeaway: Objective Recurrence Precedes Clinical Recurrence in the Natural History of Postoperative Crohn's

Bowel Continuity



(<1 week)

Histologic Recurrence

Often <1 year

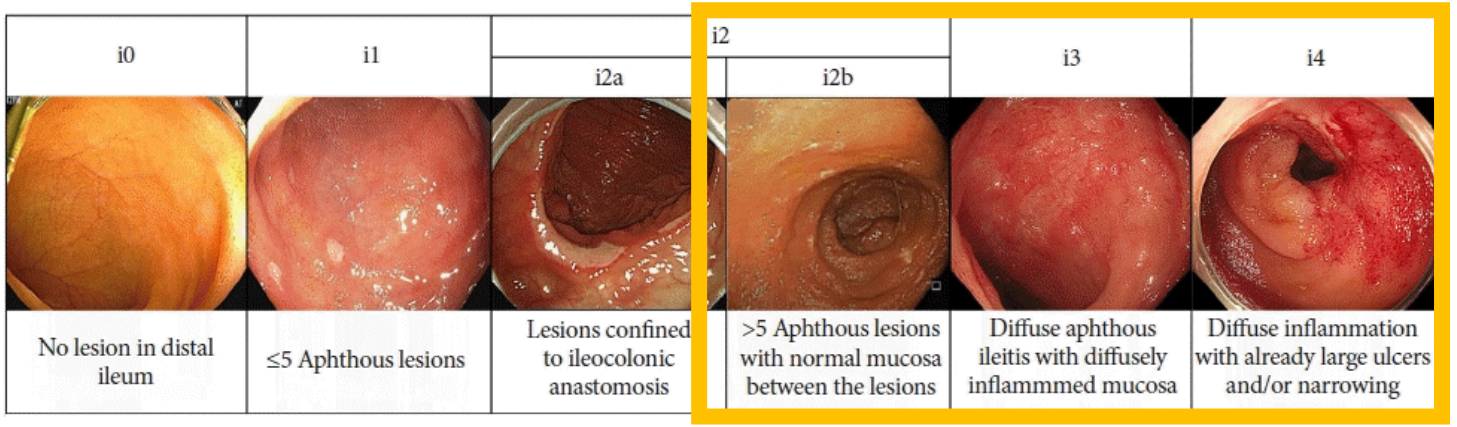
Endoscopic Recurrence
Up to 70% within 1 yr

Radiographic Recurrence

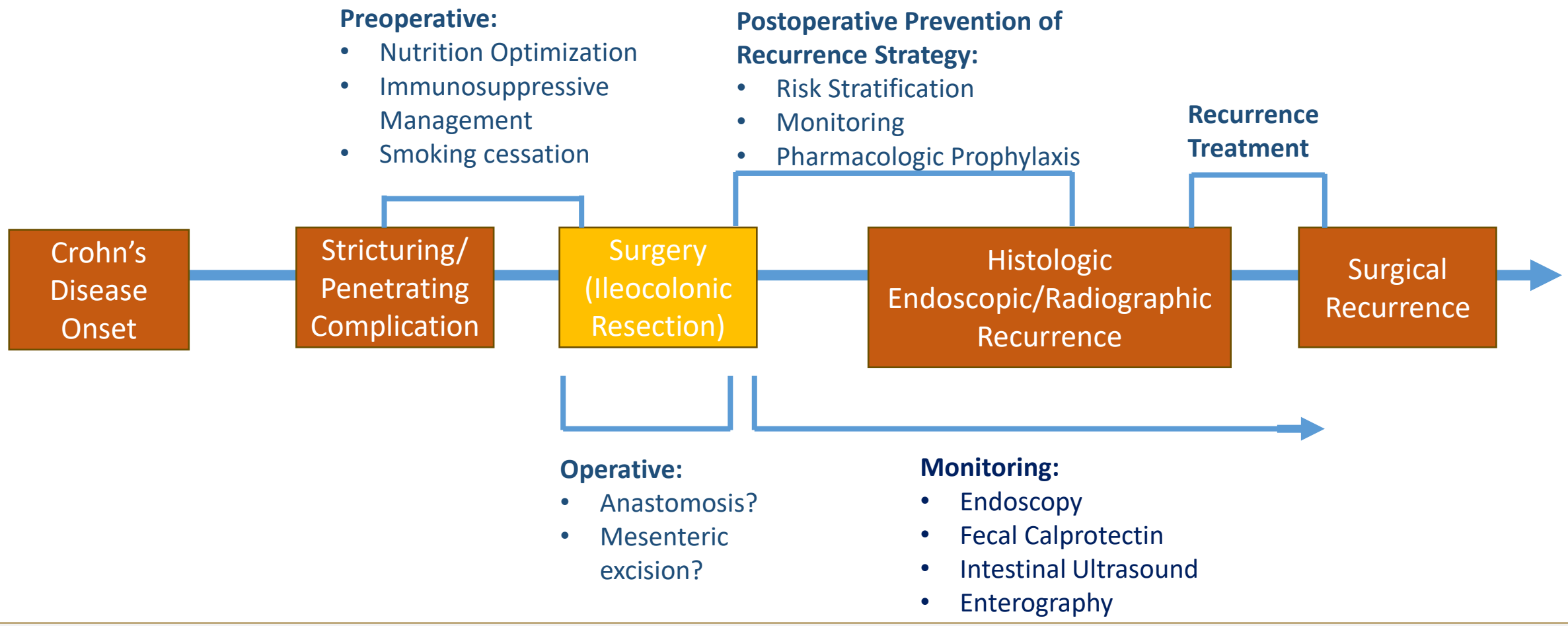
Clinical Recurrence
30% at 3 yr
60% at 5 yr

Surgical Recurrence
~20% at 5 yr

Modified Rutgeerts' Score



Adapted from Miguel Regueiro


Preoperative:
• Nutrition Optimization
• Immunosuppressive Management
• Smoking cessation
Postoperative Prevention of Recurrence Strategy:
• Risk Stratification
• Monitoring
• Pharmacologic Prophylaxis
Recurrence Treatment
Crohn's Disease Onset
Stricturing/ Penetrating Complication
Surgery (Ileocolonic Resection)
Histologic Endoscopic/Radiographic Recurrence
Surgical Recurrence
Operative:
• Anastomosis?
• Mesenteric excision?
Monitoring:
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• Fecal Calprotectin
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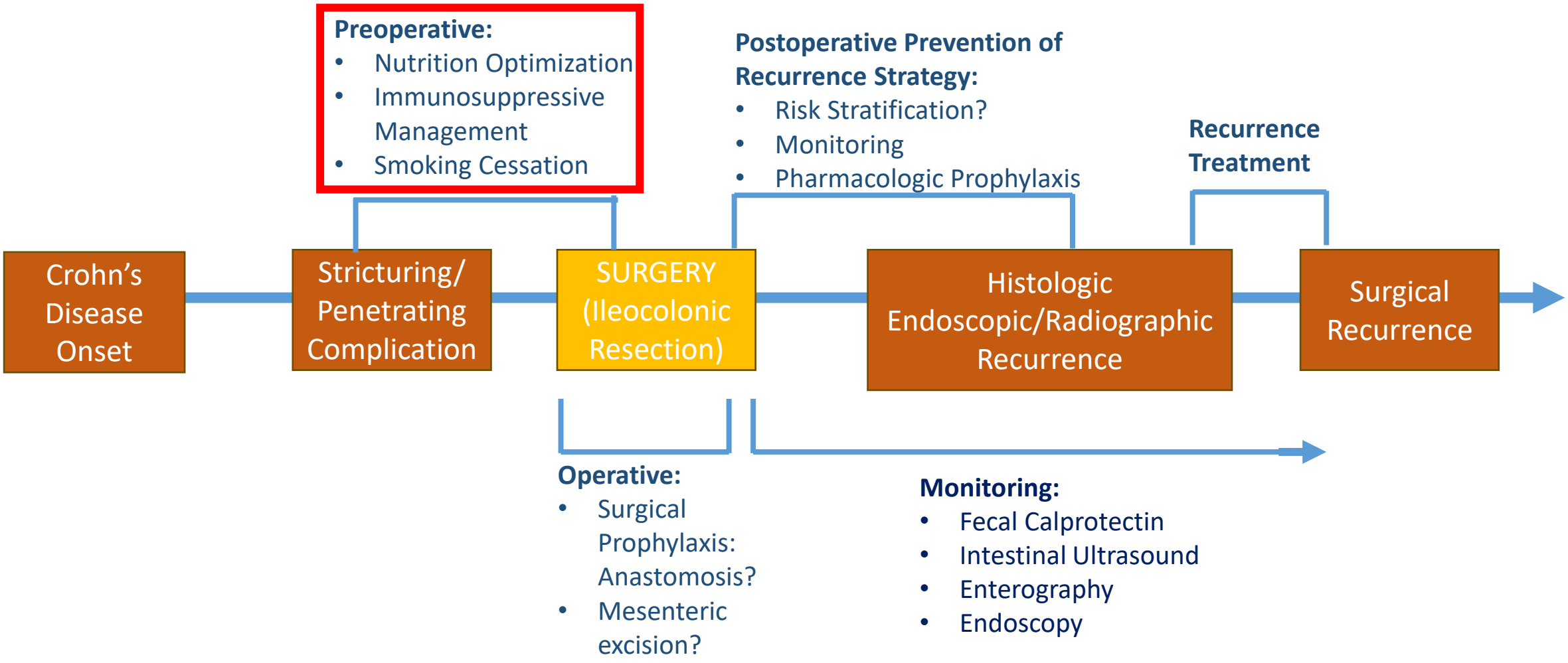
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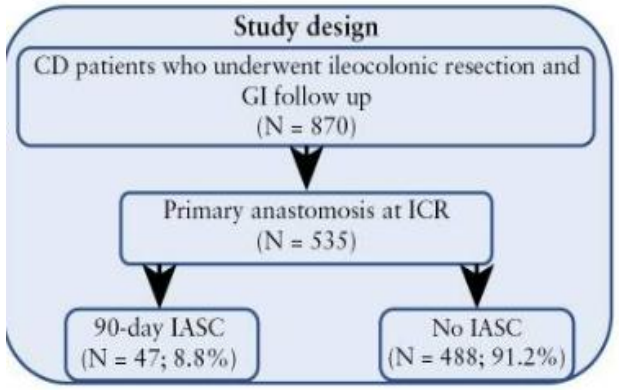
ICR +/- ostomy

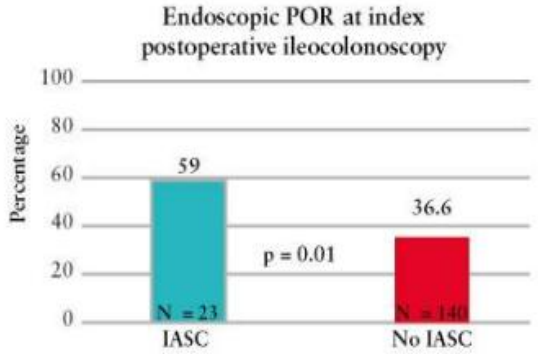
Postoperative Complications

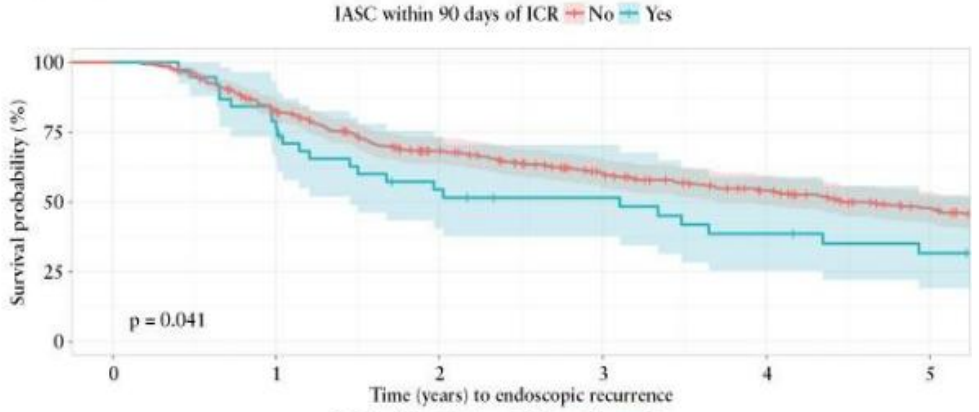
Postoperative Recurrence of Crohn's

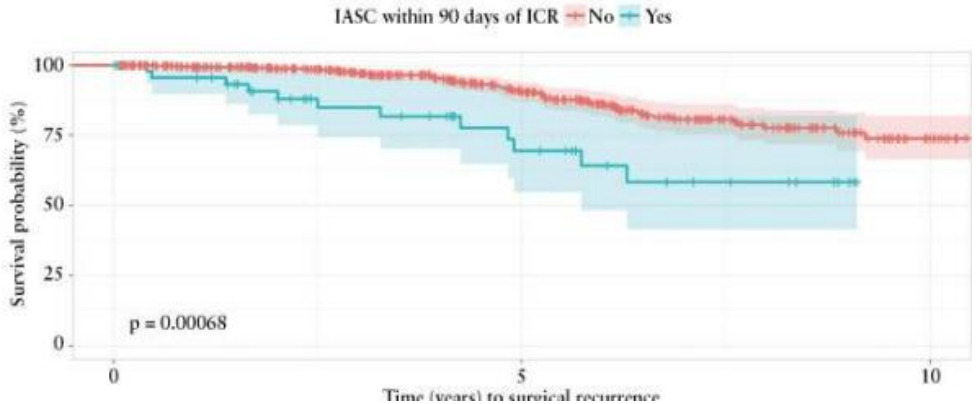
Intra-abdominal Septic Complications are a Risk factor for Postoperative Crohn's Disease

Intraabdominal septic complications after ileocolic resection increases risk for endoscopic and surgical postoperative Crohn's disease recurrence



