Managing Inflammatory Bowel Disease: Advances in Immunopathogenesis and Treatment

An AANP CE Series
Julia Pallentino, MSN, JD, FNP-BC, FAANP

Julia Pallentino is a Family Nurse Practitioner who has practiced in a gastroenterology specialty practice for the last 14 years. She is also a former medical malpractice defense attorney. Julia has worked to remove barriers to NP practice for more than 20 years and has earned numerous awards for her legislative advocacy efforts and continues to advocate for NPs at the state and national level. Julia is a nationally recognized expert in gastroenterology and speaks extensively throughout the country on a wide range of gastroenterology topics and medical malpractice issues. She has presented at the American Association of Nurse Practitioner Conference almost annually over the last 10 years and is a Fellow of the American Association of Nurse Practitioners.

Sharon Dudley-Brown, PhD, FNP-BC, FAAN

Sharon Dudley-Brown currently is an Assistant Professor of Nursing and Medicine at Johns Hopkins University, in the School of Medicine, Baltimore, MD, and is also the Co-Director of the Nurse Practitioner Fellowship Program in Gastroenterology & Hepatology at Johns Hopkins. She sees patients and conducts research on patients with inflammatory bowel disease. Sharon has held several academic appointments, both nationally and internationally, and has worked as a Nurse Practitioner at several institutions over the past 25 years. She has published several peer-reviewed papers and abstracts in the fields of nursing, inflammatory bowel disease and ulcerative colitis, and is currently a member of several editorial boards, including Gastroenterology Nursing Journal, where she is the on-line editor. She is a co-editor of a textbook on translation in evidence-based practice, entitled “Translation of evidence into nursing and health care practice”, published by Springer, soon to be out in a second edition. In addition, Sharon is a member of five professional societies, including the Society of Gastrointestinal Nurses and Associates (SGNA), the American Gastroenterological Association (AGA), and the American College of Gastroenterology (ACG). Additionally, she is an active member of the Crohn’s and Colitis Foundation of America (CCFA), serving on the National Nursing Initiatives Committee, as well as on her local Medical Advisory Committee.
Program Description

The incidence of IBD has been increasing in several countries with an estimated prevalence of 1% in North America affecting nearly 1.4 million Americans. Current evidence-based education on updates in the immunopathogenesis and treatment options of IBD can have a strong impact on the quality of care, quality of life, financial burdens and adherence in patients with IBD. This interactive program is designed to enhance patient health outcomes by expanding the primary care provider’s knowledge and competency in the management of IBD patients from symptom assessment to management of therapy. Using up-to-date evidence-based information and real-life case studies the educational activity will also equip the provider with tools to individualize patient care and enhance patient knowledge of their disease.

Learning Objectives

Upon completion of this educational activity, the participants should be able to:

- Discuss the pathophysiology, genetic components and immunopathogenesis of IBD and how this translates to individualizing treatment strategies
- Update on current and novel therapies, their mechanisms of action, side effects and monitoring requirements
- Evaluation of patient disease activity and Quality of Life and patient education resources on treatment therapies to support optimal understanding and adherence

Accreditation Statement

This activity is approved for 1.0 contact hour(s) of continuing education (which included 0.20 hour(s) of pharmacology). This activity was planned in accordance with AANP Accreditation Standards and Policies.

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### Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliations</th>
<th>Disclosures</th>
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<tbody>
<tr>
<td>Sharon Dudley-Brown, PhD, FNP-BC, FAAN</td>
<td>Certified Nurse Practitioner, Assistant Professor of Nursing &amp; Medicine, Gastroenterology and Hepatology Johns Hopkins Medicine Baltimore, MD</td>
<td>• Speakers Bureau for AbbVie</td>
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</table>
| Julia Pallentino, MSN, JD, FNP-BC, FAANP | Nurse Practitioner specializing in gastroenterology for 14 years Tallahassee, FA | • Speakers Bureau for Takeda  
• Speakers Bureau for AbbVie |
Learning Objectives

- Discuss the pathophysiology, genetic components, and immunopathogenesis of IBD and how this translates to individualizing treatment strategies
- Understand current and novel therapies, their mechanisms of action, side effects, and monitoring requirements
- Evaluate patient disease activity, quality of life, and patient education resources on treatment therapies to support optimal understanding and adherence

