CANCER TREATMENT RELATED ABDOMINAL IMAGING EFFECTS & COMPLICATIONS

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Acknowledgements

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COMPLICATIONS OF THERAPY

Gastrointestinal Complications

- **Small bowel & colon**
  - Graft vs. host disease
  - Neutropenic enterocolitis
  - Infectious Colitis (C-Difficile)
  - Pneumatosis
  - Ischemic colitis
  - GI tract perforation
  - GI tract bleeding
Graft Versus Host Disease

- Occurs in patients who have undergone bone marrow and stem cell transplant
- T lymphocytes from donor bone marrow cause selected epithelial damage of recipient target organs
- Incidence: 30-70% patients with allogeneic transplant
Graft Versus Host Disease

- Occurs in acute and chronic forms
- Used to be defined based on time- if within 100 days of transplant, termed “acute” and if after 100 days -“chronic”
- Multisystem attack of donors immune systems against recipient’s tissues
- Usually manifests as skin rash, also affects the gastrointestinal system and less commonly the respiratory system

*Mahgerefteh SY et al. Radiology 2011*
# Graft Versus Host Disease

## Acute GHVD
- Rash
- Nausea and vomiting
- Abdominal Pain
- Diarrhea
- Weight loss
- Cholestatic Jaundice
- Liver dysfunction
- Pulmonary

## Chronic GHVD
- Skin and hair changes
- Dry eyes and mouth
- Lichenoid changes
- GE reflux
- Dysphagia
- Diarrhea
- Anorexia/weight loss

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Graft Versus Host Disease

GI tract involvement

- Bowel wall thickening - moderate - not as marked as in neutropenic enterocolitis, c.diff. colitis
- Usually small bowel involved
- Mucosal enhancement - much more common than in neutropenic enterocolitis
- If barium used as oral contrast, mucosal ulceration may lead to intramural trapping of barium
- Separation of bowel loops and dilatation of small bowel and colon can be also seen

* Mahgerefteh SY et al. Radiology 2011
Graft vs. Host Disease (GVHD)
Graft vs. Host Disease (GVHD) with GI tract Involvement - Small bowel & Colon
GVHD vs. other GI complications

- **0-30 days**
  - Typhilitis- Neutropenic enterocolitis
  - Moderate bowel wall thickening- usually right colon but can affect small bowel also
  - C. difficile colitis-
  - Marked bowel wall thickening- limited to colon

- **31-100 days**
  - Viral -
  - Moderate bowel thickening- Ileocecal and asc. Colon
  - Pneumatosis

- **> 100 days**
  - Post-transplant lymph proliferative disorder (PTLD)
  - Lymph node enlargement, bowel wall nodularity and thickening

*Mahgerefteh SY et al. Radiology 2011*
COMPLICATIONS OF THERAPY
Neutropenic Enterocolitis

• **Triad:** Neutropenia, temp. >38.3 C, and evidence of colitis
• Abd. pain and distension, diarrhea, GI hemorrhage
• Usually occurs between 5-14 days after onset of therapy
• Usually affects right colon — “typhilitis” but can affect any segment of colon and small bowel
• See in leukemia, now also seen in pts. with lymphoma, and ovarian, and non-small cell lung cancer
• Can also be seen in Tx. Patients and those with AIDS
COMPLICATIONS OF THERAPY

Neutropenic Enterocolitis

• Most common GI side effect of chemotherapy
• Paclitaxol, taxotere, cisplatin/carboplatin and cytosine
• **Treatment:** Aggressive medical support (bowel rest, NG suction, IV fluids, pressors as needed, antibiotic therapy)
• Surgical therapy if there is GI hemorrhage, perforation, or ischemia
• Reported mortality rates are between 21-48%
NEUTROPENIC ENTEROCOLITIS
NEUTROPENIC ENTEROCOLITIS
COMPLICATIONS OF THERAPY

Infectious Colitis (Pseudomembranous)

- Frequently seen in pts. undergoing chemotherapy or antibiotic therapy
- C. Difficile produces a cytotoxin and an enterotoxin
- Mural thickening, mucosal and submucosal edema, leading to “target/double-halo sign”, or “accordion sign”
- Degree of mucosal thickening is usually more severe than in other colitides
- Usually self-limiting, and managed with supportive therapy
- Rarely surgery is needed
INFECTIONOUS COLITIS

- **C. Difficile colitis** - caused by Gram + organism - associated with use of antibiotics
- Diarrhea and abdominal pain
- Accounts for 15-25% of pts. with antibiotic associated diarrhea
- Complications: Toxic megacolon and perforation
- Cell toxicity assay most reliable
- Stool cultures and tests for toxins
COMPLICATIONS OF THERAPY

Neutropenic Enterocolitis vs. Infectious colitis

- Wall thickening is more pronounced in infectious colitis (c.diff)
- If seen in distribution of small bowel and colon, more likely to be neutropenic colitis
- Ascites and peritoneal stranding seen more often with infectious colitis
Pneumatosis

• Mucosal and submucosal bowel damage allows intraluminal air to enter damaged bowel wall
• With bone marrow transplant it may be related to the chemo agents themselves
• Also reported secondary to diverticulitis, GVHD, UC, Crohn, gastric and colon CA
PNEUMATOSIS DUE TO ↑ PERMEABILITY
COMPLICATIONS OF THERAPY

GI Perforation

• Spontaneous tumor rupture, or related to therapy
• Maybe related to therapy—such as Taxol, cytosine, CHOP, 5 FU, cisplatin and mitomycin
• More recently cytokine interleukin IL-2, and bevacizumab (Avastin) have also been shown to cause perforation
• Also causes hemorrhage, fistulas and abscesses
PERI-APPENDICEAL PERFORATION

Advanced metastatic colon cancer
Treated with Xeloda and Avastin
COMPLICATIONS OF THERAPY
Radiation Therapy-Small bowel and Colon

- Small bowel most sensitive- due to rapid mucosal turnover
- Rectum is least sensitive-but often affected due to:
  - a) due to fixed position in pelvis
  - b) relationship to adjacent organs which harbor several radiosensitive cancers
- Radiation enteropathy can be acute or chronic
COMPLICATIONS OF THERAPY

Radiation Therapy - Small bowel

- Acute radiation enteropathy - usually transient
- Seen usually in 2-3 weeks following therapy
- Usually seen as small bowel mucosal enhancement, wall thickening and ileus
- Chronic enteropathy - can be seen months (8-12 mths.) to years following therapy
- Can cause strictures, and lead to fistula
- Seen as wall thickening, strictures, tethering of bowel loops, and rarely fistula formation
Bx- Treatment related mucosal injury affecting small bowel and colon
COMPLICATIONS OF THERAPY
Radiation Therapy-Rectum & Colon

- Acute radiation colitis- usually transient
- Seen usually during therapy
- Tenesmus, bleeding, cramping, diarrhea
- Chronic radiation colitis- can be seen months (mean=9 mths.) following therapy
- Presents with diarrhea, bleeding, and pain
- Can lead to wall thickening, stricture, fistulae and abscess
Clinical T4 muscle invasive urothelial carcinoma underwent chemo RT

Advanced rectal carcinoma underwent chemo RT