

Pelvic Irradiation Side effects , Prevention and Treatment

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* Pelvic Irradiation Side Effects

RT is indicated in :

60%: cervical cancer patients,

45 % of endometrial cancer patients,

35 % of vulvar cancer patients,

100 % of vaginal cancer patients,

5 % of patients with ovarian cancer

- * The incidence and severity of RT side effects depend :
- * Site,
- * Volume of tissue exposed
- * Treatment schedule: total dose, dose per fraction, and type of radiation.
- * Previous surgery,
- * Concomitant chemotherapy
- * Comorbid illness :
- * Smoking history (strong predictor for both bowel and bladder complications)
- * ●Active collagen vascular disease,
- * ●Inflammatory bowel disease (IBD)
- * ●Vascular disorders –diabetes and hypertension
- * Microvascular disease.

* Side effect timing

- * **Acute toxicities** :during or shortly after the course of treatment.
- * **Subacute toxicities** :4 to 12 weeks after RT pneumonitis or myositis.
- * **Late toxicities** :after three months.

* GU Toxicity

Acute radiation cystitis:

- * Dysuria, frequency, urgency, nocturia, and bladder spasms.
- * RT-induced bladder inflammation and edema, which can compromise urothelial integrity.

IMRT :

- * *reduce GU toxicity with adjuvant treatment after hysterectomy for cervical and endometrial cancer*

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- * NSAIDS :irritative voiding symptoms

- * ● Anticholinergics and/or antispasmodics
(oxybutynin or hyoscyamine) for cystitis or bladder spasm

- * ● Cranberry juice or phenazopyridine for dysuria

* Late signs and symptoms

- * EBRT Dose <50 Gy : Late GU symptoms only grade 1,2
- * **Urinary urgency**, incontinence, and limitations in daily activities due to bladder symptoms (5%)
- * EBRT + Brachytherapy : D2cc > 101 Gy more late complications ,
- * **Contracture** =>> pain syndromes.
- * **Ureteral stricture**
- * Urethrovaginal and vesicovaginal **Fistula**
- * **Radioation hematuria** :Sodium **pentosan polysulfate** (Cap 100mg) ,
Hyperbaric Oxigenation

* GI Toxicity

* GI toxicity is the most common of both acute / late side effects

* **Acute radiation injury**

Cramping, diarrhea, anorexia, malaise, rectal discomfort, and tenesmus

Total dose and volume irradiated

the degree of acute toxicity does predict for the development of late effects

loose stool and **cramping**.

Small Bowel :high-volume **watery diarrhea**.

Large bowel **fecal urgency**, clustered bowel movements, and **tenesmus**

Cisplatin with pelvic radiation → >2 fold the risk for grade ≥3 acute GI side effects .

* Early GI Toxicity

* Proctitis and rectal discomfort

- * Enema with hydrocortisone or cod liver oil, anti-inflammatory suppositories, and a low-residue diet : no grease, spices, or insoluble fiber.
- * Two small prospective studies :topical sodium butyrate enemas in the treatment of acute radiation proctitis .Butyrate is a short chain fatty acid.
- * ●Ondansetron has been shown to reduce radiotherapy-induced nausea and vomiting .
- * chlorpromazine and dexamethasoneThe addition of dexamethasone to ondansetron appears to improve nausea control
- * ●Antidiarrheal medications.
- * loperamide . When symptoms are refractory, diphenoxylate-atropine and tincture of opium can be effective.
- * Octreotide is more effective than diphenoxylate-atropine With loperamide-refractory diarrhea, subcutaneous octreotide led to complete resolution for 80 %of patients,
- * Endometrial cancer undergoing RT +selenium-deficient :Selenium sulfate :reduced rates of grade 2 or higher diarrhea .
- * ●Probiotics :a preventive strategy for radiation enteritis.

