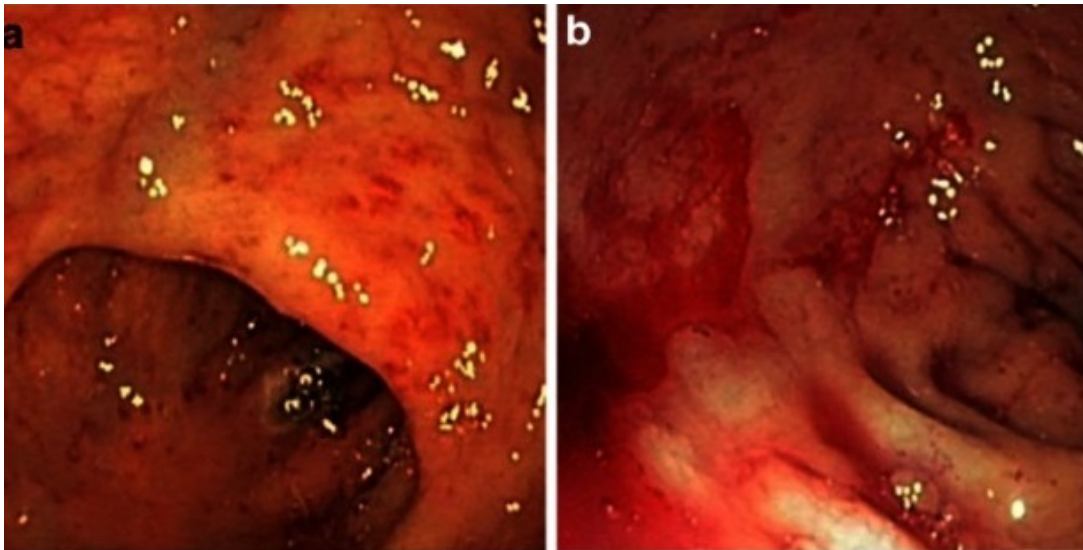


Radiation Colitis — Symptoms and Differential Diagnosis

[See online here](#)

Radiative colitis is an enteropathy syndrome that may develop after the radiation therapy to the abdomen or pelvis. Radiation therapy is a treatment option for cancers in that area. Symptoms start weeks to years after initial radiation dose and include diarrhea, malabsorption, abdominal pain, and nausea. Therapy involves treating symptoms and allowing the bowels to heal. In severe cases, partial colectomy may provide the best chance at recovery.



Definition of Radiation Colitis

Colitis, inflammation of the [colon](#), can be caused by a variety of etiologies. It is a common side effect of using radiation therapy when treating abdominal or pelvic malignancy, especially in the treatment of prostate cancer and ovarian cancer. An abdominal **dosage greater than 1.5 Gray units** may result in radiation colitis. The condition is grouped into 3 periods of time after the initial exposure: **acute, late acute, and chronic**.

Epidemiology of Radiation Colitis

Spread of radiation colitis

There are about **200,000 cases of abdominal and pelvic malignancy** reported annually (prostate, colon, rectal, bladder, cervical, and endometrial cancers). About half of these are treated with radiation therapy and almost all of those treated with radiation will develop acute radiation enteritis or colitis. Only a small portion of this group (10 %) will develop a chronic condition.

There is an increased risk of damage when receiving chemotherapy with radiation therapy. [Diabetes](#), hypertension, and a history of abdominal surgery and intestinal adhesions increase the risk of developing symptoms. Any dosage of radiation also increases the risk of developing adenocarcinomas in the colon.

Etiology of Radiation Colitis

Causes of radiation colitis

Ionizing radiation damages the intra- and extracellular structures by ionizing molecules, radiolysis, and the formation of free radicals from the water. This results in damage to the cell membrane, organelles, and DNA. DNA damage includes double and single-strand breaks and dimer formation.

If a cell suffers sufficient damage it may start apoptosis. The degree of injury is dependent on the total radiation dose and the amount of time the patient is dosed. A **larger, quick dose of radiation** has an increased risk of causing damage compared to several smaller doses, spaced out over several days or weeks.

Pathology and Pathophysiology of Radiation Colitis

Acute radiation-induced damage is characterized by plasma cell and polymorphonuclear infiltration of the lamina propria, mucosal atrophy, and submucosal edema. **Apoptosis and cell lysis** are common throughout the epithelial layer. Severe submucosal damage increases the risk of developing ulcerations. During the late acute phase, the mucosa is restored and repopulated.