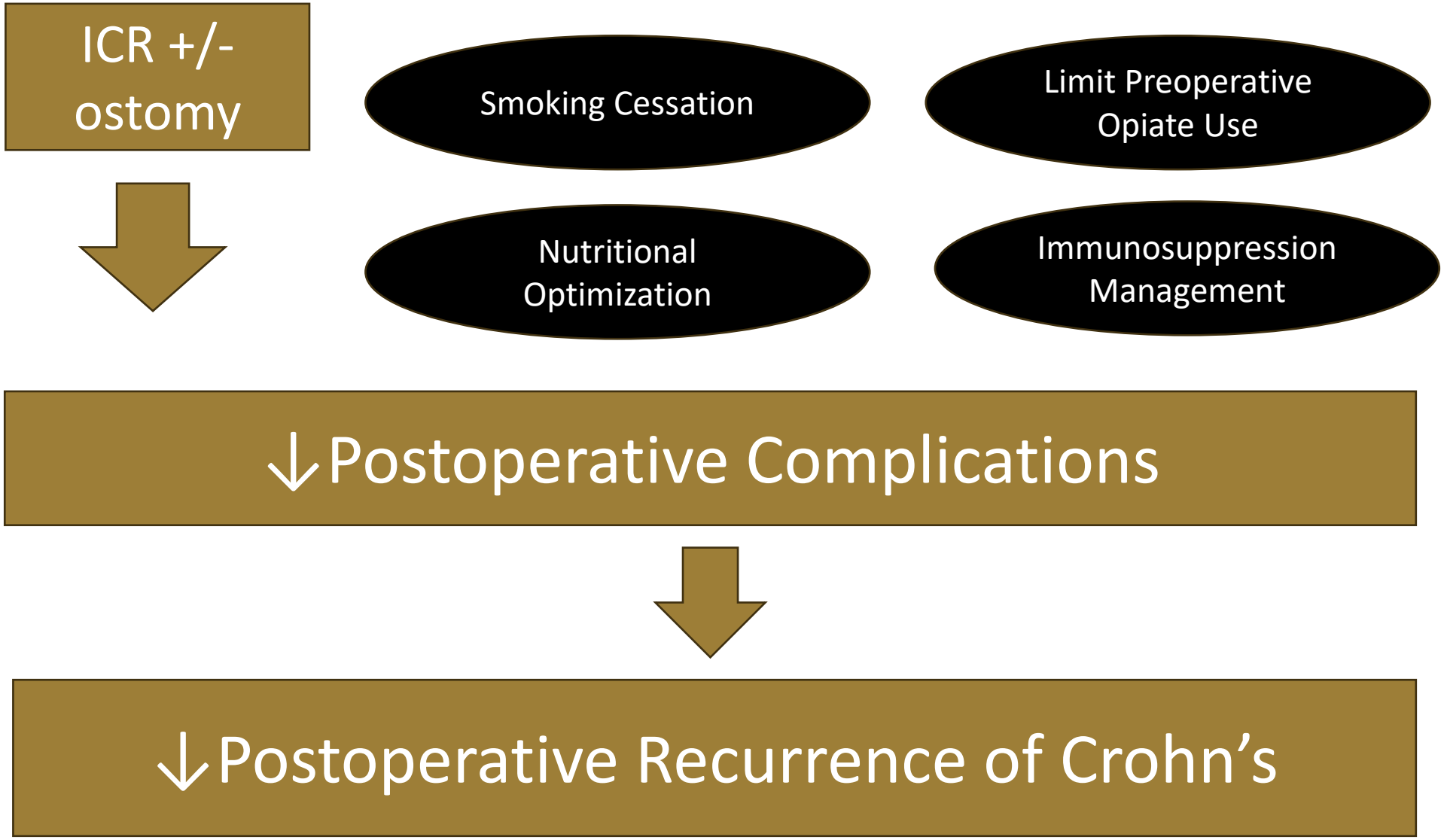






Bachour et al.

Preoperative Optimization to Prevent Postop Complications



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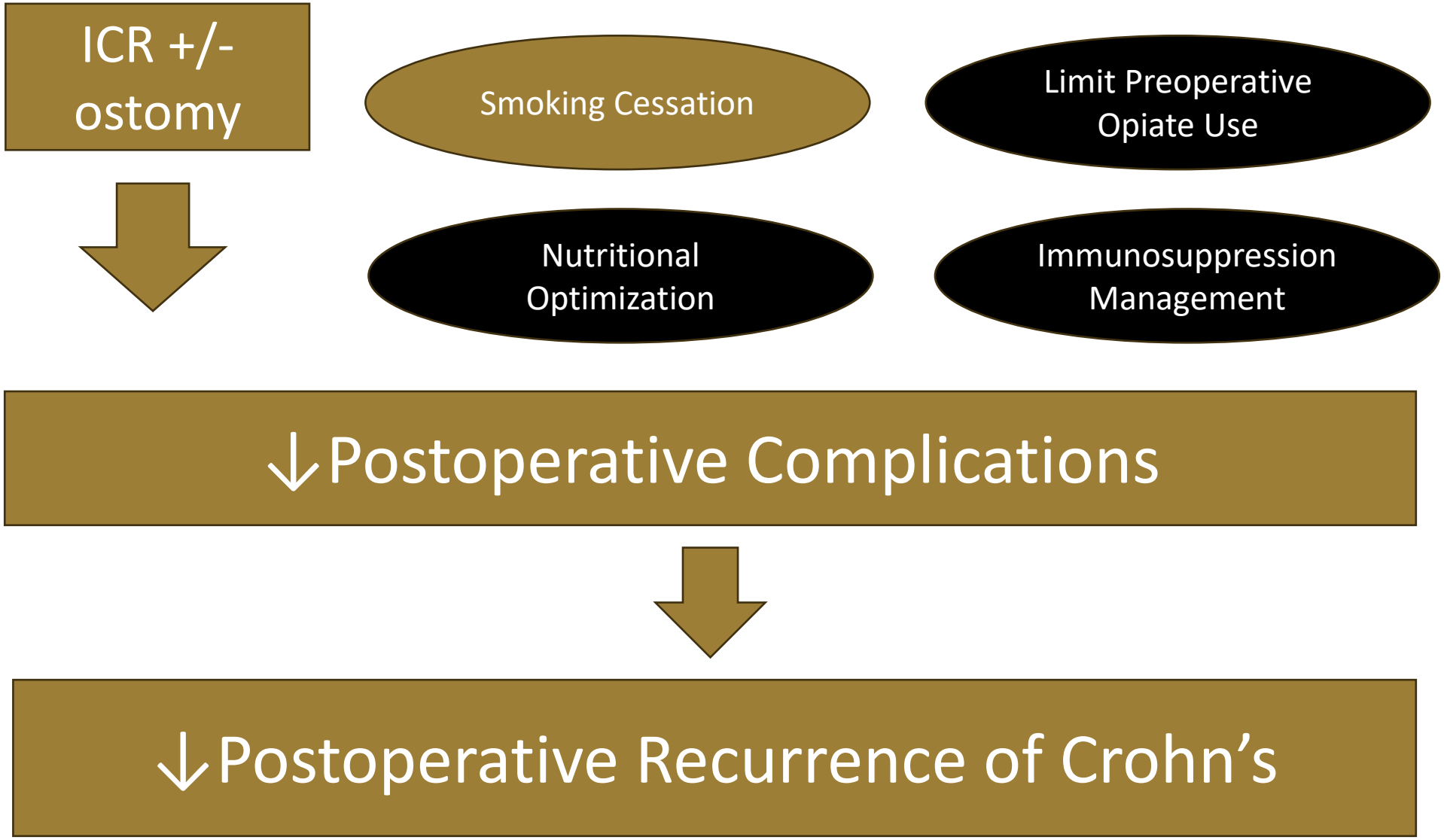
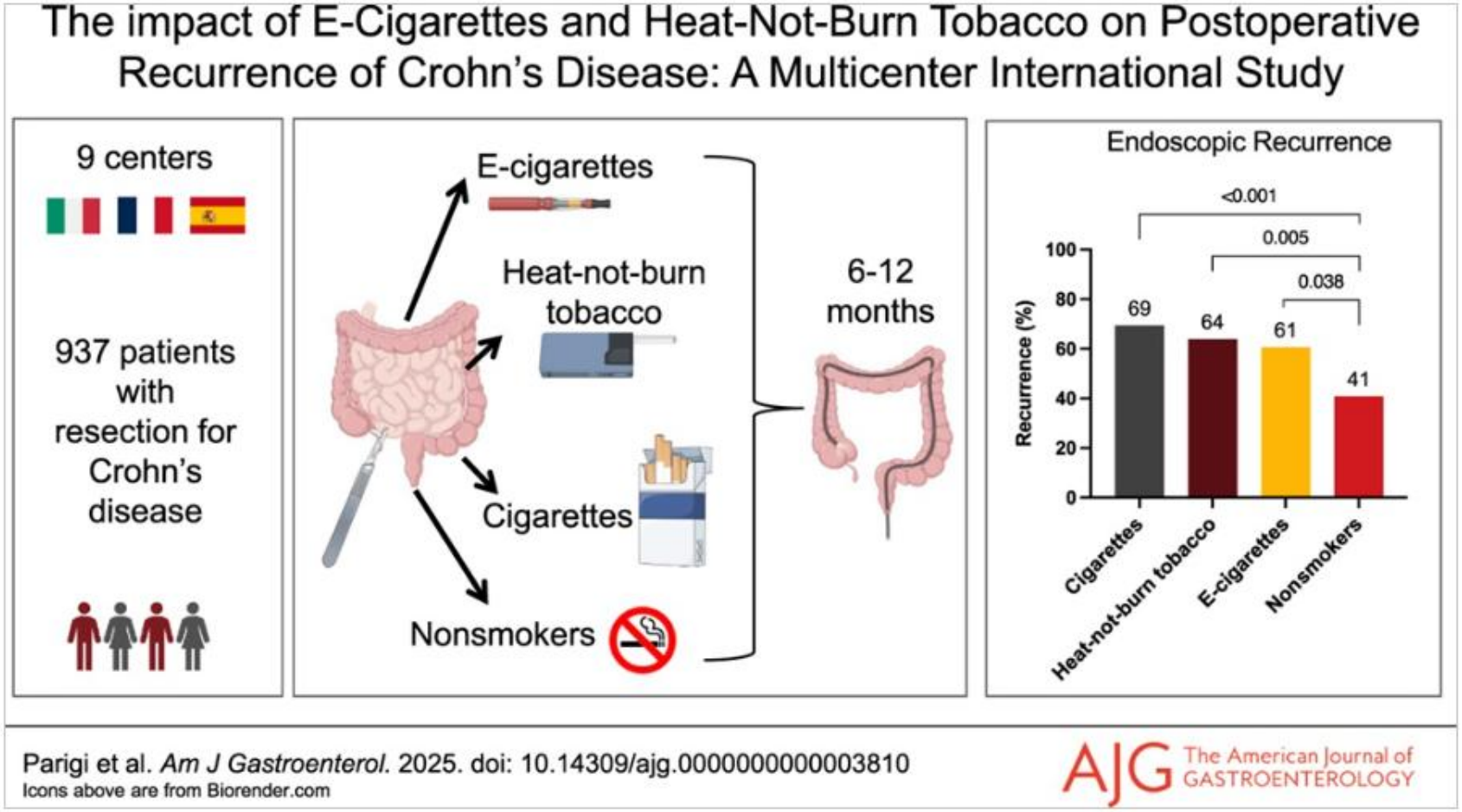


Smoking is associated with Postoperative Complications & Recurrence of Crohn's

- Smoking is associated with postoperative complications
- Smoking, independently, is one of the strongest risk factors for postoperative Crohn's recurrence
  - Alteration of microbiome in neoterminal ileum (↑*Proteus*)