Overview of Inflammatory Bowel Disease
**General Overview**

A group of idiopathic chronic inflammatory intestinal conditions resulting from an inflammatory response to intestinal microbes in a susceptible host

While pathogenesis not fully understood, genetic and environmental factors thought to cause dysregulation of intestinal immunity, resulting in gastrointestinal injury

Two main manifestations are ulcerative colitis (UC) and Crohn's disease (CD), with overlapping and distinct clinical and pathologic features


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**Katy S: Presenting Symptoms**

- Katy is a 25-year-old elementary school teacher.
- She became an established patient at your practice when she moved to the area 3 years ago after graduating from college and accepting a teaching position at a local school.
- Until today, Katy's medical history is significant only for seasonal allergies.
- At today's appointment, Katy reports she has experienced intermittent abdominal pain and diarrhea for the past 2 to 3 months.
Katy S: Presenting Symptoms

- When you ask her to describe her symptoms, Katy reports:
  - Onset of the pain ~1 hour after eating, with more severe pain in the evening
  - The pain occurs almost daily and is most noticeable in the right lower quadrant
  - Katy indicates the pain persists for a few hours and may be accompanied by nausea
  - She reports no relief from ibuprofen but indicates a heating pad is sometimes helpful
  - Katy tells you she has 4 to 6 episodes of diarrhea each day, although the timing is variable
  - Occasionally she awakens a night with diarrhea and she experiences urgency
  - She expresses concerns about having an accident while teaching
  - She denies taking any other-the-counter medications for the diarrhea
  - Katy also denies seeing any blood in her stool

Crohn’s Disease

- Genetic factors likely play stronger role in CD
- Inflammation is often transmural
- Typically involves ileum and colon but can affect any region of intestine
- Can cause intestinal granulomas, strictures, and fistulas

Brian P: Presenting Symptoms

- Brian is a 19-year-old college freshman attending a local university.
- He presents to your university health center with a history of ulcerative colitis diagnosed at age 15.
- He has been maintained for the past 2 years on mesalamine 800 mg DR BID with good symptom control even though this is sub-therapeutic.
- Brian reports worsening diarrhea over the last 3 months.
- He has multiple, loose, watery, bloody stools ~6 to 8 times a day.

Brian P: Presenting Symptoms

- Brian complains of fatigue and weakness.
- He also expresses concern that his symptoms prevent him from attending class and he has fallen behind on his class assignments.
- He is afraid he will have to drop out of school and does not want to tell his parents of his worsening illness.
- Brian reports successful treatment of past relapses with prednisone prescribed by his local gastroenterologist.
Ulcerative Colitis

Characterized by chronic inflammation associated with genetic, and environmental factors

Inflammation limited to colonic mucosa

Portion of affected colon ranges from ulcerative proctitis, proximal disease, or pancolitis

Disease Activity in Ulcerative Colitis

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
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</thead>
<tbody>
<tr>
<td>Bloody stools/day</td>
<td>&lt;4</td>
<td>≥4 IF</td>
<td>≥6 AND</td>
</tr>
<tr>
<td>Pulse</td>
<td>&lt;90 bpm</td>
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<tr>
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<td>≤37.8° C</td>
<td>&gt;37.8° C or</td>
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<td>Hemoglobin</td>
<td>&gt;11.5 g/dL</td>
<td>≥10.5 g/dL</td>
<td>&lt;10.5 g/dL or</td>
</tr>
<tr>
<td>ESR or CRP</td>
<td>&lt;20 mm/hr Normal</td>
<td>≤30 mm/hr ≤30 mg/L</td>
<td>&gt;30 mm/hr or &gt;30 mg/dL</td>
</tr>
</tbody>
</table>

Epidemiology

Crohn’s Disease

- Annual US incidence estimated at 7 cases per 100,000; peak incidence in third decade of life
- Higher prevalence in urban areas and higher socioeconomic class; lowest incidence in Asia and South America
- Higher incidence among men than women in past decade but appears to becoming equal between genders

