

# Gastrointestinal Imaging

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## Definition

Inflammatory disorder of the colon that occurs as a complication of antibiotic treatment.

### ► Epidemiology

Humans represent the main reservoir of *Clostridium difficile*, which is not part of the normal intestinal flora • The pathogen occurs in 2–3% of healthy adults and in 5–15% of asymptomatic inpatients and outpatients.

### ► Etiology, pathophysiology, pathogenesis

Infection with *C. difficile* is a hospital-acquired infection that usually occurs secondary to antibiotic treatment • Further predisposing factors include immunosuppression, chemotherapy, intensive care, and major surgery • The disorder is caused by toxin produced by the pathogen • This leads to formation of pseudomembranous, exudative, inflammatory plaques in the colon • Occasionally the small bowel is also involved.

## Imaging Signs

### ► Modality of choice

Endoscopy, ultrasound, CT.

### ► Pathognomonic findings

Bowel wall is thickened owing to edema • Mucosa enhances markedly • The rest of the wall is thickened but does not enhance (edema) • Haustration is preserved • Usually there is only slight pericolic inflammation • The rectum and sigmoid colon are involved in 80–90% of cases • Segmental involvement is more common than diffuse involvement.

*Complications:* Toxic megacolon (diameter > 5–6 cm) • Perforation.

### ► Endoscopic findings

Cream-colored confluent plaques or pseudomembranes on fragile mucosa • Primarily located in the rectum and sigmoid colon • Lesions are occasionally limited to the ascending colon.

### ► Ultrasound findings

Thickening of the bowel wall, which in the florid stage is highly perfused (demonstrated by color Doppler and ultrasound contrast agents) • Peristalsis is reduced in the thickened bowel segments.

### ► CT findings

Swollen bowel wall • Occasionally several layers can be differentiated (target sign) • Mucosa enhances markedly with contrast • The edematous bowel wall does not enhance • Ascites may occur in very severe cases • Oral or rectal contrast agent is trapped between the swollen mucosal folds (accordion sign).

### ► Findings on plain abdominal radiography

Demonstrates toxic megacolon (diameter exceeding 5–6 cm) • Bowel wall occasionally appears irregularly thickened • No feces in the colon • The extent and severity of the disorder are often underestimated.



**Fig. 8.5** Pseudomembranous colitis. Single-contrast image of the colon. Irregular contour of the rectum and sigmoid.

#### ► Findings on contrast enema

Largely replaced by endoscopy and cross-sectional imaging modalities • Pseudomembranous plaques cause small nodular filling defects • Confluent pseudomembranes produce a grossly irregular mucosal surface.

#### ► MRI findings

Bowel wall is thickened • On fat-suppressed T2-weighted images, the acute inflammation (edema) is well visualized • There is an intense signal in the bowel wall and vicinity • Good modality for visualizing stenoses • However, MRI is only a supplementary modality.

### Clinical Aspects

#### ► Typical presentation

Broad spectrum of symptoms • Slight diarrhea may be present and cease after antibiotic treatment is discontinued • Any degree of severity is possible, including severe colitis with intense watery diarrhea (bloody in 10% of cases), abdominal cramps, and fever • Life-threatening complications can result from shock, bowel perforation, and megacolon • Acute abdomen or abdominal sepsis occurs in 5% of cases • Symptoms can begin immediately after the onset of antibiotic treatment or may only occur weeks later • Toxin is detected in the feces.