Smoking (any) is associated with POR



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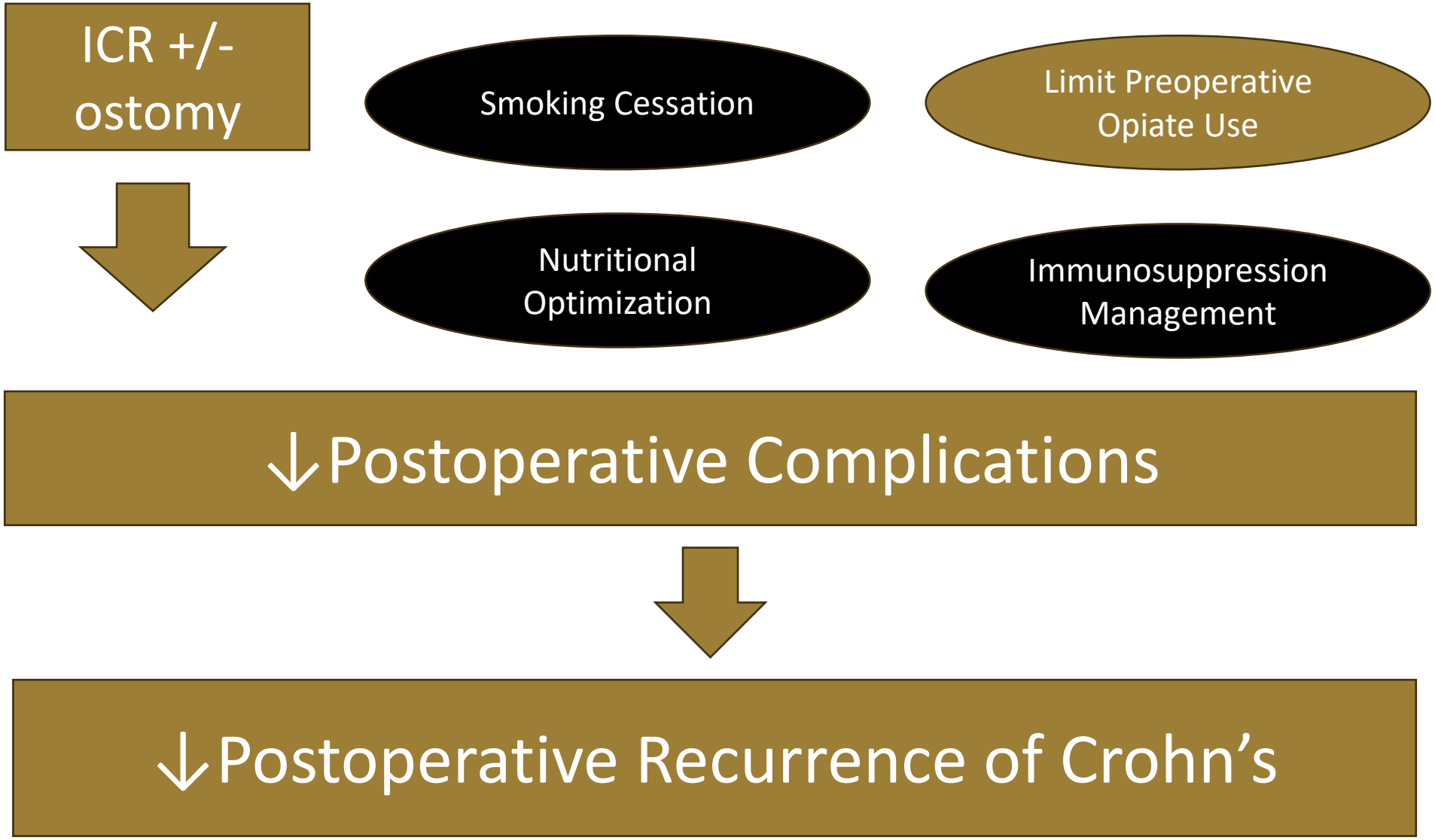
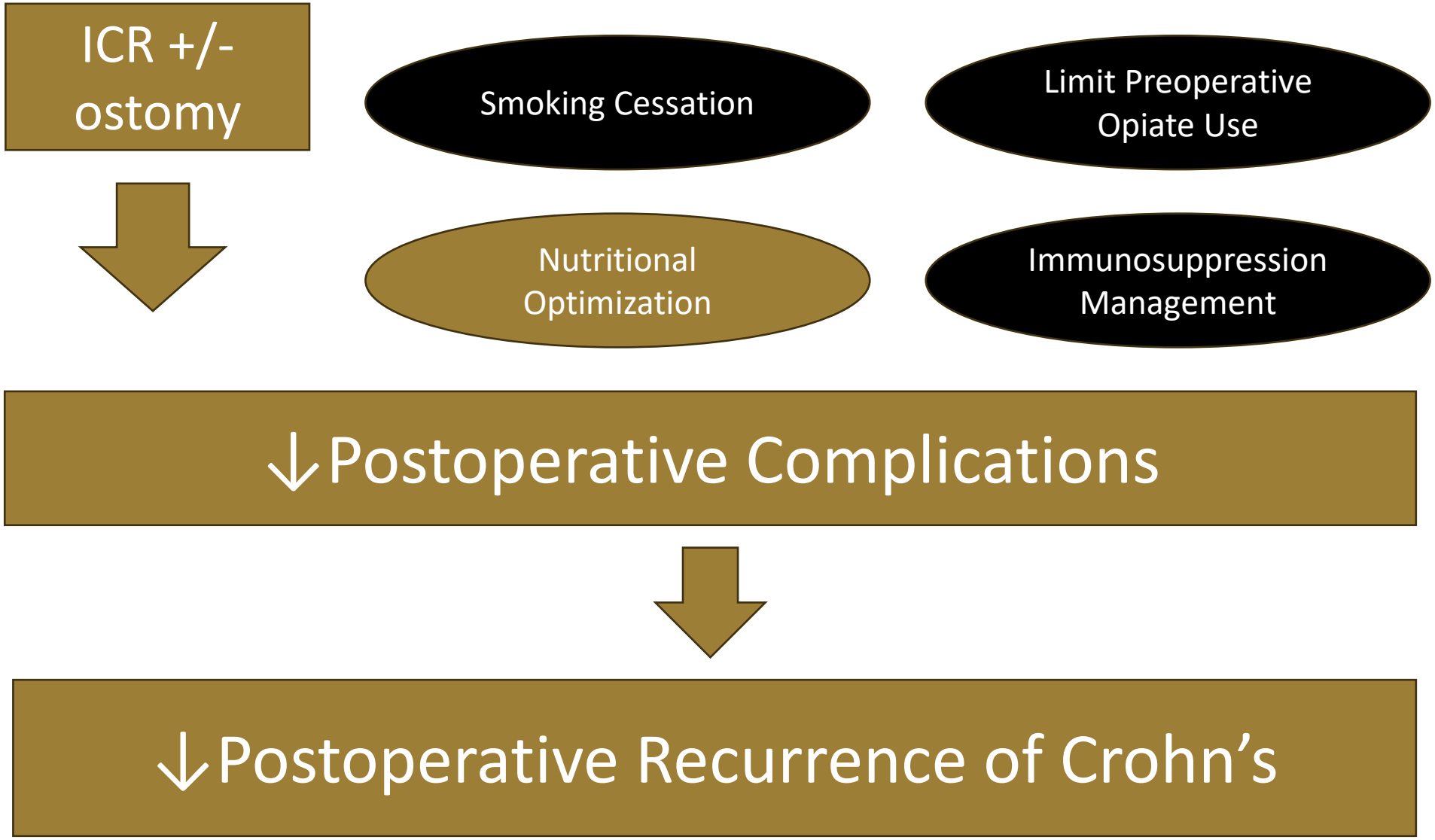


Initiation of Preoperative Opiates Portrays Worse Postoperative Outcomes

- Increased LOS
- Readmission
- Major postoperative complications
- Higher healthcare utilization

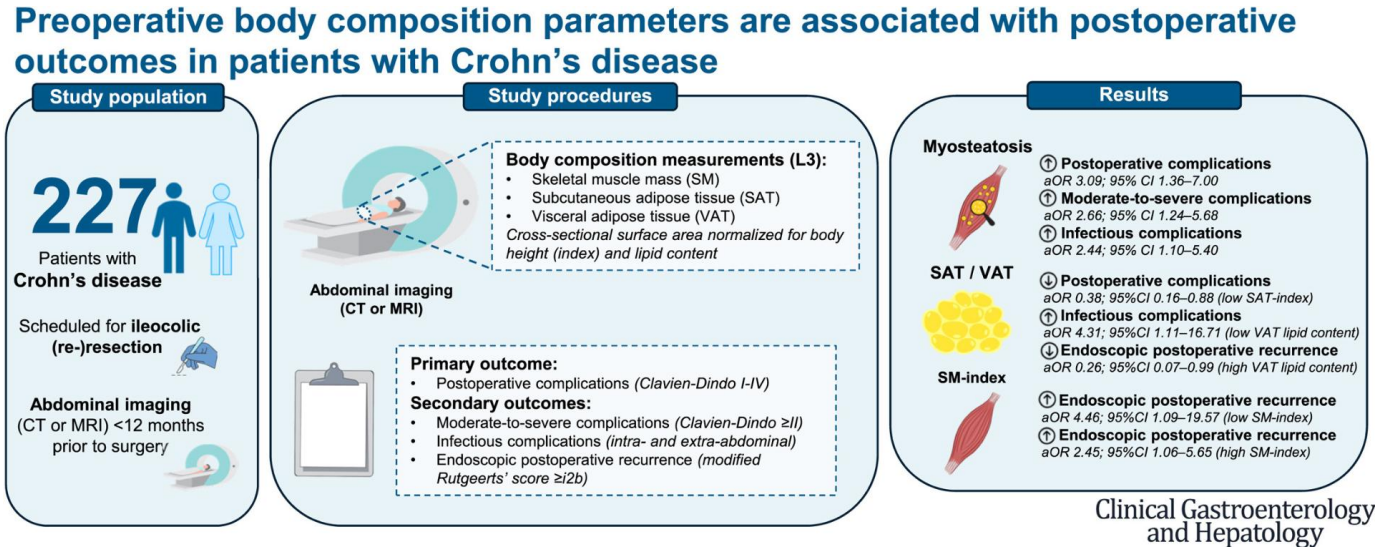
Preoperative Optimization to Prevent Postop Complications



Nutritional Optimization to Prevent Postoperative Complications

- Malnourished
- Sarcopenia (any range of weight)
- Myosteatosis (any range of weight; elderly, obese)

- Postop complications
- Postop infections
- Recurrence



Nutritional Optimization to Prevent Postop Complications

Dietician involvement early & often

EEN (2-6 weeks preop)

- Decreased surgical stay
- Decreased postop complications

TPN

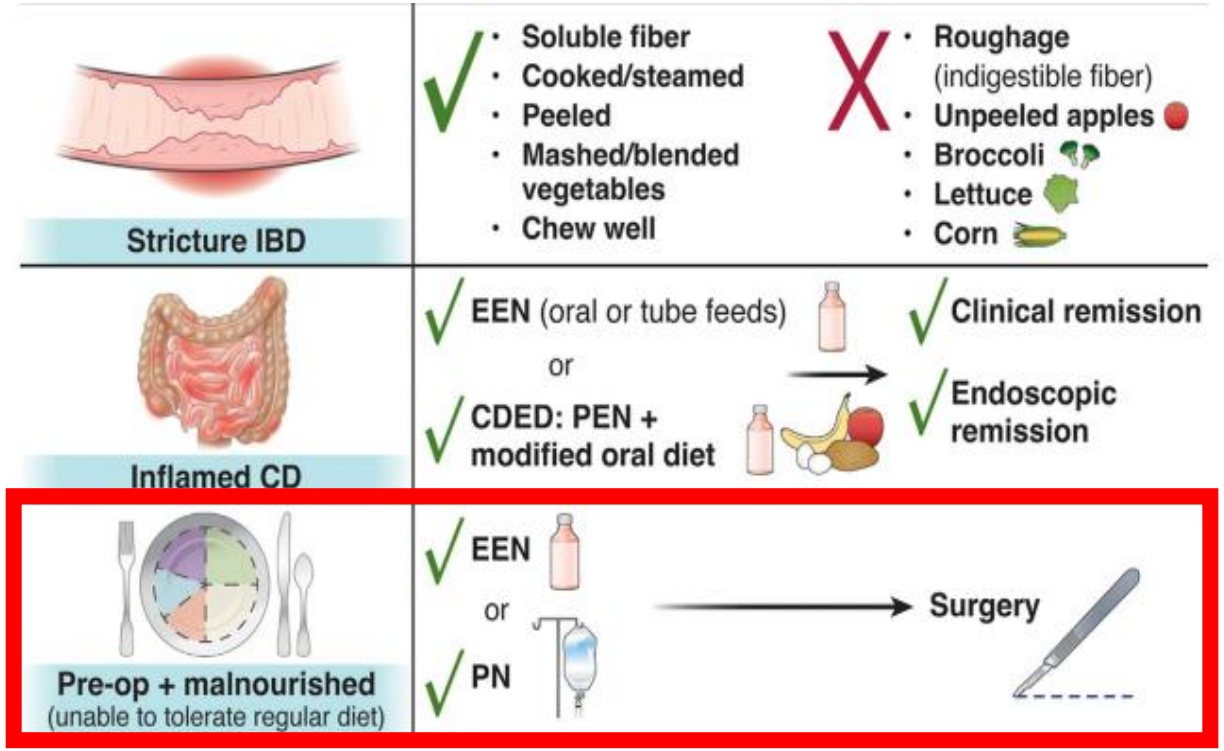
- Decreased postop complications

EEN > TPN

- Safer
- Decreased postop complications

Specific micronutrient alterations

- 520 food diaries from 103 patients (Bak et al.)
- ↓ isoflavones, pinitol → ↓ ePOR



Gastroenterology 2024;166:521–532

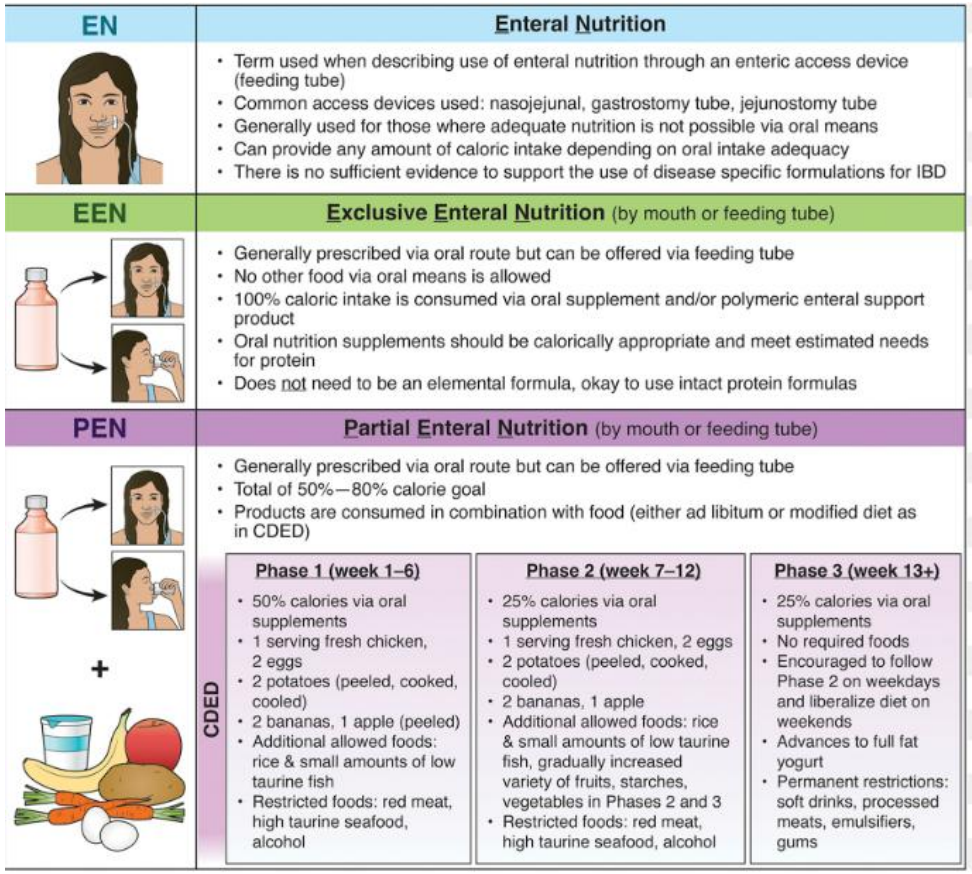
CLINICAL PRACTICE UPDATES

AGA Clinical Practice Update on Diet and Nutritional Therapies in Patients With Inflammatory Bowel Disease: Expert Review

Jana G. Hashash,[1] Jaclyn Elkins,[2] James D. Lewis,[3] and David G. Binion[4]

Enteral nutrition as an adjunct therapy to prevent postoperative Crohn's disease?