Ulcerative Colitis

Annual US incidence estimated at 9 to 12 cases per 100,000

Increased incidence at higher latitudes, industrialized nations, Western nations

More common than Crohn’s with similar incidence in men and women


Pathogenesis and Risk Factors
Interaction of Risk Factors

Genetics

- 2% to 14% of individuals with CD have positive family history of CD
- 8% to 14% of persons with UC have family history of IBD, most often UC
- 1 in 3 risk of IBD if both parents have positive history

Environment

Dysfunctional Immune Response

Environmental Risk Factors

**Tobacco**
- Increases risk and severity of CD
- Former smokers and nonsmokers at higher risk of UC

**Diet**
- Vitamin D deficiency, high fat diet, high meat and egg consumption, high protein diets; dietary fiber inversely related to UC and CD

**Medications**
- Aspirin and NSAIDs, oral contraceptives and HRT, anti-anaerobic antibiotics, penicillin/β-lactamase inhibitor combinations

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Altered Immune Response

Innate immune system recognizes bacterial products and cellular signaling

Abnormal signaling pathways cause dysregulation of inflammatory response

Activates adaptive immune system, leading to excess proinflammatory cytokine production by CD4+ T cells

Symptoms Associated with Intestinal Inflammation

- **Diarrhea**
  - May contain mucus or blood
  - Nocturnal diarrhea
  - Incontinence
- **Pain or rectal bleeding with bowel movement**
- **Severe bowel movement urgency**
- **Constipation**
  - Can be primary symptom in UC limited to rectum (proctitis)
  - Can be as severe with obstruction and no passage of flatus when bowel obstruction is present


Symptoms Associated with Intestinal Inflammation

- **Tenesmus**
- **Nausea and vomiting; more common in CD**
- **Abdominal cramps and pain**
  - Frequently located in RLQ in CD
  - Around the umbilicus or in the LLQ in moderate-to-severe UC

In most cases, CD and UC are chronic, intermittent conditions. Symptoms range from mild to severe during relapses and may completely resolve during remissions. Symptoms typically depend on the segment of the intestinal tract that is affected.

Constitutional Symptoms

- Fever
- Loss of appetite
- Weight loss
- Night sweats
- Growth delays
- Primary amenorrhea


Evaluation and Diagnosis
Your physical exam reveals:
  - A low-grade fever of 100°F
  - A 5-pound weight loss since Katy's last visit 6 months ago
  - Tenderness and guarding in her RLQ

You perform blood tests including a CBC, TSH, comprehensive metabolic panel, sedimentation rate, and C-reactive protein.

You also order a stool test for *C. difficile*, culture, giardia, ova and parasites, fecal lactoferrin, and fecal immunohistochemical test.

Results:
  - Hemoglobin: 8.2
  - Sedimentation rate: elevated
  - C-reactive protein: elevated
  - Fecal lactoferrin: 175
  - Other stool tests: negative

You refer Katy to a nurse practitioner colleague in gastroenterology for possible inflammatory bowel disease.
History

Current History
- Current and past symptoms including duration
- Mood disorders
- Possible extraintestinal manifestations

Family History
- Inflammatory bowel disease
- Celiac disease
- Colorectal cancer

Medical History
- Tuberculosis and known contacts with TB
- Intestinal infections
- Medications: antibiotics and NSAIDs

Social History
- Tobacco use
- Missing work or usual social activities
- Travel

Physical Exam

General physical examination for cachexia, fever, pallor, nutritional status, pulse and BP, weight and height

Abdomen for altered bowel sounds, distention, guarding, hepatomegaly, masses, rebound, tenderness, and surgical scars

Perianal exam for abscesses, fissures, fistula, or tags

Extraintestinal examination of mouth, eyes, skin, and joints for arthropathy, uveitis, erythema nodosum, primary sclerosing cholangitis, metabolic bone disease

**Laboratory and Blood Tests**

- Routine fecal exam and cultures
- *Clostridium difficile*
- Occult blood or leukocytes
- Calprotectin, lactoferrin, α₁-antitrypsin
- Cytomegalovirus

**Lab Tests**

- CBC
- ESR, CRP, orosomucoid
- Electrolytes, albumin, calcium, magnesium, vitamin B₁₂
- Serum ferritin, transferrin saturation, soluble transferrin receptor assay
- Liver enzyme and function
- HIV

**Blood Tests**

**Imaging and Endoscopy**

**Sigmoidoscopy or Colonoscopy**
- Reveals ulcers, inflammation, bleeding, stenoses; permits biopsies of colon and terminal ilium

**Upper GI Endoscopy**
- Use when patient has upper gastrointestinal symptoms such as nausea, vomiting, epigastric pain

**Cross-sectional Imaging**
- CT, US, MRI to determine extent and severity of disease
- US and MRI preferred due to young age of patients and need for repeat imaging over time

**Capsule Endoscopy**
- Capsule endoscopy for patients with suspected CD and negative work-up

As Brian’s NP, what steps would you take next?