#### ► Therapeutic options

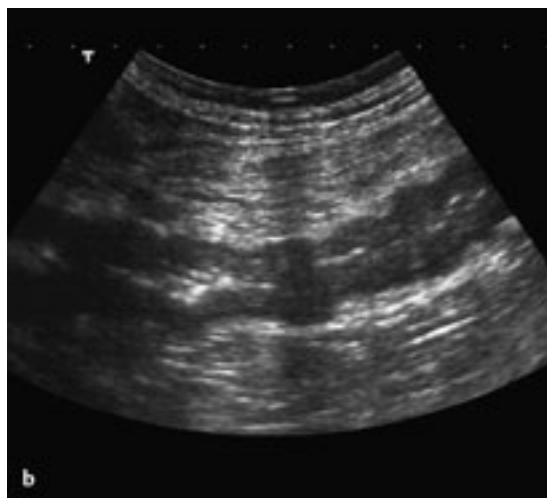
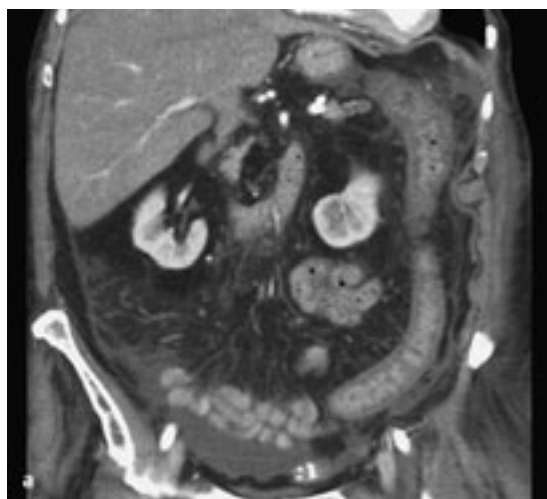
Discontinue the antibiotics • Fluid and electrolyte substitution • Metronidazole and vancomycin may be indicated in severe cases.

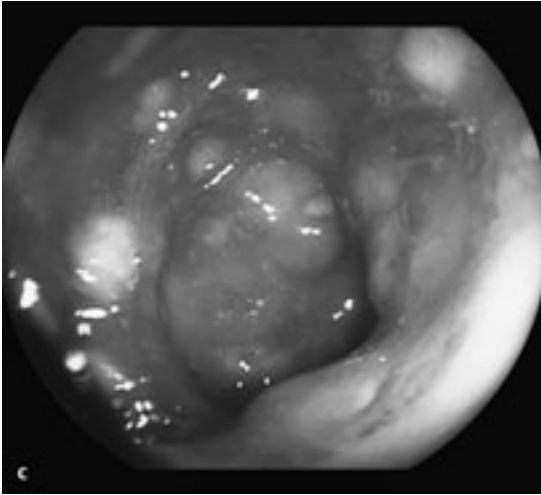
**Fig. 8.6a–c**

Pseudomembranous colitis.

**a** CT. The entire visualized segment of the colon up to the splenic flexure exhibits marked thickening of the wall. The mucosa is well perfused and there is free fluid in the lower abdomen.

**b** Ultrasound. Thickened, hypoechoic wall at the junction of the descending colon and sigmoid.





**c** Endoscopy.  
Typical yellow plaques on the surface of the mucosa.

### ► **Course and prognosis**

Mortality is 1–3.5% • Left untreated, the severe form has a mortality of 15–30%.

### ► **What does the clinician want to know?**

Exclude ischemic disorders of the bowel • Extent • Severity • Complications.

## **Differential Diagnosis**

### *Ischemic colitis*

- Older patients
- Vascular pathology is present
- Reduced perfusion of the bowel wall

### *Diverticulitis*

- Diverticula
- Pericolic inflammation in fatty tissue
- Thickening of the fascia
- Usually most pronounced in the sigmoid colon

### *Crohn disease*

- Usually associated with small bowel involvement
- Transmural inflammation with fistulas and abscesses
- Proliferation of fatty and fibrotic tissue (“creeping fat”)
- Spreads from the terminal ileum toward the rectum

### *Simple antibiotic-associated colitis*

- Watery (not bloody) diarrhea that ceases spontaneously when drug is discontinued
- No plaques or membranes

**Tips and Pitfalls**

Normal CT findings do not exclude *Clostridium* colitis • Conversely, severe morphologic changes correlate poorly with the clinical picture.

**Selected Literature**

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