- 4 weeks Preoperative EEN vs not
  - Endoscopic recurrence: 11.9% vs 28.4% at 6 months (p=0.03) but no difference at 12 months (p=0.059) (pilot study)



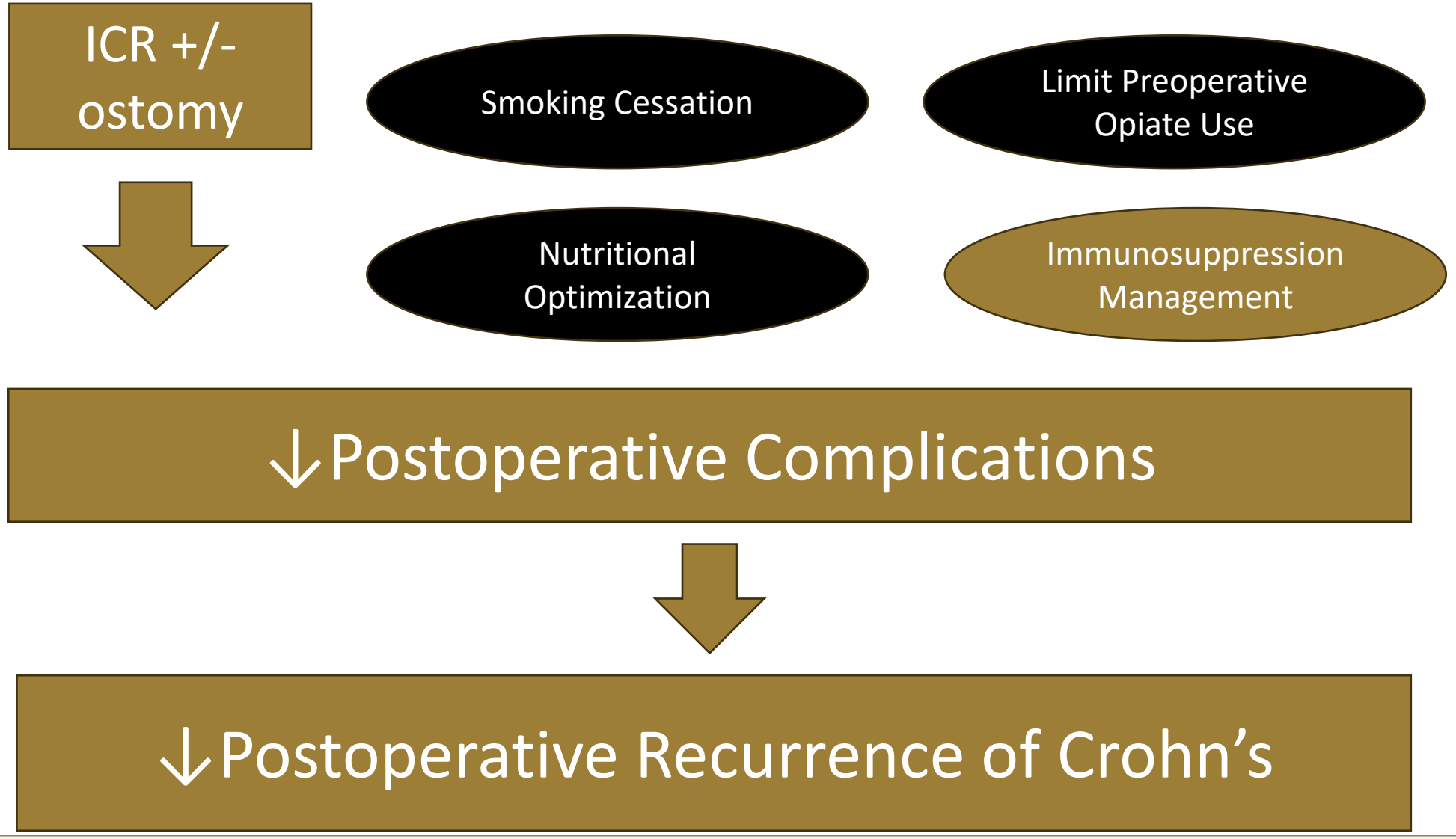
EN	**Enteral Nutrition** • Term used when describing use of enteral nutrition through an enteric access device (feeding tube) • Common access devices used: nasojejunal, gastrostomy tube, jejunostomy tube • Generally used for those where adequate nutrition is not possible via oral means • Can provide any amount of caloric intake depending on oral intake adequacy • There is no sufficient evidence to support the use of disease specific formulations for IBD
EEN	**Exclusive Enteral Nutrition** (by mouth or feeding tube) • Generally prescribed via oral route but can be offered via feeding tube • No other food via oral means is allowed • 100% caloric intake is consumed via oral supplement and/or polymeric enteral support product • Oral nutrition supplements should be calorically appropriate and meet estimated needs for protein • Does not need to be an elemental formula, okay to use intact protein formulas
PEN	**Partial Enteral Nutrition** (by mouth or feeding tube) • Generally prescribed via oral route but can be offered via feeding tube • Total of 50%—80% calorie goal • Products are consumed in combination with food (either ad libitum or modified diet as in CDED)

CDED

Phase 1 (week 1–6)	Phase 2 (week 7–12)	Phase 3 (week 13+)
• 50% calories via oral supplements • 1 serving fresh chicken, 2 eggs • 2 potatoes (peeled, cooked, cooled) • 2 bananas, 1 apple (peeled) • Additional allowed foods: rice & small amounts of low taurine fish • Restricted foods: red meat, high taurine seafood, alcohol	• 25% calories via oral supplements • 1 serving fresh chicken, 2 eggs • 2 potatoes (peeled, cooked, cooled) • 2 bananas, 1 apple • Additional allowed foods: rice & small amounts of low taurine fish, gradually increased variety of fruits, starches, vegetables in Phases 2 and 3 • Restricted foods: red meat, high taurine seafood, alcohol	• 25% calories via oral supplements • No required foods • Encouraged to follow Phase 2 on weekdays and liberalize diet on weekends • Advances to full fat yogurt • Permanent restrictions: soft drinks, processed meats, emulsifiers, gums

Ge X, et al.
Hashash JG, et al.

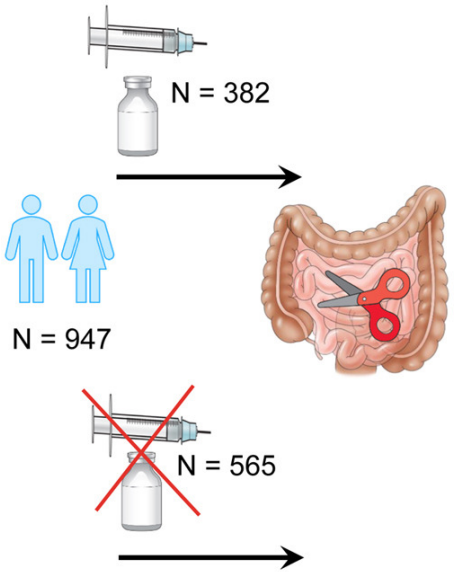
Preoperative Optimization to Prevent Postop Complications

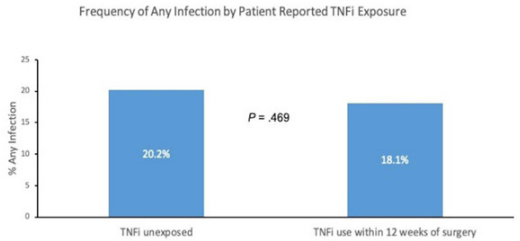


Biologic Use Should Not Delay Surgery

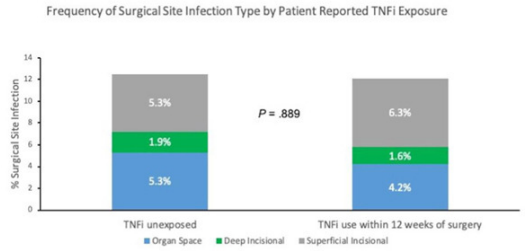
Anti-TNF: PUCCINI trial suggests no increased risk of postoperative complications

Prospective Cohort Study to Investigate the Safety of Preoperative Tumor Necrosis Factor Inhibitor Exposure in Patients with Inflammatory Bowel Disease Undergoing Intra-abdominal Surgery (PUCCINI)





→ **Not** associated with Any Infection or SSI



Corticosteroids

Past Diabetes

→ + association with Any Infection & SSI

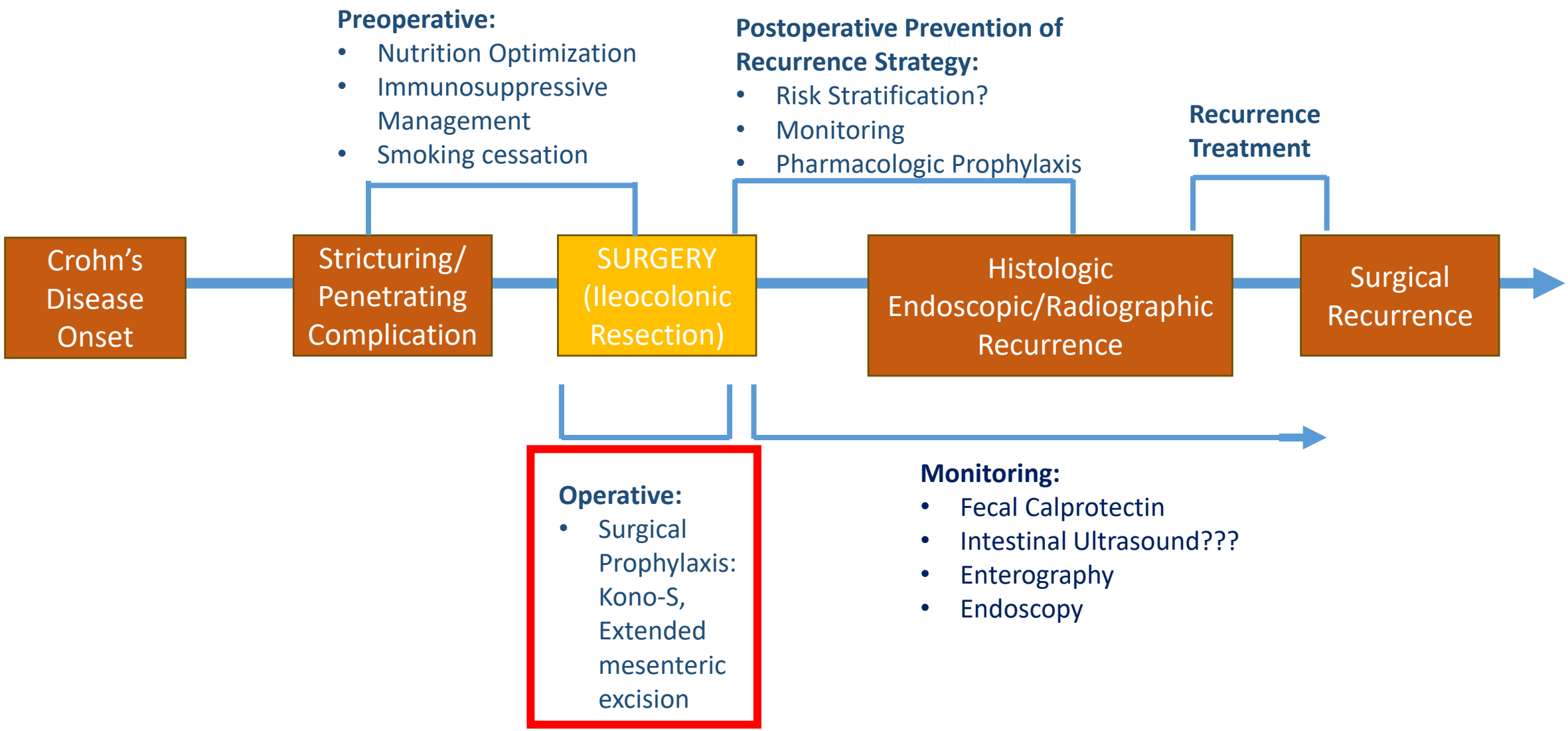
Gastroenterology

Biologic Use Should Not Delay Surgery

- Biologics not associated with postoperative complications

- Impact of preoperative use of biologics on 30-day surgical morbidity and mortality in patients with Crohn's disease undergoing ileocolectomy: National Surgical Quality Improvement Program database analysis