- Obtain a thorough history of his medication adherence
- Perform a complete physical exam
- Perform CBC, complete metabolic panel, ESR, and iron studies

Your physical exam of Brian reveals:

- Weight: 153 lbs., a 7-pound weight loss from his usual weight of 160
- Pulse: 83 bpm
- Temperature: 36.2°C
- Skin: pale and dry

Upon furthering questioning, Brian reports:

- Increased frequency of headaches
- Difficulty sleeping
Brian P: Diagnostic Evaluation

- Perform CBC, complete metabolic profile, ESR, and iron studies

Results:

- CBC: mild anemia with Hgb 12.0 g/dL
- Complete metabolic panel: potassium 3.3 mEq/L
- ESR: elevated
- Iron studies: evidence of iron deficiency anemia
Intestinal Complications

- Fistula and Perianal Disease
- Strictures and Obstruction
- Intra-abdominal Abscess
- Bowel Perforation
- Hemorrhage
- Toxic Megacolon
- Colorectal Cancer
- Primary Sclerosing Cholangitis

Extra-intestinal Complications

- Anemia
- Cholelithiasis
- Nephrolithiasis
- Metabolic bone disease
- Vitamin D deficiency
- Osteoporosis and fractures
- Peripheral arthritis
- Ankylosing spondylitis
- Sacroiliitis
- Spondylarthropathy
- Erythema nodosum
- Pyoderma gangrenosum
- Uveitis
- Episcleritis
- Scleroconjunctivitis


Extra-intestinal Complications

- More prevalent during disease flares
- More common in patients diagnosed before age 30 and those with extremely severe UC
- Decrease in health-related quality of life
  - Depression
  - Anxiety

Venous Thromboembolism
Colorectal Cancer
Quality of Life


Treatment Goals
**Treatment Goals**

- Improve and maintain patient's well-being
- Treat acute disease
- Maintain steroid-free remissions
- Prevent complications requiring hospitalization and surgery
- Maintain good nutritional status

**Factors to Guide Management**

- Determine if UC or CD
- Determine Disease Location & Phenotype
- Determine Severity
- Assess Tolerance to Medical Intervention
- Assess Individual Symptom Response
- Monitor for Complications
- Review Access to Diagnostic & Treatment Options
- Review Past Disease Course and Duration

Diet and Lifestyle Interventions

Nutrition

- Address nutritional and vitamin deficiencies and electrolyte imbalance
- Decrease fiber during high disease activity
- Enteral diets for moderate or severe disease; parenteral nutrition for severe fulminant disease

**Nutrition**

- Low residue diet may decrease frequency of bowel movements
- High residue diet may benefit patients with ulcerative proctitis, when constipation may be an issue
- Reduction of dietary fermentable oligosaccharides, disaccharides, monosaccharides, and polyols may decrease symptoms (FODMAP)


**Lifestyle**

**Tobacco Use**
- Cessation improves course of CD
- Cessation may be associated with flares of UC

**Stress**
- Decreased stress and improved stress management may improve symptoms
- Consider referral to mental health worker; be attentive to psychiatric comorbidities

Primary Pharmacologic Interventions

Pharmacologic Interventions

- Major classes of pharmacologic agents approved for UC and CD include:
  - 5-aminosalicylic acids
  - Corticosteroids
  - Immnomodulators
  - TNF inhibitors and monoclonal antibodies

- Severity of disease at presentation should guide therapy

- Emerging research suggests aggressive treatment at earlier stage of disease may improve clinical outcomes and increase likelihood of mucosal healing.
  - Study revealed CD patients randomized to early treatment with immunomodulator plus TNF inhibitor were more likely to achieve clinical remission, steroid-free remission, and mucosal healing compared to patients treated with corticosteroids sequentially followed (as needed) by azathioprine and infliximab