Chronic radiation colitis shows submucosal fibrosis, endarteritis, and lymphoid atrophy. These changes are progressive over months and years. Vascular changes may lead to **mucosal ischemia, ulceration, bowel perforation, necrosis, and malabsorption**. Fibrosis of the connective tissue may result in contracture and obstruction.

Symptoms of Radiation Colitis

Signs of radiation colitis

Acute radiation colitis signs and symptoms include:

- Nausea
- Vomiting
- [Diarrhea](#)
- Hematochezia
- Abdominal tenderness without peritonitis
- Malabsorption ([lactose intolerance](#))

Chronic radiation colitis presents with:

- Malabsorption
- Abdominal tenderness without peritonitis
- Chronic [diarrhea](#)

Diagnosis of Radiation Colitis

A history of radiation treatment followed by most symptoms of radiation colitis is expected. These **symptoms should steadily improve over time**. The aggressive investigation is usually reserved for chronic symptoms. However, hematochezia or symptoms of obstruction should be aggressively evaluated because surgery may be required.

Lab testing

A **complete blood count** may be useful to establish anemia in chronic radiation colitis due to blood loss and malnutrition. Other assays are available to evaluate intestinal absorption. These tests include:

- Fecal fat concentration
- Fecal bile acid concentration
- Schilling Test for B12 absorption
- Lactose intolerance test
- Bile acid breath test

Imaging and direct visualization

There are two reasons to evaluate the colon directly by visualization (**colonoscopy**) or by imaging (**CT, MRI**) and those are the obstruction or a lower GI bleed. If a patient has minor symptoms of enteritis and appears to be improving, then these tests are unnecessary. However, severe radiation colitis with an active bleed may require visualization and treatment. Radiation damaged mucosal tissue is inflamed and friable. Submucosal telangiectasias are often visible in cases of chronic disease.