Immunosuppressive Agent	Safe to Continue?
Corticosteroids	No • Taper to lowest dose possible • ↑Any infection • ↑Surgical site infection • ↑Intra-abdominal sepsis
Anti-TNF	Yes
Vedolizumab	Yes
IL 12+/-23	Yes
JAK-inhibitors	Yes???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• Intestinal Ultrasound???
• Enterography
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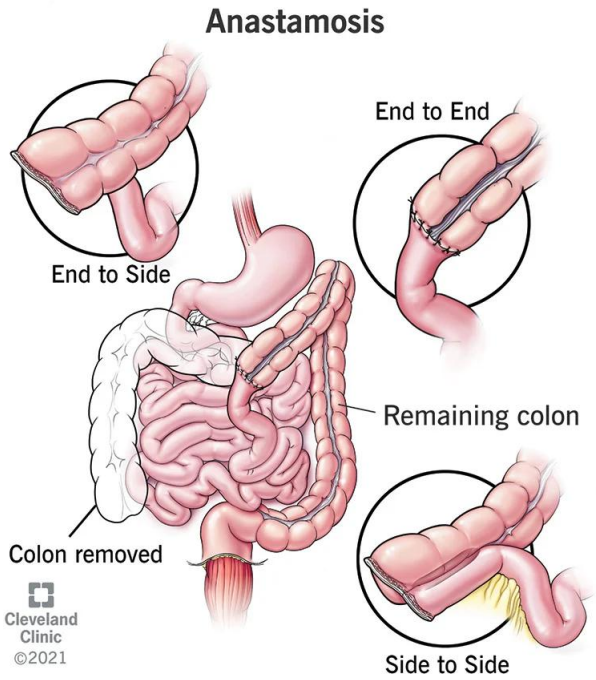
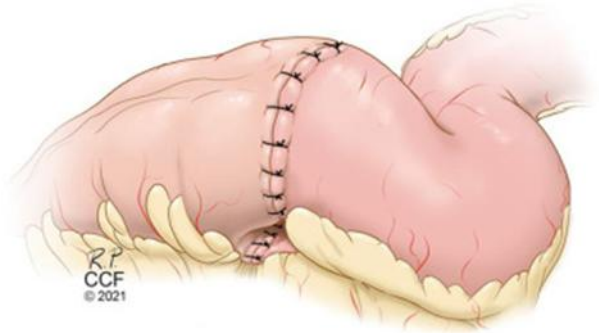
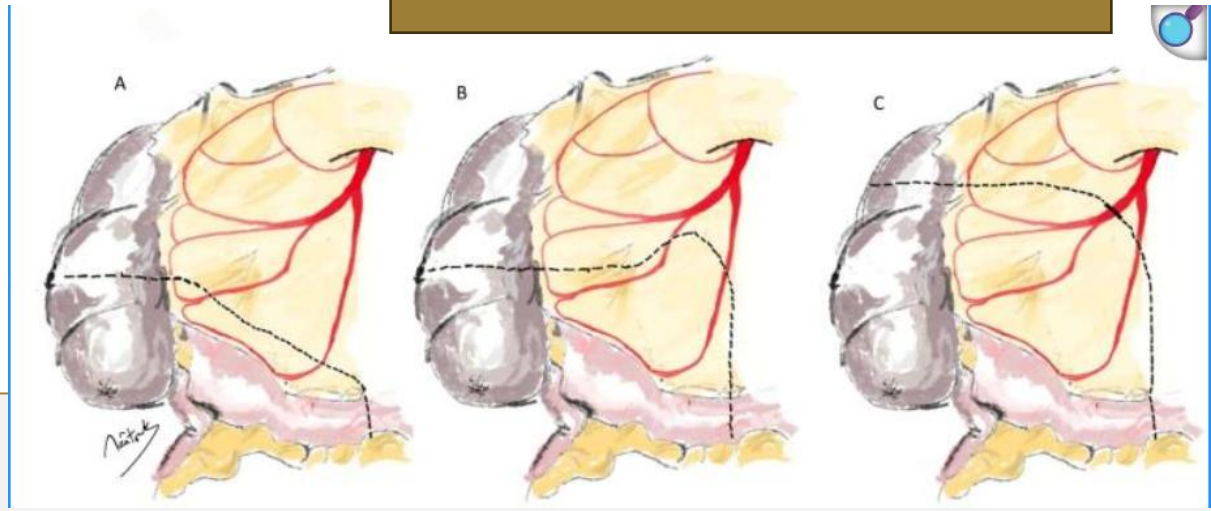
Operative techniques to reduce POR remain controversial

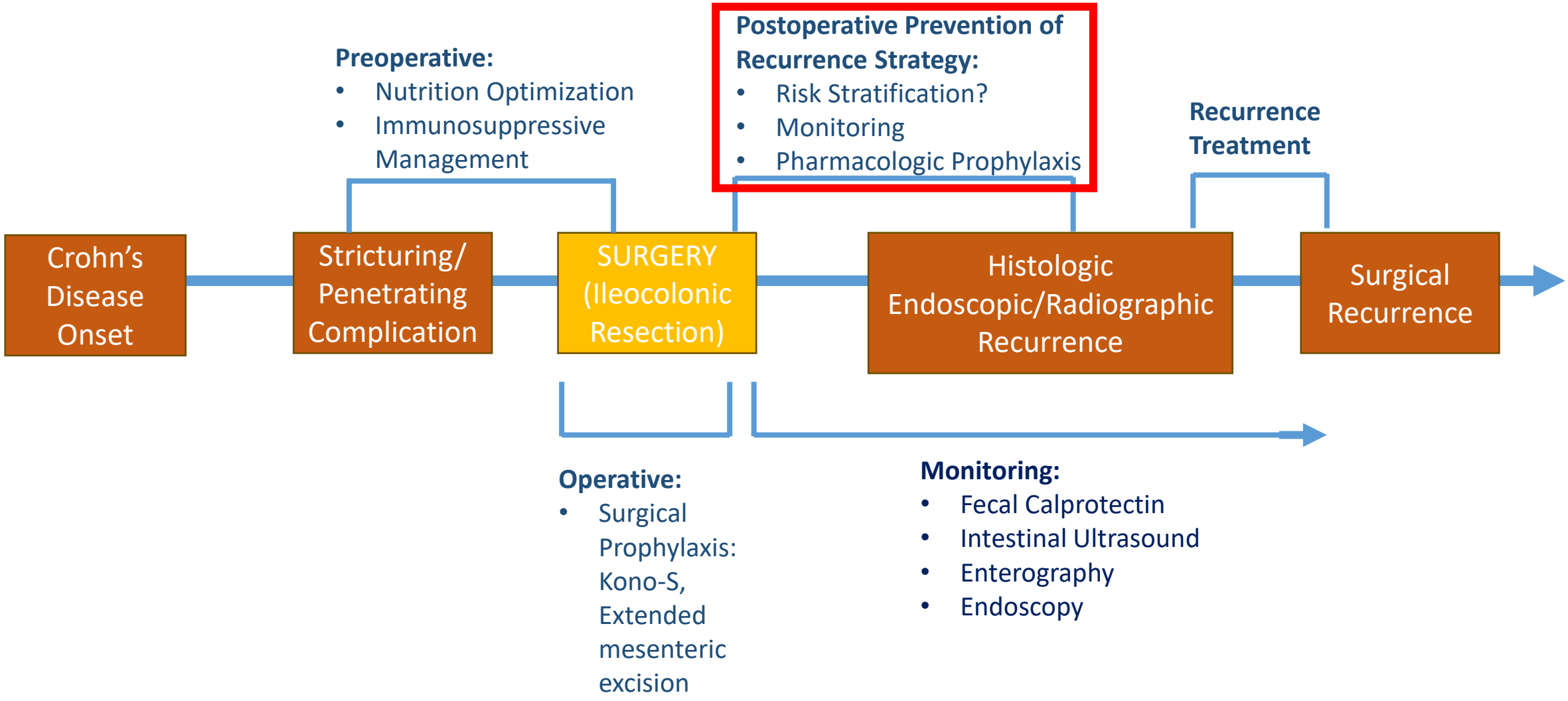


Kono-S: Creation of anastomosis away from mesentery (anti-mesenteric) and ↓fecal stasis



Extended mesenteric resection

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Postoperative Management Options

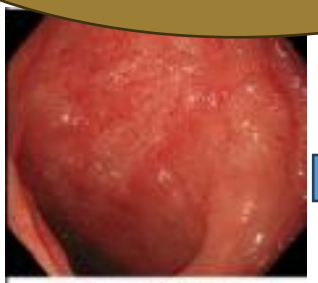
- 1) Proactive: Biologic prophylaxis immediately postoperatively

No lesion in distal ileum

Prophylaxis

How to identify which option is right for each patient?

- 2) Reactive: Monitor for dis… …l disease activity



Diffuse aphthous ileitis with diffusely inflammmed mucosa

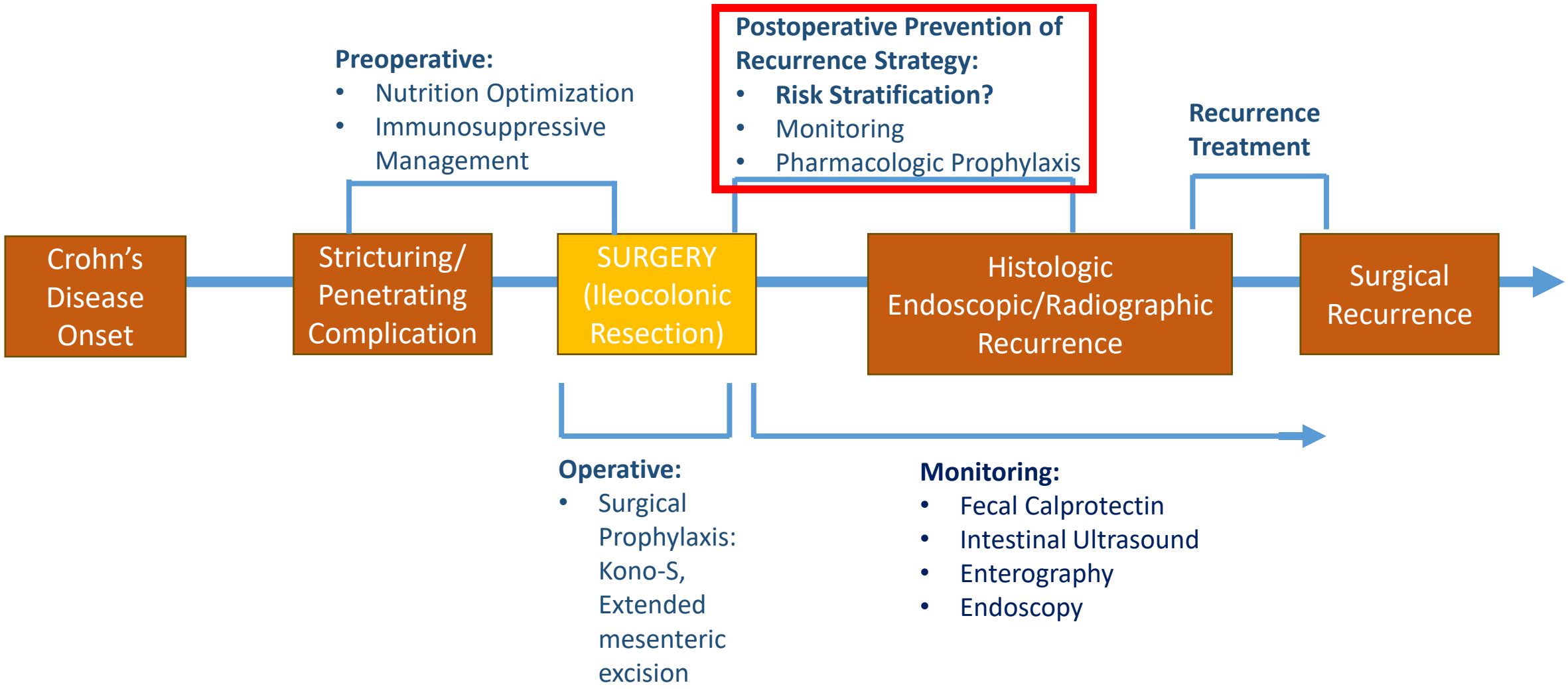
Treat

CONS:

- High healthcare utilization
- Exposure to adverse effects of medications in some who may not need it

CONS:

- Too little, too late in some patients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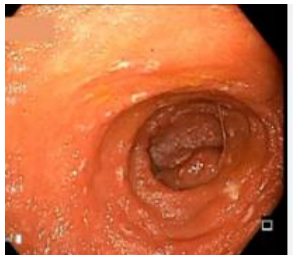
Type of Risk Factor	Risk Factors
PATIENT/DISEASE CHARACTERISTIC-BASED	• Smoking • Penetrating • Perianal • ≥2 Prior ICR • Age<30 (?)
SURGICAL	• Intra-abdominal septic complication • >50 cm SBR • Limited mesenteric excision?
HISTOLOGIC	• Positive margins (most associated) • Plexitis (?) • Lymphatic vessel density (?) • Paneth cell morphology (?)
MICROBIOME	• AIEC • Proteobacteria, Akkermansia spp., Fusobacteriaceae • Depletion of Streptococcaceae, Actinomycineae, Faecalibacterium • Proteus in active smokers
-"OMICS"	• Ileal tissue transcriptomics, blood transcriptomics, and urinary metabolomics
GENETICS	• NOD2/CARD15, CARD8, SMAD3
BILE ACIDS	• Bile acid

Key Takeaway: High-risk classified patients should initiate pharmacologic prophylaxis

Risk Category	Risk Factors	Clinical recurrence >18 mo after surgery	Endoscopic risk >18 mo after surgery
Low Risk		20%	30%
High Risk	**Smoking** **Penetrating disease** **Hx Perianal disease** **2+ ICR** IASC* Male gender* Non-white* Positive histologic margin*	50%	80%

*nontraditional RF

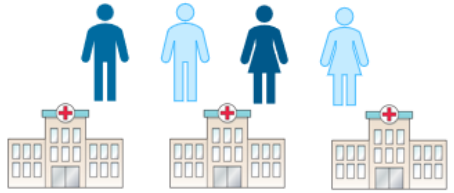
Endoscopic Monitoring 6-12m



Pharmacologic Prophylaxis

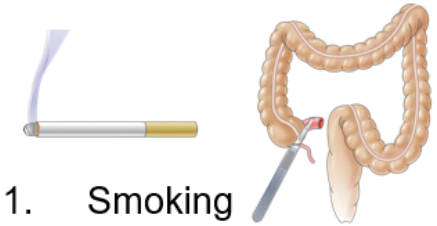
Regueiro M, et al.
Bachour S, et al.
Hernandez-Rocha C, et al.
Bak MTJ, et al. APT
Bak MTJ, et al. Ann Surg

Risk factors increase surgical recurrence risk and biologic prophylaxis may be applied more broadly



Multicenter retrospective analysis of 1404 adult Crohn's disease patients who underwent ileocecal resection