5-aminosalicylic Acid

**Mechanism of Action:** reduces inflammation of colon by preventing production of substances involved in inflammatory process

**Indication:** achieve and maintain remission of mild-to-moderate UC; lack of evidence for efficacy of 5-ASAs in CD likely due to limitations of superficial anti-inflammatory agent for transmural disease

**Available Agents:** sulfasalazine, mesalamine, olsalazine, balsalazide; the various 5-ASAs are available for release to different areas of the bowel including local mesalamine preparations, enemas, suppositories, and oral, delayed-release formulations

**Dosage:** 2.0-4.8 g/d for active disease; ≥2 g/d for maintenance; once-daily is optimal dosing due to improved adherence and comparable efficacy with split dosing

**Adverse Effects:** generally well-tolerated although reports of headache, nausea, loss of appetite, vomiting, rash, fever, decreased WBC, abdominal pain and cramps, diarrhea, flatulence, hair loss, dizziness; check renal function every 6 months

Corticosteroids

**Mechanism of Action:** blocks early manifestations of inflammation, including enhanced vascular permeability, vasodilation, neutrophil infiltration; also controls later consequences of inflammation such as fibroblast activation, vascular proliferation, and collagen deposition; also influence immunological responses which decreases inflammation

**Indication:** effective and safe for both luminal CD and UC for induction of remission; no role in maintenance of remission; 20% to 30% of patients fail to respond

**Available Agents:** most widely used are hydrocortisone, prednisolone, methylprednisolone, budesonide; available for oral, rectal, and IV administration; budesonide is a non-systemic, enteric-coated, locally-acting agent with a pH- and time-dependent coating that enables release into ileum and ascending colon and is indicated for CD

**Dosage:** dose and route of administration varies for moderate and severe flares of UC and CD; dose reductions during remission; parenteral administration during severe cases of UC; give lowest effective dose for shortest time; frequent short-term use not recommended

**Adverse Effects:** hypertension, opportunistic infections, steroid-induced psychosis, steroid dependence, diabetes, osteoporosis, weight gain, acne, mood swings, increased facial hair, elevated glucose levels, insomnia

Immunomodulators

Mechanism of Action: derivatives of thioguanine that act as purine metabolites; following metabolization into 6-thioguanine nucleotides, immunosuppression occurs, which induces effector T cell apoptosis, decreases NF-κB activation, and decreases pro-inflammatory cytokine secretion.

Indication: effective and safe for induction and maintenance of remission when 5-ASA or corticosteroids fail; reduce or eliminate corticosteroid dependence; 10% to 30% fail to respond.

Available Agents: thiopurines (azathioprine, 6-mercaptopurine), methotrexate, calcineurin inhibitors (tacrolimus, cyclosporin A); methotrexate mainly for patients refractory to or intolerant of thiopurines; cyclosporin mainly used for severe exacerbations of UC refractory to alternative therapy.

Dosage: 2.0 to 2.5 mg/kg for azathioprine; 1.0 to 1.5 mg/kg for 6-MP; SQ or IM methotrexate 25 mg/w for induction and 15 to 25 mg/w for maintenance; IV cyclosporin 5 mg/kg.

Adverse Effects: lymphoproliferative disease, early hypersensitivity reactions (fever, pancreatitis); bone marrow suppression, hepatotoxicity.

TNF Inhibitors and Monoclonal Antibodies

Mechanism of Action: targeted agents that bind and interfere with cytokines, which are cell signaling molecules involved in the inflammatory response characteristic of IBD.

Indication: acutely ill or corticosteroid-dependent patients with moderate-to-severe CD or UC; fistulizing CD; golimumab for moderate-to-severe UC who are corticosteroid-dependent or refractory to 5-ASA.

Available Agents: infliximab, adalimumab, certolizumab, golimumab (TNF inhibitors); vedolizumab (monoclonal antibody).

Clinical Response: little difference in efficacy between infliximab and adalimumab for CD; infliximab seems more effective for UC; effective when combined with thiopurines; gut specificity of vedolizumab reduces systemic and CNS toxicity and effective for patients with CD refractory to TNF inhibitor.

