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Ulcerative Colitis: A Streamlined Overview of Pathophysiology and Treatment Strategies

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Abstract: Ulcerative colitis is a chronic inflammatory disorder of the colon that progresses through alternating periods of active flare-ups and remission. The condition primarily affects the lining of the large intestine, beginning in the rectum and often spreading upward through the colon. Several factors can increase susceptibility, including prior bacterial infections such as *Salmonella* or *Campylobacter*, as well as a family history of inflammatory bowel disease. Diagnosis is typically guided by clinical symptoms such as rectal bleeding, tenesmus, and an urgent need to defecate. Confirmation is obtained through endoscopic evaluation, which usually reveals continuous mucosal inflammation starting at the rectum and extending proximally, depending on disease severity. Fecal biomarkers may also be utilized to monitor inflammation levels and anticipate relapses. Although ulcerative colitis can severely impact young, otherwise healthy individuals, its underlying causes remain only partially understood. This uncertainty has encouraged diverse theories regarding its development and treatment. Despite significant advances in therapy, the condition continues to pose both clinical and psychological challenges. Treatment strategies are primarily aimed at controlling inflammation and maintaining remission. Commonly prescribed medications include 5-aminosalicylic acid compounds and corticosteroids, with the choice of agent and delivery method based on disease extent and severity. Experimental options such as fecal microbiota transplantation are under investigation, while complementary interventions like probiotics and curcumin have produced variable results. In cases of severe or treatment-resistant disease, surgical management may become necessary. Because prolonged inflammation and immunosuppressive therapy can elevate the risk of colorectal cancer, patients require vigilant preventive care and regular screening to detect complications early.

Keywords: *Ulcerative Colitis, Symptoms, Advancements, Treatment.*

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I. INTRODUCTION

➢ *Overview*

Ulcerative colitis is a chronic inflammatory disorder of unknown origin that mainly targets the lining of the colon and rectum. The condition most commonly arises in young adults and shows a slightly higher prevalence among females. Clinically, it presents with recurrent bouts of diarrhea containing blood, mucus, or pus. The disease tends to follow a fluctuating pattern, alternating between periods of remission and relapse, with potential complications during active episodes. This discussion offers a concise overview of ulcerative colitis and evaluates the existing evidence surrounding its management and therapeutic approaches.

➢ *Prevalence and Causative Factors*

- Age and prevalence: Ulcerative colitis most often develops between the ages of 15 and 30 years and occurs more frequently in developed nations, with an estimated prevalence of about 286 cases per 100,000 adults in the United States.
- Ethnic and genetic susceptibility: Individuals of Caucasian descent, particularly those with Ashkenazi Jewish ancestry, have a higher risk of developing ulcerative colitis.
- Medication-related risks: The use of certain pharmaceutical agents—including oral contraceptives, hormone replacement therapy, and nonsteroidal anti-inflammatory drugs (NSAIDs)—may contribute to an increased likelihood of disease onset or exacerbation.
- Environmental influences: Exposure to environmental triggers, such as bacterial agents, pollutants, or chemical irritants, may provoke immune responses associated with disease activity.
- Diet and lifestyle: Consuming a high-fat, high-sugar diet that is low in dietary fiber, along with sedentary lifestyle habits, can elevate susceptibility to ulcerative colitis or worsen its symptoms.

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➢ *Clinical Features*

- Key clinical features: The main symptoms of ulcerative colitis include bloody and mucous-filled diarrhea, cramp-like abdominal pain, reduced appetite, and unintentional weight loss.
- Onset and progression: The disease may begin gradually or suddenly. In severe, fulminant cases, symptoms can develop within hours, requiring urgent medical attention.
- Typical disease course: More commonly, patients experience mild to moderate diarrhea with frequent recurrences, which can persist for months or even years.
- Clinical presentation and referral: Many patients initially present to surgical units after being misdiagnosed with hemorrhoids (piles), whereas those with more advanced or complicated disease are usually referred from medical departments for specialized care.

➢ *Diagnostic Evaluation*

Diagnosis of ulcerative colitis depends primarily on specialized diagnostic procedures rather than solely on clinical evaluation. Sigmoidoscopy serves as the main diagnostic tool, allowing direct visualization of the inflamed mucosa, while radiologic imaging helps assess the extent of disease involvement and identify potential complications. A stool analysis is also performed to exclude infectious causes, particularly pathogens responsible for dysentery.

Other conditions that may present with bloody diarrhea include ischemic colitis, Crohn's disease, and radiation-induced colitis. In contrast, non-bloody diarrhea can result from disorders such as microscopic colitis, irritable bowel syndrome, celiac disease, or various forms of food intolerance.