High-Risk Factors for Surgical Recurrence



1. Smoking
2. ≥ 2 Ileocecal Resection
3. Penetrating Disease
4. History of Perianal Disease

High-Risk* vs. Low-Risk

Surgical Recurrence

Endoscopic Recurrence

*Patients with ≥1 High-Risk Factor

Biologic Prophylaxis by Risk

High Risk* → Prophylaxis → Surgical Recurrence; Endoscopic Recurrence

Low Risk → Prophylaxis → Endoscopic Recurrence

Clinical Gastroenterology and Hepatology

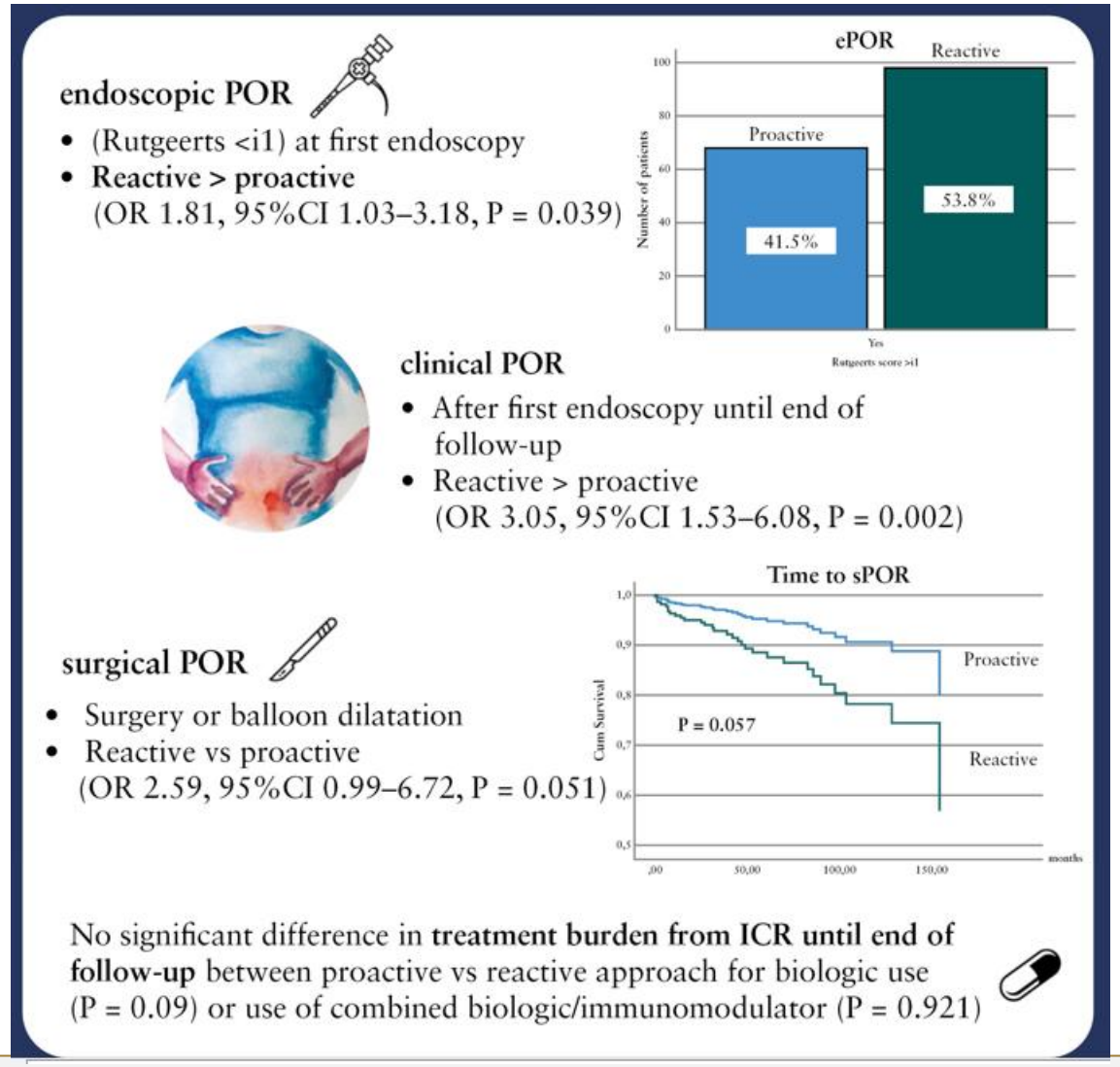
Prophylaxis versus Endoscopy-Driven Treatment

Multicenter, prospective cohort based on clinical risk stratification (Arkbosch JHC, et al.)

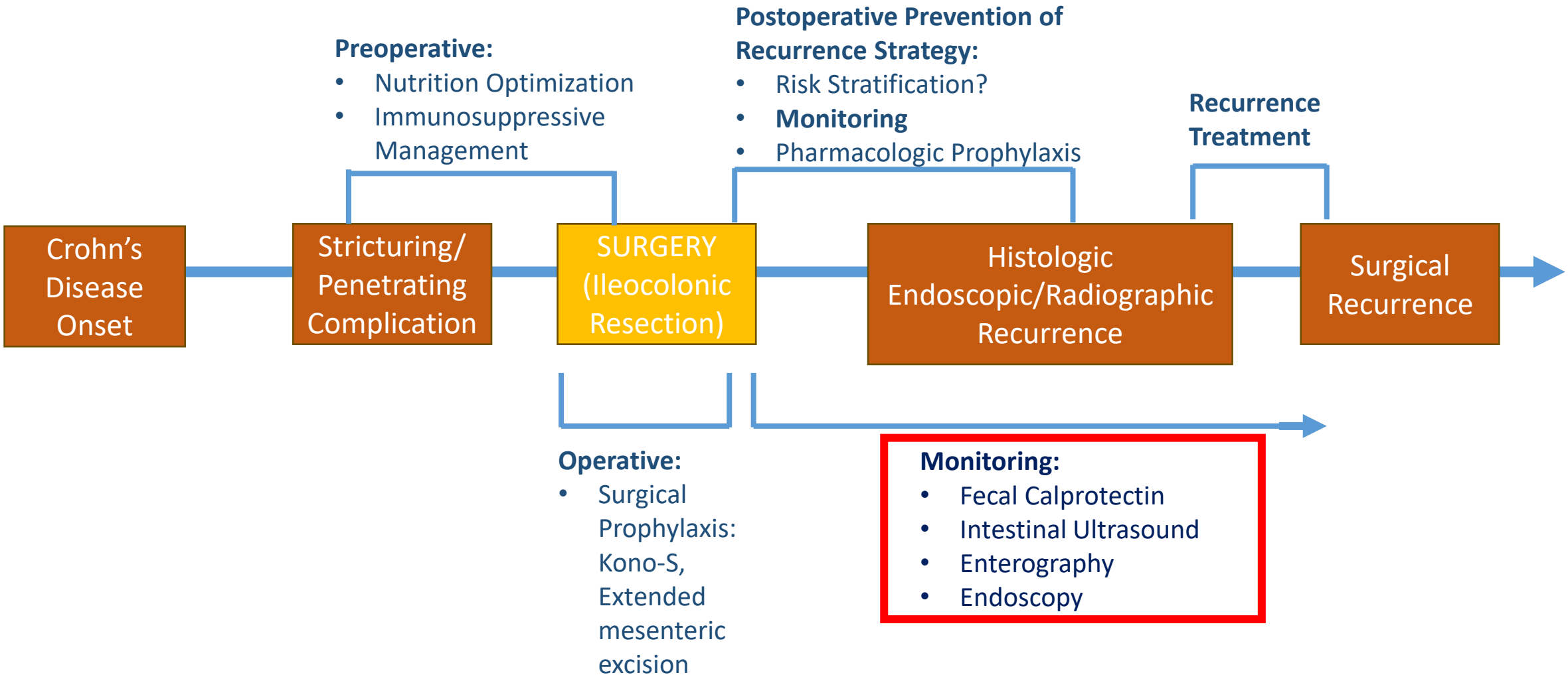
- 213 patients: PPX vs Not
  - Low risk: ↓ **ePOR** (16% vs 45%; p<0.05)
  - High risk: ↓ **ePOR** (26% vs 49%; p<0.05)

Retrospective, multicentric European cohort (Geldof J, et al.)

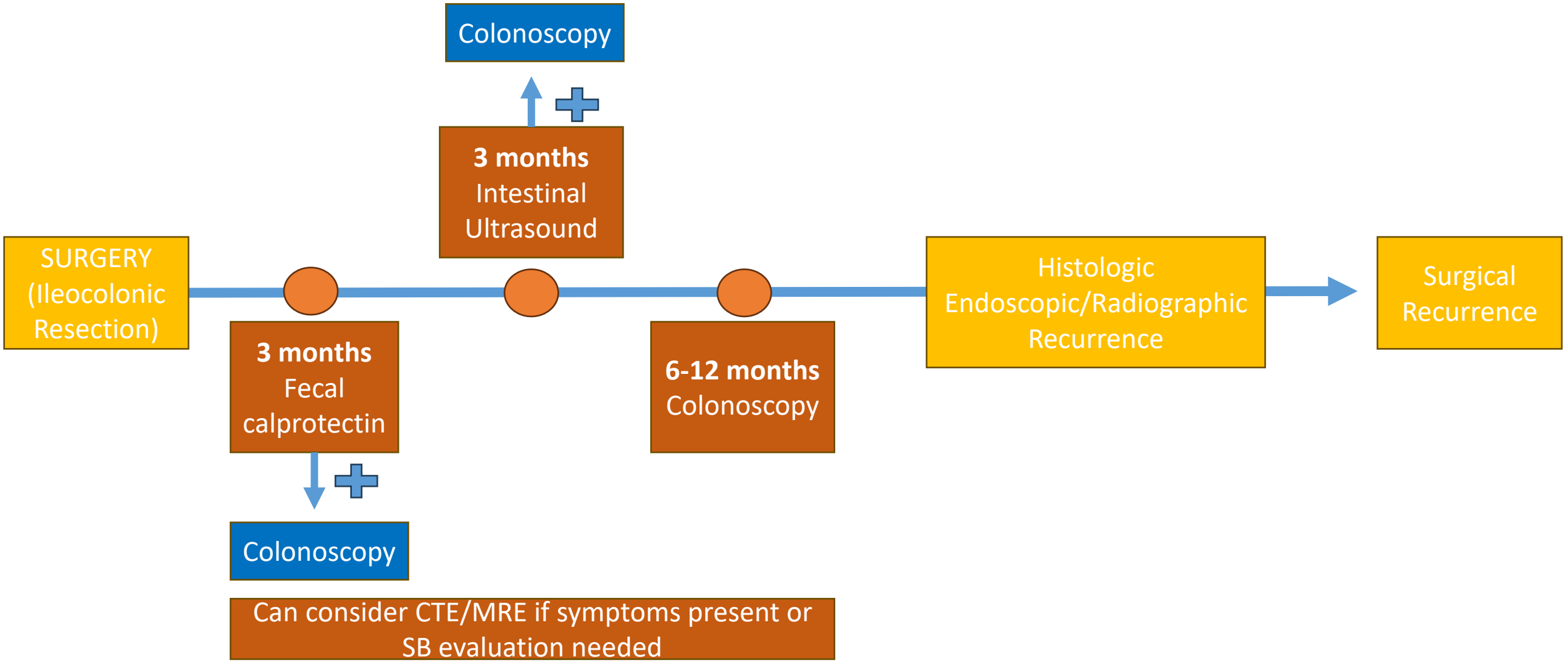
- 346 patients (47.4% PPX vs. 52.6% Not)
  - **ePOR >i1 at 6-12 mo:** 41.5% vs 53.8% (OR 1.8; p<0.05)
    - No difference in severe POR
  - **cPOR:** 17.7% vs 35.7% (OR 3.05; p<0.05)
  - **sPOR:** 6.7% vs 13.2% (OR 2.59; p=0.057)



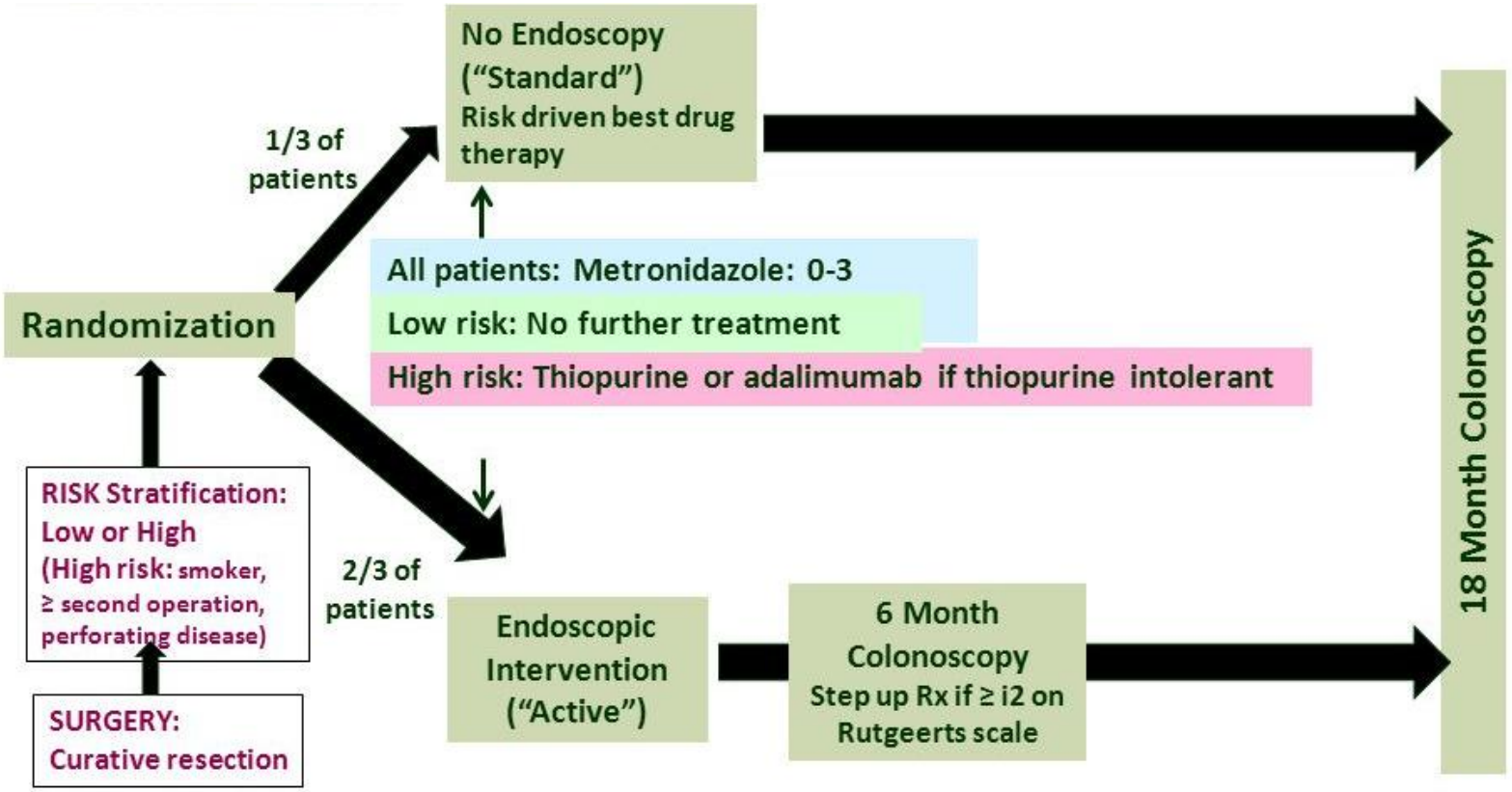
Arkenbosch JH, et al.
Geldof J, et al.