Adverse Effects: opportunistic infections, lymphoma, nonmelanoma skin cancer; ~10% per year of patients lose response to TNF inhibitor; lower response rate when treated with second TNF inhibitor.
### WGO Recommendations: Disease Status and Drug Therapy

<table>
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<th>Status</th>
<th>Distal UC</th>
<th>Extensive UC</th>
<th>CD</th>
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<tr>
<td>Mild</td>
<td>• Rectal or oral 5-aminosalicylic acid</td>
<td>• Topical and oral 5-aminosalicylic acid</td>
<td>• 5-aminosalicylic acid for colonic disease only</td>
</tr>
<tr>
<td></td>
<td>• Rectal corticosteroids</td>
<td></td>
<td>• Metronidazole or ciprofloxacin for perineal disease</td>
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<td></td>
<td></td>
<td></td>
<td>• Budesonide for ileal or right colon disease</td>
</tr>
<tr>
<td>Moderate</td>
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<td></td>
<td>• Rectal corticosteroids</td>
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<td>• Azathioprine or 6-mercaptopurine</td>
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<td></td>
<td></td>
<td>• Methotrexate</td>
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<td></td>
<td></td>
<td></td>
<td>• Anti-TNF agents</td>
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<tr>
<td>Severe</td>
<td>• Rectal and oral 5-aminosalicylic acid</td>
<td>• IV corticosteroids</td>
<td>• Oral or IV corticosteroids</td>
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<td>• Oral or IV corticosteroids</td>
<td>• IV cyclosporin</td>
<td>• SC or IM methotrexate</td>
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<td></td>
<td>• Rectal corticosteroids</td>
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<tr>
<td>Refractory</td>
<td>• Oral or IV corticosteroids with azathioprine or 6-mercaptopurine</td>
<td>• Oral or IV corticosteroids with azathioprine or infliximab or cyclospor</td>
<td>• 5-aminosalicylic acid for colonic disease only</td>
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<td>• Metronidazole or ciprofloxacin for perineal disease</td>
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<td>• Budesonide for ileal or right colon disease</td>
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<td>Quiescent</td>
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<td>• Anti-TNF agents</td>
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<td>Perianal</td>
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<td>• Not applicable</td>
<td>• Oral antibiotics</td>
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Emerging Therapies for IBD

**Ustekinumab**
- An antibody to interleukin-12/23
- Phase 3 trial of 526 subjects randomized to IV ustekinumab at 1, 3, or 6 mg/kg or placebo, with responders at 6 weeks undergoing second randomization to SC ustekinumab 90 mg or placebo
- No significant difference in clinical remission vs placebo
- Maintenance therapy demonstrated significantly higher rates of clinical remission (41.7% vs 27.4%) and response (69.4% vs 42.5%) for ustekinumab vs placebo

**Tofacitinib**
- An oral Janus kinase (JAK) inhibitor that blocks inflammation
- Phase 2 trial in patients with moderate-to-severe UC showed significantly higher rates of clinical response at 15 mg dose and clinical remission at 3, 10, and 15 mg doses compared to placebo
- Possible adverse effect on LDL and HDL levels

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**Emerging Therapies for IBD**

**Microbiome Modulators**
- Antibiotics: meta-analyses suggest beneficial for active CD and UC and quiescent CD; evidence for efficacy of nitroimidazoles for prevention of recurrence of perineal fistulizing CD and pouchitis
- Probiotics for in active UC and prevention of pouchitis; no evidence of benefit for CD
- Fecal microbiota transplantation: appears safe but variably effective
Symptomatic Therapy and Supplements

**Antibiotics**: metronidazole, ciprofloxacin, rifaximin

**Antidiarrheals**: loperamide, cholestyramine, diphenoxylate, atropine

**Anticholinergics and antispasmodic agents**: dicyclomine, hyoscyamine

**Analgesics**: acetaminophen; **avoid narcotics**

**Nutritional supplements** for those with malnutrition or during periods of reduced oral intake; **Vitamin B₁₂** for those with deficiency; **vitamin D and calcium** supplementation for steroid users; **parenteral iron** for those with chronic iron-deficiency anemia if oral iron not tolerated