* Late GI Toxicity

* *Mucosal atrophy and loss of mucin-producing goblet cells*

- * The symptoms of late GI toxicity :
- * ● **Chronic diarrhea** - . Ongoing antidiarrheal medications are often necessary.
- * ● **Malabsorption** - This can be related to RT involving the distal ileum. **vitamin B12** deficiency occurs in 12 to 20 percent. Cholestyramine when bile salt malabsorption
- * **Fibrosis**
- * ● **Recurrent ileus or obstruction**
- * Prolonged chronic radiation enteritis → **Malnutrition**: perioperative nutritional therapy
- * ● **Mucosal telangiectasias or ulcerations**
- * The signs :painless hematochezia, tenesmus, or pain.
- * Median time to onset is 14 months and symptoms typically appear within three years
- * **Image-guided brachytherapy** has the potential to further reduce its incidence].
- * **IMRT**
- * ● **Rectal proctopathy**:
- * **Avoiding constipation** may limit episodes of bleeding.
- * Sucralfate enemas, **aluminum hydroxide**
- * In refractory cases: **endoscopic intervention**
- * **Topical formalin** ,**argon plasma coagulation** at controlling bleeding
- * topical butyrate does not reduce symptoms of chronic proctitis
- * **Surgical management** for :transfusion-dependent bleeding, refractory pain, and fistula,

ANTIDIARRHEAL INTERVENTIONS

SCREENING

- Provide immediate antidiarrheal therapy indicated by grade

INTERVENTION^j

GRADE 1

- If chemotherapy induced, decrease or delay the next dose of chemotherapy
- Provide oral hydration and electrolyte replacement
- Initiate antidiarrheal (eg, diphenoxylate/atropine) if patient not already on opioids

GRADE 2

- Provide IV fluids if patient is unable to tolerate oral fluids
- Initiate/continue antidiarrheal—as above
- Consider anticholinergic agents
- If non-C.diff infection-related: Treat with appropriate antibiotics
- If C. diff infection-related: Administer antibiotics and probiotics as appropriate
- If chemotherapy-induced, decrease or delay the next dose of chemotherapy
- If immunotherapy-mediated diarrhea, consider
 - ▶ Corticosteroids
 - ▶ Infliximab
 - ▶ Probiotics
 - ▶ [See Management of Immunotherapy-Related Toxicity Guidelines](#) for immunotherapy-related diarrhea

GRADES 3/4

- Inpatient hospitalization (intensive care for Grade 4 if consistent with goals)
- For GVHD diarrhea, consider limiting diet, steroids, and IV nutrition
- Provide IV fluids and use antidiarrheal agents and anticholinergics as mentioned above
- Consider somatostatin analog
- Consider parenteral hydration in home setting

*Vagina

- * **Acute vaginal mucositis**
- * Vaginal douches :local anesthetic+anti-inflammatory agent, benzydamine
- * vaginal estrogen
- * **Vaginal stenosis** : the most common late vaginal side effect in EBRT and/or BT
- * Vaginismus
- * sexual dysfunction (dysparunia)
- * Topical estrogen (one to three times weekly) applied in the first six months following radiation reduces dyspareunia and improves vaginal caliber
- * **Fistulas** – Rectovaginal and vesicovaginal fistulas are a rare but serious.The need for interstitial brachytherapy may increase this risk compared with intracavitary brachytherapy
- * As with vaginal necrosis: hyperbaric oxygen and pentoxifylline

* Ovaries Skin And Bone Marrow

- * **Infertility** or **premature menopause**
 - * premature ovarian failure (POM) The dose is 16.5 Gy at 20 Y/O and 14.3 Gy at 30 Y/O
 - * laparoscopic ovarian transposition
 - * at least 3 cm from the radiation field border+clips.
 - * High rates of preservation (80 to 88 %)
 - * **BONE AND BONE MARROW**
 - * **SKIN** : **erythema** and **soreness** to **moist desquamation**,
AND **ulceration**
 - * **skin hygiene**, **water-based creams**, or ointments such as lanolin
 - * Moist desquamation : Silvadene cream
- Radiation-induced fibrosis: oral pentoxifylline + vitamin E