Preoperative:
• Nutrition Optimization
• Immunosuppressive Management
Postoperative Prevention of Recurrence Strategy:
• Risk Stratification?
• Monitoring
• Pharmacologic Prophylaxis
Recurrence Treatment
Crohn's Disease Onset
Stricturing/ Penetrating Complication
SURGERY (Ileocolonic Resection)
Histologic Endoscopic/Radiographic Recurrence
Surgical Recurrence
Operative:
• Surgical Prophylaxis: Kono-S, Extended mesenteric excision
Monitoring:
• Fecal Calprotectin
• Intestinal Ultrasound
• Enterography
• Endoscopy

Monitoring Strategy



Endoscopic Monitoring: POCER trial, De cruz et al.

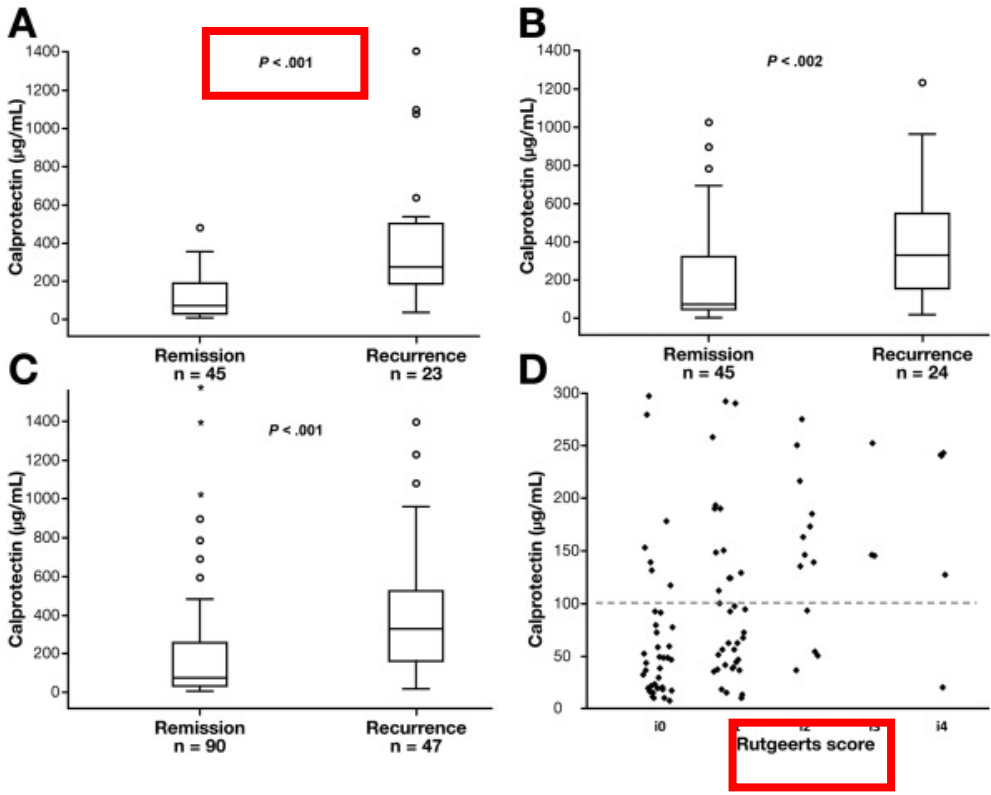


Endoscopic monitoring vs. No Endoscopy:

- Primary outcome: 18 mo Endoscopic recurrence
- Results: 49% vs. 67% recurrence at 18 mo. ($p<0.05$)
- Conclusion: Active endoscopic monitoring with option of step-up therapy is a cornerstone of postoperative Crohn's disease management

Non-invasive monitoring: Fecal Calprotectin

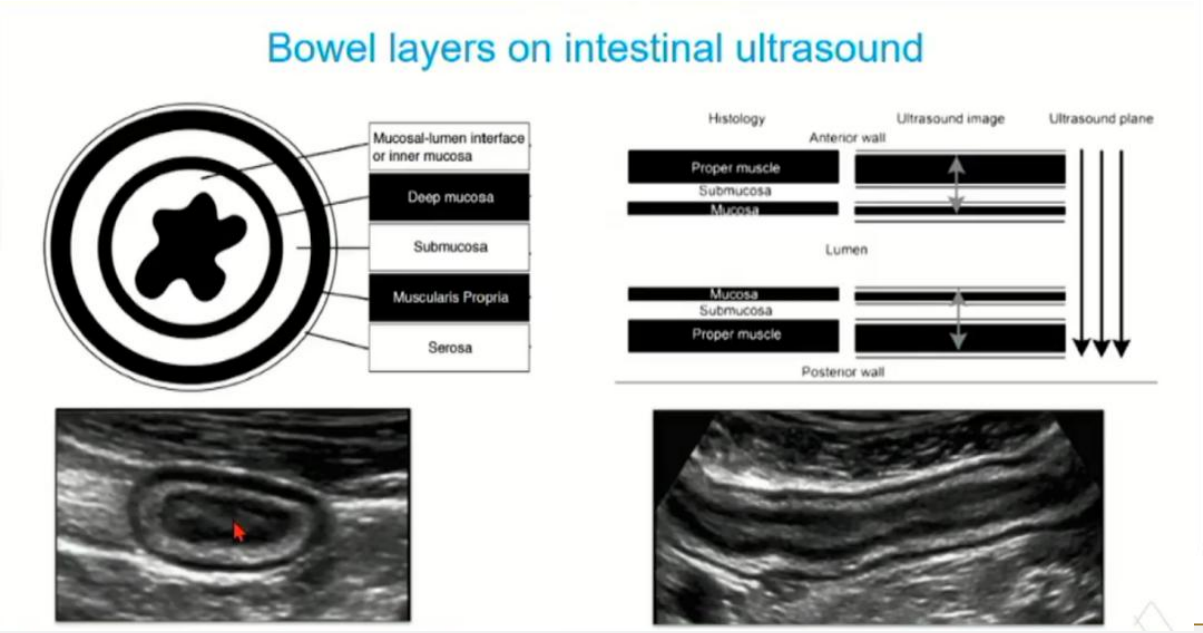
- FC >100 associated with endoscopic recurrence with 89% sensitivity and 58% specificity
- FC responds to step-up therapy
- FC <50 +/- imaging or negative IUS may delay initial colonoscopy

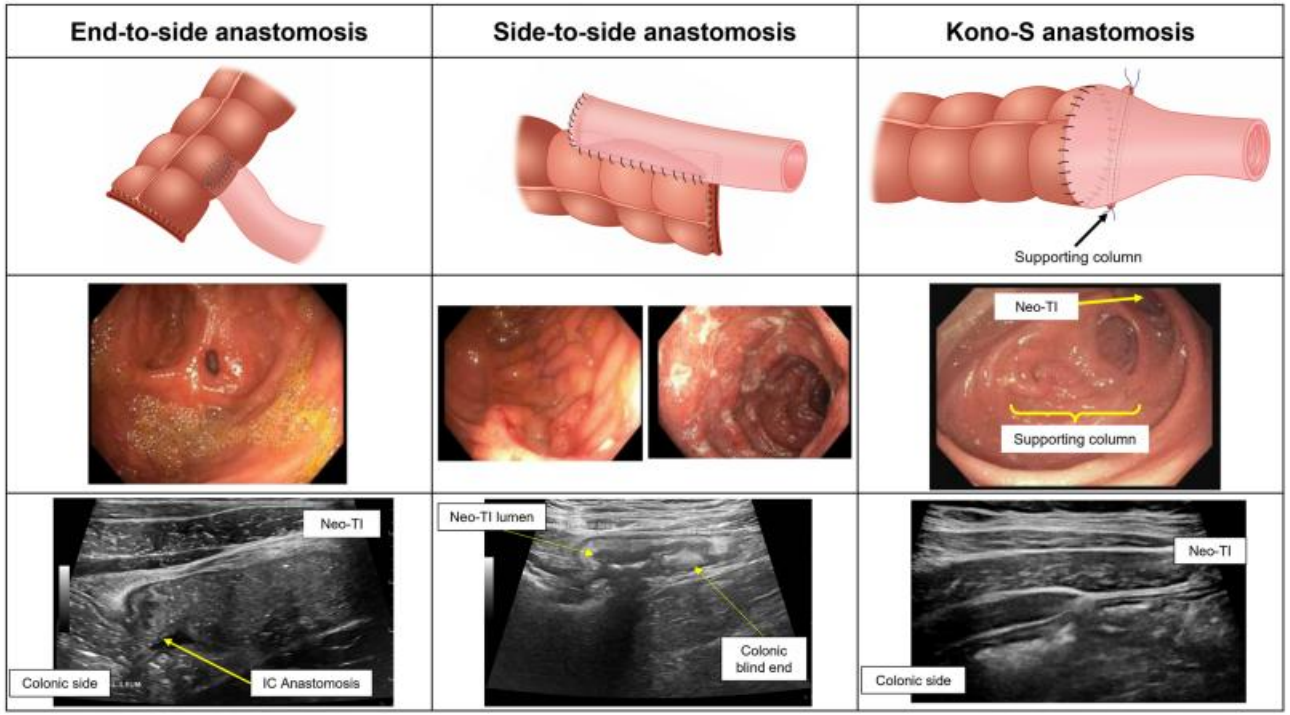


Wright EK, et al.
Samnani S, et al.

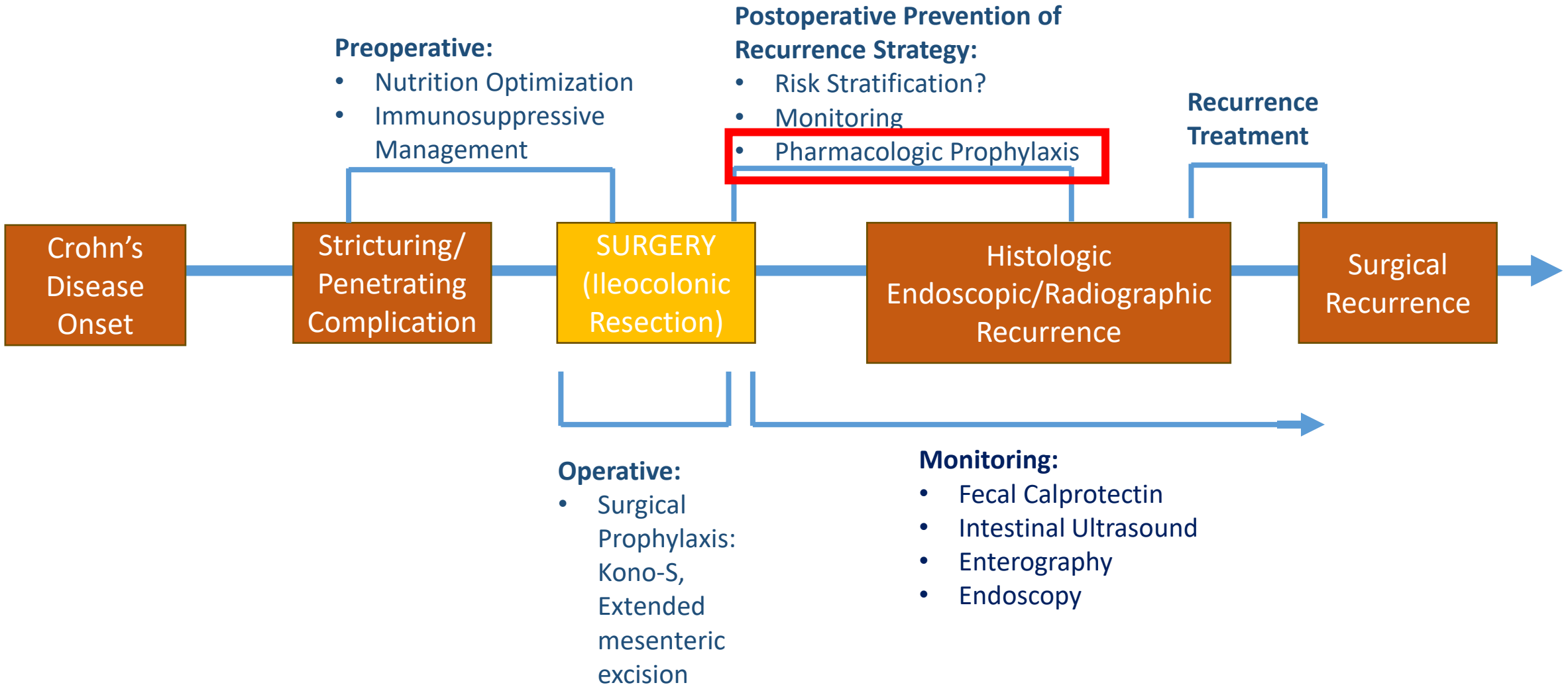
Intestinal Ultrasound in Postoperative Crohn's

- Bowel wall thickness
  - Active inflammation, fibrosis
    - Color doppler signal may help differentiate
- Mesenteric LN
- Modified Limberg score (doppler)





Furfaro F, et al.
Gu P, et al.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• Enterography
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Type of Prophylaxis

Table 4. Efficacy of various therapies and knowledge gaps for the prevention and treatment of POR.