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**Brian P: Treatment Plan**

- As Brian’s NP, what steps would you take next?
  - Increase mesalamine to 800 mg TID
  - Reinforce importance of regular medication dosing
  - Add prednisone 10 mg/d for 10 days
  - Administer oral iron supplement
  - Emphasize importance of regular meals and sleep
  - Schedule follow-up appointment in 2 weeks
Brian P: Follow-up

- Brian reports he is doing much better.
- His energy has returned.
- He is having 1 to 2 loose bowel movements daily with no blood.
- He completed the prednisone and reports no exacerbation of his symptoms since discontinuation.
- You continue mesalamine at 800 mg TID and schedule a follow-up appointment in 1 month.

Surgical Interventions
**Indications for Surgery: Ulcerative Colitis**

25% to 30% of patients require surgery, which is curative

- Refractory to medical therapy
- The presence of dysplasia

**Surgical procedures**

- Proctocolectomy with ileostomy
- Total proctocolectomy with ileoanal anastomosis - IPAA
- Subtotal colectomy with end ileostomy and Hartmann pouch for fulminant colitis


**Indications for Surgery: Crohn’s Disease**

70% to 75% of patients require surgery

- Relieve symptoms if refractory to medical therapy or correct complications
- Not curative
- Goal is conservative resection to preserve bowel length

**Surgical procedures**

- Ileorectal or ileocolonic anastomosis for distal ileal or proximal colonic disease
- Diverting ileostomy for severe perianal fistulas
- Resection for symptomatic enteroenteric fistulas

Follow-up Care

Katy S: One-month Follow-up

- Katy returns to you for a 1-month follow-up visit.
- Her chart reveals several imaging tests including:
  - EGD
  - Colonoscopy,
  - Small bowel imaging
- Katy was diagnosed with 11 mm ileal Crohn’s disease.
- The GI NP has recommended treatment with a biologic agent.
- Katy needs an immunization review and update before starting a biologic agent and also wants to discuss her treatment options with you.
Katy S: Vaccinations

- You review the mechanism of action of anti-TNF therapy with Katy, including a review of risk and benefits.
- A review of Katy's vaccination history reveals:
  - She recalls having chicken pox but denies a history of shingles.
  - Katy also thinks she received the hepatitis B vaccine, but there is no record of this.
  - The MMR was administered prior to Katy starting college.
  - Katy had a negative PPD test before she began teaching 4 years ago.
- Your plan:
  - Varicella titre
  - Hepatitis B surface antigen and surface antibody
  - QuantiFERON-TB Gold

Katy S: Follow-up Plan

- You discuss with Katy the importance of:
  - Regular follow-up blood tests
  - Colonoscopy
  - Lifestyle modifications
  - Screening and monitoring for osteoporosis
  - Screening for cervical, breast, and skin cancer
  - Routine monitoring of blood pressure, signs of depression, and ophthalmologic changes
  - General preventive care
  - Contraception
**Periodic Laboratory Evaluations**

- CBC
- Vitamin B<sub>12</sub>
- Ferritin
- Liver Enzymes
- Lipid Panel
- Iron
- BUN and Creatinine
- Fasting Glucose
- Vitamin D-25-OH

**Surveillance for Colorectal Cancer**

- Increased risk for colorectal cancer (CRC) compared to general population
- Estimated standardized incidence ratio for CRC is 2.3 (95% CI, 2.0, 2.6) and 2.6 (95% CI, 1.69, 4.12) for individuals with UC and CD, respectively
- Risk factors include:
  - Duration of inflammatory disease, extent of disease, degree of inflammation
  - Coexistence of primary sclerosing cholangitis
  - Family history of CRC
  - Higher risk in patients with extensive colitis, intermediate left-colitis
  - Lower risk in proctitis
- Endoscopic surveillance – every 1-2 years beginning 7 to 8 years following onset of initial symptoms


Bone Health and Immunizations

Screen with DEXA; initiate screening for patients on corticosteroids >3 months, postmenopausal, age >50, history of fragility fracture; recommend lifestyle modifications

Follow recommendations for general population for most patients with IBD with exception of early dosing for pneumococcal vaccine polyvalent and zoster; no live viruses for immunosuppressed patients


Patient and Provider Resources