➢ *Melanoma*

Colon cancer most commonly develops between the ages of 40 and 60, though it can occasionally occur in younger individuals. Patients often report a recent alteration in bowel habits, which may include rectal bleeding and the passage of mucus. Typically, diarrhea alternates with constipation, reflecting irregular bowel function. In some cases, a palpable mass may be detected, while most tumors can be visualized through rectal examination or sigmoidoscopy.

A barium enema X-ray frequently identifies the lesion, though not in every instance, and certain tumors are first recognized during laparoscopic evaluation. The disease tends to be more prevalent among older adults, often presenting with long-standing discomfort, particularly in the left iliac fossa. Unlike inflammatory conditions, the presence of blood or mucus in the stool is less common. Diagnosis is typically confirmed using radiological studies, such as barium enema imaging, and occasionally supported by sigmoidoscopic findings.

➢ *Dysentery*

In cases of amoebic dysentery, there is often a history of residence or travel abroad, particularly to regions where the infection is common. Diagnosis is confirmed by identifying *Entamoeba histolytica* in stool specimens, using concentration or staining techniques when necessary. The frequent misdiagnosis of ulcerative colitis as bacillary dysentery is reflected by the number of patients with ulcerative colitis who have historically been treated in infectious disease or fever hospitals.

➢ *Crohn's Disease Involving the Colon*

This condition can sometimes be mistaken for ulcerative colitis. On radiographic examination, the presence of the "string stricture sign" may assist in establishing the correct diagnosis, though laparotomy is often performed for confirmation.

Familial adenomatous polyposis (polyposis coli) may present with diarrhea, blood, and mucus in the stool, but is typically associated with a strong family history of bowel disorders and a high incidence of colorectal cancer among relatives. The polyps can usually be visualized during sigmoidoscopic evaluation.

Radiation colitis may develop following exposure to therapeutic radiation, such as X-rays, radium, or cobalt therapy. It is characterized by mucosal thickening and telangiectasia, and the patient's history of prior radiation treatment is key to differentiating it from other colonic diseases.

Antibiotic-associated colitis presents with diarrhea that develops after antibiotic therapy for an unrelated infection. Stool cultures may reveal organisms such as Staphylococcus aureus or Clostridium difficile.

Tuberculous colitis, though relatively uncommon, occurs as a secondary manifestation of pulmonary tuberculosis and may exhibit either ulcerative or hyperplastic lesions. Diagnosis is challenging because mycobacteria are rarely isolated in these cases.

Finally, ulcerative colitis must be distinguished from several other conditions, including simple mucous colitis, Brooke's ileocolitis, and colitis caused by bacillary dysentery.

➢ *Therapeutic Management*

Discussions about the treatment of ulcerative colitis can be complex, as there is considerable variation in professional perspectives regarding optimal management. This divergence partly arises because surgeons typically manage more severe cases, whereas physicians often encounter patients with milder disease. In the United Kingdom, psychiatrists seldom participate directly in treatment, although reports from the United States have described positive outcomes following approximately 50 hours of intensive psychotherapy.

➢ *Induction and Maintenance of Remission*

The primary goal in managing ulcerative colitis is to achieve mucosal healing and effective symptom control, thereby maintaining a sustained, steroid-free remission

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while minimizing the need for hospitalization or surgical intervention.

➢ *Management of Mild Ulcerative Colitis*

- According to the 2019 guidelines of the American College of Gastroenterology (ACG), patients with mild ulcerative proctitis should be treated with rectal 5-aminosalicylic acid (5-ASA) formulations as first-line therapy.
- For mild to moderate ulcerative colitis, a combination of oral 5-ASA and rectal 5-ASA enemas is recommended. Rectal 5-ASA preparations are preferred over rectal corticosteroids, as mesalamine has been shown to be more effective than sulfasalazine in inducing remission.
- Patients who are unresponsive to or intolerant of 5-ASA therapy may be prescribed oral budesonide (extended-release, MMX formulation), designed to deliver the medication directly to the colonic mucosa for targeted anti-inflammatory action.

➢ *Treatment of Moderate to Severe Disease*

- For moderate to severe ulcerative colitis, biologic therapy remains the cornerstone of treatment.
- Biologic agents, either alone or in combination with glucocorticoids or immunomodulators, are recommended for both induction and maintenance of remission. However, thiopurines or methotrexate should not be used as monotherapy, as they are less effective in achieving remission on their own.
- Systemic corticosteroids can be effective for inducing remission, but both dosage and duration should be carefully limited to minimize adverse effects.
- Other pharmacologic options for inducing remission include tumor necrosis factor-alpha (TNF-α) inhibitors, anti-integrin antibodies, anti-interleukin agents, and Janus kinase (JAK) inhibitors.
- Fecal microbiota transplantation (FMT) has shown potential in inducing remission for some patients; however, its use remains restricted to clinical research settings pending further evidence.