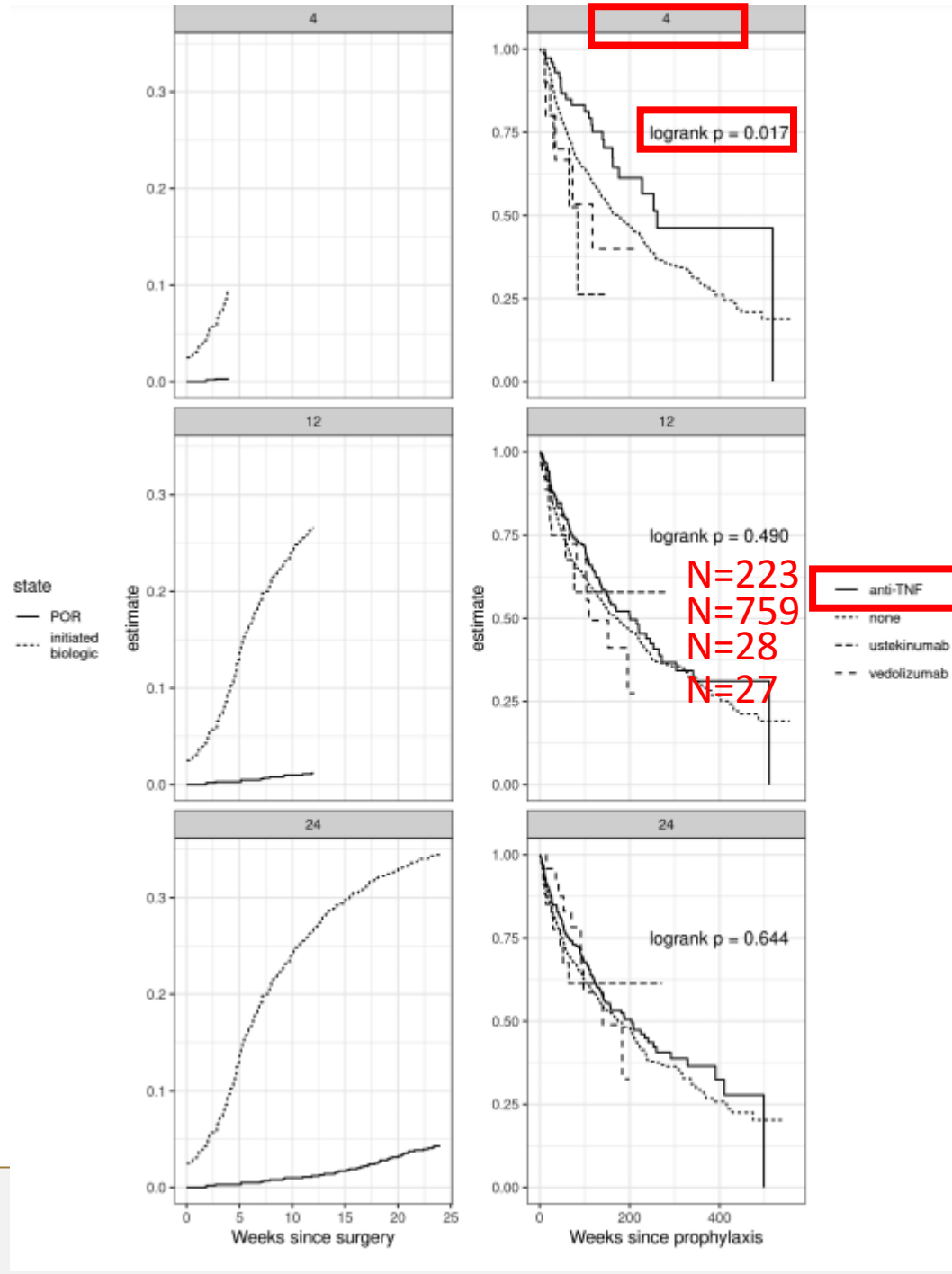
Medication	POR prevention	Treatment of POR
Curcumin	–[53]	?
Enteral nutrition	+[70–72]	?
Nitroimidazole/antibiotics	+[38,39] → Poor tolerance	–
Mesalamine	–[31,63]	–[34]
Budesonide	–[48,49]	?[a]
Thiopurines	+[31,41,42] → Conflicting data	+[34]
Anti-TNF	+++[55–59,62–64]	+++[60]
Vedolizumab	++?[68]	?
Ustekinumab	++?[69]	?

[a]Authors opinion. Budesonide may be used for short term induction therapy, but similar to luminal ileal CD, is not likely effective for long-term therapy.
CD, Crohn's disease; POR, postoperative recurrence; TNF, tumor necrosis factor.

Prophylaxis Timing

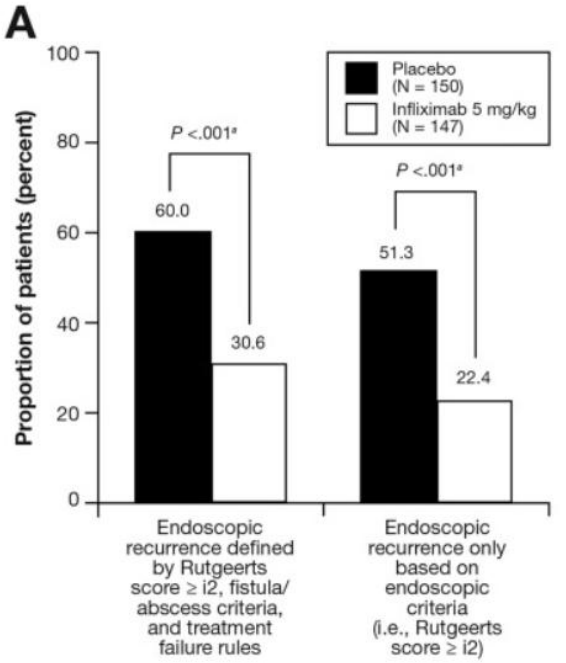
- Starting Anti-TNF within 4 weeks is associated with decreased POR
- Low sample size for other biologics but probably can extrapolate

- Recommend starting within 4 weeks if possible but if not, within 12 weeks of ICR date or ostomy closure

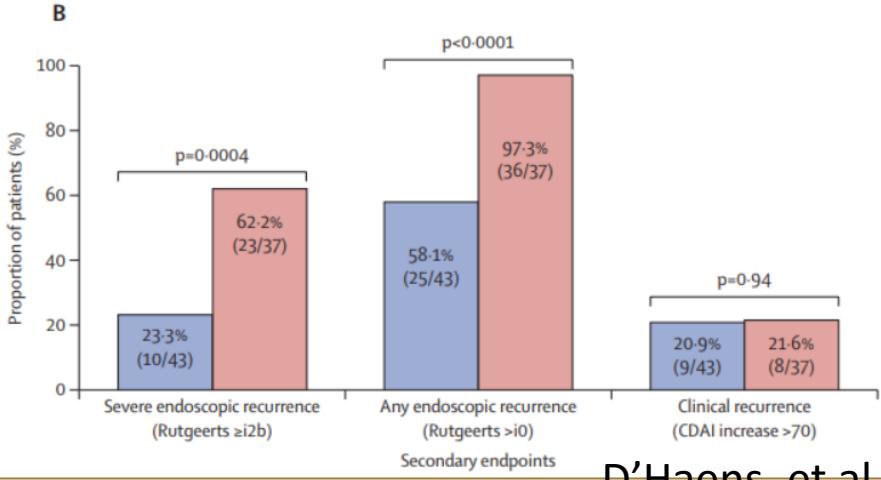


Type of Prophylaxis

- Anti-TNF (RCT: PREVENT- Regueiro et al.- Infliximab; Adalimumab)
- Vedolizumab (RCT: REPREVIO- D'haens et al.)
- Ustekinumab (Retrospective Data)
- IL23 ?
- Small molecules ?
- Recycling Anti-TNFs (Emerging data)
- Biologics > Thiopurines



Regueiro, et al.



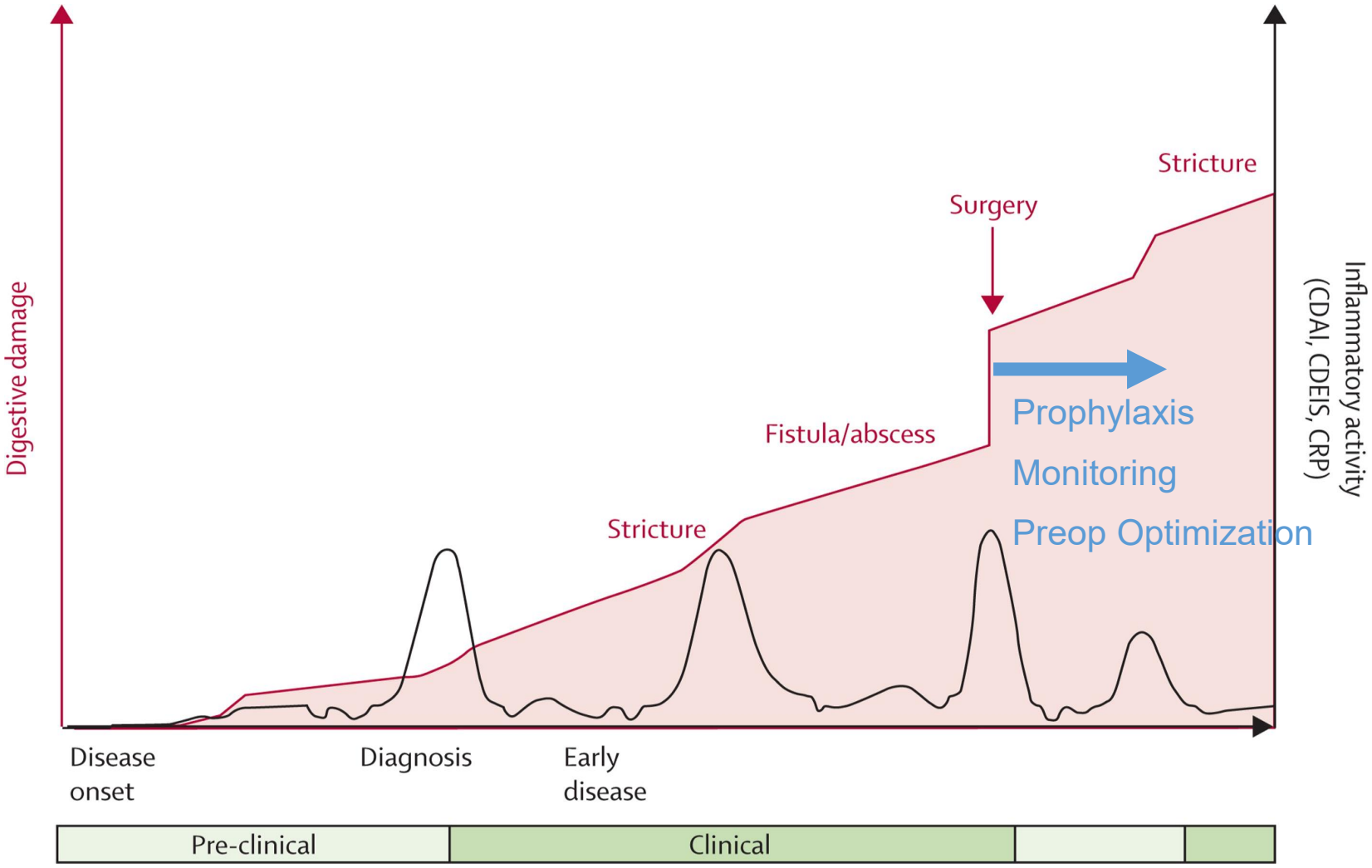
D'Haens, et al.

Key Takeaways: Multidisciplinary Management

- **Preoperative Optimization**
  - Smoking cessation
  - Limit steroid use preoperatively
  - Biologics do not affect postop outcomes
  - Nutritional optimization

- **Postoperative**
  - Monitoring with fecal calprotectin at 3 months & Colonoscopy at 6-12 months is essential; IUS if available
  - High versus Low-risk stratification to determine postop prophylaxis
    - Anti-TNF, VDZ, IL23, IL12/23 and likely any advanced therapy
    - Ideally initiate within 4 weeks
  - Modified Rutgeerts' >i2b is recurrence; case by case consideration for i2a to escalate therapy

Thank you!


Digestive damage
Inflammatory activity
(CDAI, CDEIS, CRP)
Stricture
Surgery
Fistula/abscess
Stricture
Prophylaxis
Monitoring
Preop Optimization
Disease onset
Diagnosis
Early disease
Pre-clinical
Clinical

CME/MOC Question:

A 45F is undergoing ileocolonic resection for an ileal stricture and ileosigmoid fistula. Infliximab q8w was attempted prior to resection but the patient had persistent complicated disease. When should the infliximab be held?

A. Hold two doses prior to surgery
B. Hold one dose prior to surgery
C. Plan resection as soon as possible regardless of last dose
D. Hold three doses prior to surgery

Joint Providership

ASGE
American Society for Gastrointestinal Endoscopy

NCSG
North Carolina Society of Gastroenterology

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