Inflammatory Bowel Disease: Advances in Immunopathogenesis and Treatment
<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliations</th>
<th>Disclosures</th>
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<tbody>
<tr>
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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.

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

Crohn’s Disease

- Genetic factors likely play a 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

### Disease Activity in Ulcerative Colitis

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bloody stools/day</td>
<td>&lt;4</td>
<td>≥4 <em>IF</em></td>
<td>≥6 <em>AND</em></td>
</tr>
<tr>
<td>Pulse</td>
<td>&lt;90 bpm</td>
<td>≤90 bpm</td>
<td>&gt;90 bpm <em>or</em></td>
</tr>
<tr>
<td>Temperature</td>
<td>&lt;37.5°C</td>
<td>≤37.8°C</td>
<td>&gt;37.8°C <em>or</em></td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>&gt;11.5 g/dL</td>
<td>≥10.5 g/dL</td>
<td>&lt;10.5 g/dL <em>or</em></td>
</tr>
<tr>
<td>ESR or CRP</td>
<td>&lt;20 mm/hr Normal</td>
<td>≤30 mm/hr</td>
<td>&gt;30 mm/hr <em>or</em> 30 mg/dL</td>
</tr>
</tbody>
</table>

*IF* and *AND* indicate the presence of additional symptoms.

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.
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
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.
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

Environment

Dysfunctional Immune Response

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

References:
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
Environmental Risk Factors

- Geographic Location
- Stress and Depression
- Ambient Air Pollution

References:
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.

Clinical Features
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 obstipation 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
Katy S: Diagnostic Evaluation

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

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

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

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

**Physical Exam**

<table>
<thead>
<tr>
<th>Procedure</th>
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<tbody>
<tr>
<td>General physical examination for cachexia, fever, pallor, nutritional status, pulse and BP, weight and height</td>
</tr>
<tr>
<td>Abdomen for altered bowel sounds, distention, guarding, hepatomegaly, masses, rebound, tenderness, and surgical scars</td>
</tr>
<tr>
<td>Perianal exam for abscesses, fissures, fistula, or tags</td>
</tr>
<tr>
<td>Extraintestinal examination of mouth, eyes, skin, and joints for arthropathy, uveitis, erythema nodosum, primary sclerosing cholangitis, metabolic bone disease</td>
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Laboratory and Blood Tests

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

Lab Tests

Blood Tests

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

- 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.
# Imaging and Endoscopy

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Details</th>
</tr>
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<tbody>
<tr>
<td>Sigmoidoscopy or Colonoscopy</td>
<td>• Reveals ulcers, inflammation, bleeding, stenoses; permits biopsies of colon and terminal ilium</td>
</tr>
<tr>
<td>Upper GI Endoscopy</td>
<td>• Use when patient has upper gastrointestinal symptoms such as nausea, vomiting, epigastric pain</td>
</tr>
<tr>
<td>Cross-sectional Imaging</td>
<td>• CT, US, MRI to determine extent and severity of disease&lt;br&gt;• US and MRI preferred due to young age of patients and need for repeat imaging over time</td>
</tr>
<tr>
<td>Capsule Endoscopy</td>
<td>• Capsule endoscopy for patients with suspected CD and negative work-up</td>
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Brian P: Diagnostic Evaluation

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
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
Complications
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

Malabsorption Complications

- Peripheral arthritis
- Ankylosing spondylitis
- Sacroiliitis
- Spondylarthropathy

Inflammatory Joint Disease

- Erythema nodosum
- Pyoderma gangrenosum

Skin Inflammation

- Uveitis
- Episcleritis
- Scleroconjunctivitis

Eye Inflammation

Extra-intestinal Complications

- More prevalent during disease flares

Venous Thromboembolism

- More common in patients diagnosed before age 30 and those with extremely severe UC

Colorectal Cancer

- Decrease in health-related quality of life
- Depression
- Anxiety

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

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
  - Immunomodulators
  - 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

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>
<thead>
<tr>
<th>Status</th>
<th>Distal UC</th>
<th>Extensive UC</th>
<th>CD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mild</strong></td>
<td>• Rectal or oral 5-aminosalicylic acid&lt;br&gt;• Rectal corticosteroids</td>
<td>• Topical and oral 5-aminosalicylic acid</td>
<td>• 5-aminosalicylic acid for colonic disease only&lt;br&gt;• Metronidazole or ciprofloxacin for perineal disease&lt;br&gt;• Budesonide for ileal or right colon disease</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>• Rectal or oral 5-aminosalicylic acid&lt;br&gt;• Rectal corticosteroids</td>
<td>• Topical and oral 5-aminosalicylic acid</td>
<td>• Oral corticosteroids&lt;br&gt;• Azathioprine or 6-mercaptopurine&lt;br&gt;• Methotrexate&lt;br&gt;• Anti-TNF agents</td>
</tr>
<tr>
<td><strong>Severe</strong></td>
<td>• Rectal and oral 5-aminosalicylic acid&lt;br&gt;• Oral or IV corticosteroids&lt;br&gt;• Rectal corticosteroids</td>
<td>• IV corticosteroids&lt;br&gt;• IV cyclosporin&lt;br&gt;• IV infliximab</td>
<td>• Oral or IV corticosteroids&lt;br&gt;• SC or IM methotrexate&lt;br&gt;• IV infliximab or SC adalimumab or certolizumab</td>
</tr>
</tbody>
</table>

## WGO Recommendations: Disease Status and Drug Therapy

<table>
<thead>
<tr>
<th>Status</th>
<th>Distal UC</th>
<th>Extensive UC</th>
<th>CD</th>
</tr>
</thead>
<tbody>
<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 cyclosporin</td>
<td>• 5-aminosalicylic acid for colonic disease only</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Metronidazole or ciprofloxacin for perineal disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Budesonide for ileal or right colon disease</td>
</tr>
<tr>
<td>Quiescent</td>
<td>• Oral or rectal 5-aminosalicylic acid</td>
<td>• Oral 5-aminosalicylic acid</td>
<td>• Oral corticosteroids</td>
</tr>
<tr>
<td></td>
<td>• Oral azathioprine or 6-mercaptopurine</td>
<td>• Oral azathioprine or 6-MP</td>
<td>• Azathioprine or 6-mercaptopurine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Methotrexate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Anti-TNF agents</td>
</tr>
<tr>
<td>Perianal</td>
<td>• Not applicable</td>
<td>• Not applicable</td>
<td>• Oral antibiotics</td>
</tr>
</tbody>
</table>

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

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 inactive 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 $B_{12}$** 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

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
- Liver Enzymes
- BUN and Creatinine
- Vitamin B$_{12}$
- Lipid Panel
- Fasting Glucose
- Ferritin
- Iron
- 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
Resources

Crohn’s and Colitis Foundation of America at www.ccfa.org/science-and-professionals


American Academy of Family Physicians at www.aafp.org
Centre for Digestive Diseases at www.cdd.com.au

British Society of Gastroenterology at www.bsg.org.uk

American Society of Colon and Rectal Surgeons at www.fascrs.org
Please complete the back page of the program evaluation and turn it in!