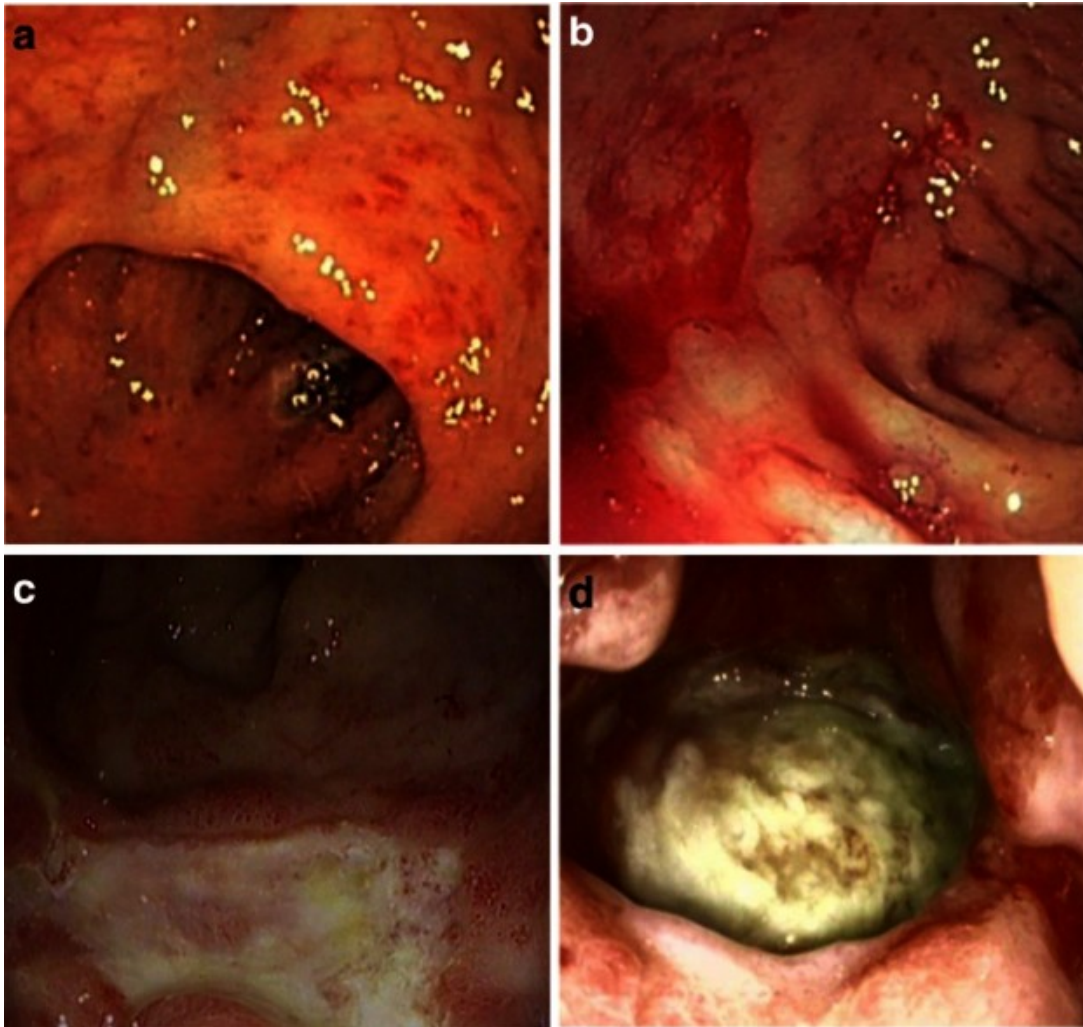


Image: "The effects of chronic radiation on the rectum. Inflammation and telangiectasia visible throughout the mucosa. a shows CRP with edematous and multiple non-confluent telangiectatic lesions, b demonstrates a predominantly bleeding form of CRP, c illustrates necrosis with multiple confluent telangiectatic lesions, and d shows an ulcer" by The Author(s) 2015. License: [CC-BY 4.0](https://creativecommons.org/licenses/by/4.0/)

Histology

Mucosal sampling is **rarely required for diagnosis**. Acute radiation colitis is characterized by submucosal edema and mucosal atrophy while chronic enteritis shows obliterative arteritis and fibrosis.

Differential Diagnoses of Radiation Colitis

Clinical pictures similar to radiation colitis

- Post-operative Intestinal Stricture
- Adenocarcinoma
- Proctitis
- Strangulating hernia
- [Bacterial overgrowth syndrome](#)
- Intussusception
- [Diverticulosis](#)
- [Hemorrhoids](#)

Therapy of Radiation Colitis

Treatment of radiation colitis

Most patients respond to **conservative treatment**, however, some patients with recurring symptoms may require surgical intervention. Several protective measures can be enacted before radiation treatment to minimize damage to the colon.

Prophylactic treatment

- **Sulfasalazine:** Reduces the incidence and severity of radiation colitis
- **Glutamine:** May provides some protection
- **Hydration and probiotics:** Offer some protection and reduce the severity of radiation colitis

Treatment post-radiation therapy

Treating the symptoms of colitis while the body recovers may reduce healing time and improve the patient's quality of life.

- Antiemetic
- Antidiarrheal
- Change of diet (lactose restrictions)

Some hemorrhage treatment can be performed via colonoscopy with the use of argon plasma or formalin. Both treatments are usually well tolerated.

Surgery

Surgical treatment is **reserved for refractory** and the most complicated cases including obstruction, fistulas, hemorrhages, and perforations. Surgical options include resection and diversion (colostomy).

Progression and Prognosis of Radiation Colitis

Radiation therapy is a mainstay of abdominal and cancer treatment. Its role is growing to include preoperative and postoperative therapy. It is a very effective tool and greatly reduces cancer mortality and morbidity. Radiative colitis is an unfortunate and severe side effect. **Most patients recover with minimal medical intervention** but some require surgical treatment and in a small fraction surgery is insufficient to prevent mortality.

References

Abobakr K Shadad, Frank J Sullivan, Joseph D Martin, Laurence J Egan. (2013).

Gastrointestinal radiation injury: Symptoms, risk factors and mechanisms. World J Gastroenterol. 19(2): 185-198.

Abayomi J, Kirwan J, Hackett A. (2009). The prevalence of chronic radiation enteritis following radiotherapy for cervical or endometrial cancer and its impact on quality of life. Eur J Oncol Nurs. 13(4):262-7.

Denton A, Forbes A, Andreyev J, Maher EJ (2002). Non surgical interventions for late

radiation proctitis in patients who have received radical radiotherapy to the pelvi.
Cochrane Database Syst Rev (1): CD003455.

Hauer-Jensen M, Denham J, Andreyev H. (2014). Radiation enteropathy-pathogenesis, treatment and prevention. Nat Rev Gastroenterol Hepatol 11 (8): 470-9.

Shadad A, Sullivan F, Martin J, Egan L. (2014). Gastrointestinal radiation injury: symptoms, risk factors and mechanisms. World J Gastroenterol. 19 (2):185-98.

Legal Note: Unless otherwise stated, all rights reserved by Lecturio GmbH. For further legal regulations see our [legal information page](#).

Notes