➢ *Surgical Intervention*

Indications for surgical intervention include:

- Chronic disability resulting from unsuccessful medical therapy.
- Severe acute disease unresponsive to pharmacologic management.
- Development of complications such as strictures, perforation, or arthritis.
- Increased malignancy risk, particularly in long-standing disease.

➢ *Surgical Management is Guided by Two Key Principles:*

- Diversion of fecal flow, typically through the creation of an ileostomy, and
- Resection of the diseased bowel segment.

The most commonly performed procedure is a total proctocolectomy with a permanent ileostomy. This operation may be performed in one or two stages, depending on the patient's general condition.

- In a staged approach, the first stage involves creating an ileostomy and removing the colon, followed later by the excision of the rectum and sigmoid colon.
- In certain cases, rectal lesions may regress following fecal diversion, allowing surgeons to attempt rectal preservation and perform an ileo-rectal or ileo-anal anastomosis.

Aylett's surgical approach demonstrated favorable outcomes, with patients averaging five bowel movements per day following ileo-rectal anastomosis. However, similar results have been difficult to replicate consistently among other surgeons. Dukes proposed that such reconstructive procedures may be more appropriate for children or individuals unable to manage a permanent ileostomy. Many of these anastomoses eventually required reversal due to excessive stool frequency and recurrence of inflammation.

The advent of modern appliances, such as the "Chiron" disposable ileostomy bag, along with support from ileostomy associations, has greatly improved patient quality of life. Most patients with an ileostomy today can lead active, fulfilling lives with minimal restriction when proper care is maintained.

Despite these advances, surgery does not represent a complete cure. As one French clinician aptly stated, *"Colectomy merely removes the anatomically diseased organ—it does not eradicate the underlying disorder."*

➢ *Life and Behavioral Interventions*

- Lifestyle and dietary modifications play an important role in reducing symptom severity and improving the overall quality of life for individuals with ulcerative colitis.
- Adopting a low-FODMAP diet—which limits fermentable oligosaccharides, disaccharides, monosaccharides, and polyols—can lessen gastrointestinal symptoms without influencing the clinical course of the disease.
- Regular physical activity has been shown to enhance quality of life and reduce anxiety levels commonly experienced by individuals living with inflammatory bowel disease (IBD).

➢ *Sanitarium Care*

Approximately 25% of patients with ulcerative colitis will require hospitalization due to the severity of their disease.

Prompt endoscopic evaluation should be performed to exclude cytomegalovirus (CMV) colitis, and testing for Clostridioides difficile infection is also essential.

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Patients should avoid nonsteroidal anti-inflammatory drugs (NSAIDs), analgesics, and anticholinergic medications, as these can exacerbate symptoms or complicate disease management. Antibiotics are generally not recommended unless there is clear evidence of infection.

A surgical consultation is warranted in patients who fail to improve after three days of intravenous corticosteroid therapy, or sooner if surgical complications such as toxic megacolon develop.

If there is no clinical response to intravenous corticosteroids within three days, rescue therapy with cyclosporine (Neoral) or infliximab (Remicade) may be initiated to induce remission and avoid colectomy.

➢ *Preventative Care Considerations*

- Immunizations should be administered in accordance with the Advisory Committee on Immunization Practices (ACIP) and the Centers for Disease Control and Prevention (CDC) guidelines, with special consideration for additional vaccines required by patients undergoing immunosuppressive therapy.
- Dual-energy X-ray absorptiometry (DEXA) scanning is recommended to evaluate bone mineral density in patients with ulcerative colitis, particularly those who have received long-term oral corticosteroid therapy for three months or more, due to their elevated risk of osteoporosis.
- Colonoscopy screening is advised to commence eight years after the diagnosis of ulcerative colitis, or immediately if primary sclerosing cholangitis (PSC) is present, as both conditions carry an increased risk of colorectal cancer.
- For patients with disease extending beyond the sigmoid colon, surveillance colonoscopies should be performed every one to three years, depending on individual risk factors and prior endoscopic findings.
- Individuals with coexisting PSC should undergo annual colonoscopic surveillance, given their substantially higher risk of developing colorectal malignancy.

II. CONCLUDING REMARKS

Ulcerative colitis is a chronic, relapsing inflammatory disorder of the colon that presents ongoing diagnostic, therapeutic, and management challenges. Although advances in medical therapy have enhanced symptom control and quality of life, the disease remains only partially understood and exhibits a highly variable clinical course among patients. Effective management requires careful clinical assessment, individualized treatment approaches, and routine surveillance to minimize complications and mitigate long-term risks, including an elevated likelihood of colorectal cancer. Continued research into the pathogenesis, innovative therapies, and potential curative strategies offers promise for achieving better disease control and improved patient outcomes in the years ahead.

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