Radiation Proctitis

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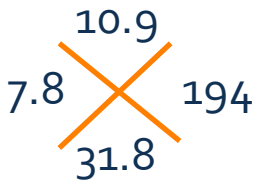
Case Presentation

- 67 year old legally blind male presented with BRBPR on 7/21
- Denies nausea, vomiting, rectal pain, anorexia, fever/chills
- PMH: ESRD on HD, PVD, DM, CAD, Prostate cancer, radiation proctitis (11/2007, 01/2010) s/p APC
  - 2 cm rectal ulcer 2/11 s/p electrocautery
  - 6/2011 with no stigmata of bleeding
    - Bx: hyperplastic colonic mucosa; negative for tumor
- PSH: brachytherapy (2005), BKA

Case Presentation

- VS: T 97F BP 132/89 HR 72 O2 sat 100%
- General: AAO x 3
- CV: RRR, S1S2 normal
- Pulm: CTA bilaterally
- GI: soft nontender, nondistended
- Rectal: Bright red blood; no masses palpated, good sphincter tone
- Extremities: Right BKA

- GI endoscopy:
  - 7/22: poor prep
  - 7/26: deep large ulcer at base of rectum with a clot at edge
  - S/p epinephrine and clips



Hct: 29 → 27 → 25 → 26 → 24

Case Presentation

- Transferred to floor on 7/27
- 7/28/11 (HD#7) obtunded and bleeding profusely from his rectum
  - Procedure: Oversewing the rectal ulcer
- CT scan 7/29 demonstrated radiation seeds fistulizing into the rectum

Case Presentation

- Patient was stabilized with PRBCs and IVF
- 8/03/11: transverse loop colostomy
- Tolerated diet on POD #0 and discharged on POD#1

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Causes

- Acute or chronic side effect from radiation exposure to the pelvis
  - Prostate cancer 6400-7200 cGy
  - Cervical cancer 4500 cGy
  - Endometrial cancer 4500-5000 cGy
  - Rectal cancer 2500-5040 cGy
- Brachytherapy: seeds or cervical cap
- Can occur in sites outside primary therapeutic field

Predisposing factors

- Previous abdominal or pelvic surgery
- Chemotherapeautic agents
  - Adriamycin
  - 5-FU
  - Methotrexate
  - actinomycin
- Preexisting inflammatory conditions
  - Diverticulitis
  - IBD

Radiation Therapy Techniques

- External beam radiation therapy
  - Multiple ports which direct the beam through 3 or more planes focusing on the tumor
- Brachytherapy
  - Ultimate form of conformal therapy
  - Selective placement and exposure of radioactive beads within the tumor bed
  - Maximal radiation delivered to the tumor

Tolerance Dose Levels

ORGAN	MINIMAL DOSE ($TD_{5/50}$) (CGY)	MAXIMAL DOSE (CGY)
Liver	3500	4500
Stomach	4500	5000
Small Bowel	4500	6500
colon	4500	6500
rectum	5000	8000
Esopahgus	6000	7500

**Doses of 3000-7000 cGy in divided fractions of 150-200 cGy over 4-8 weeks

What is injury dependent on???

- Total dose
- Beam energy and percentage depth dose
- Fractionation size
- Field size
- Duration of delivery
- Tissue proliferation
- Tissue oxygenation

How does radiation kill cells?

- Highest kill effect on rapidly dividing cells
  - Mucosa → submucosa → muscularis → serosa
- Execution route:
  - Direct ionization of DNA
  - Production of toxic oxygen-free radicals

Disrupt nuclear DNA integrity

APOPTOSIS

Acute Injury

- Directly related to fraction size, frequency, total volume of tissue irradiated
- Higher doses over shorter intervals induce greater toxicity
- Loss of absorptive capacity
  - DIARRHEA, TENESMUS and MUCOUS DISCHARGE (50-75%)
  - Endoscopically an ulcer appears and hematochezia
- If therapy halted regeneration of the crypts ensues
- Histologic recovery usually complete by 6 months

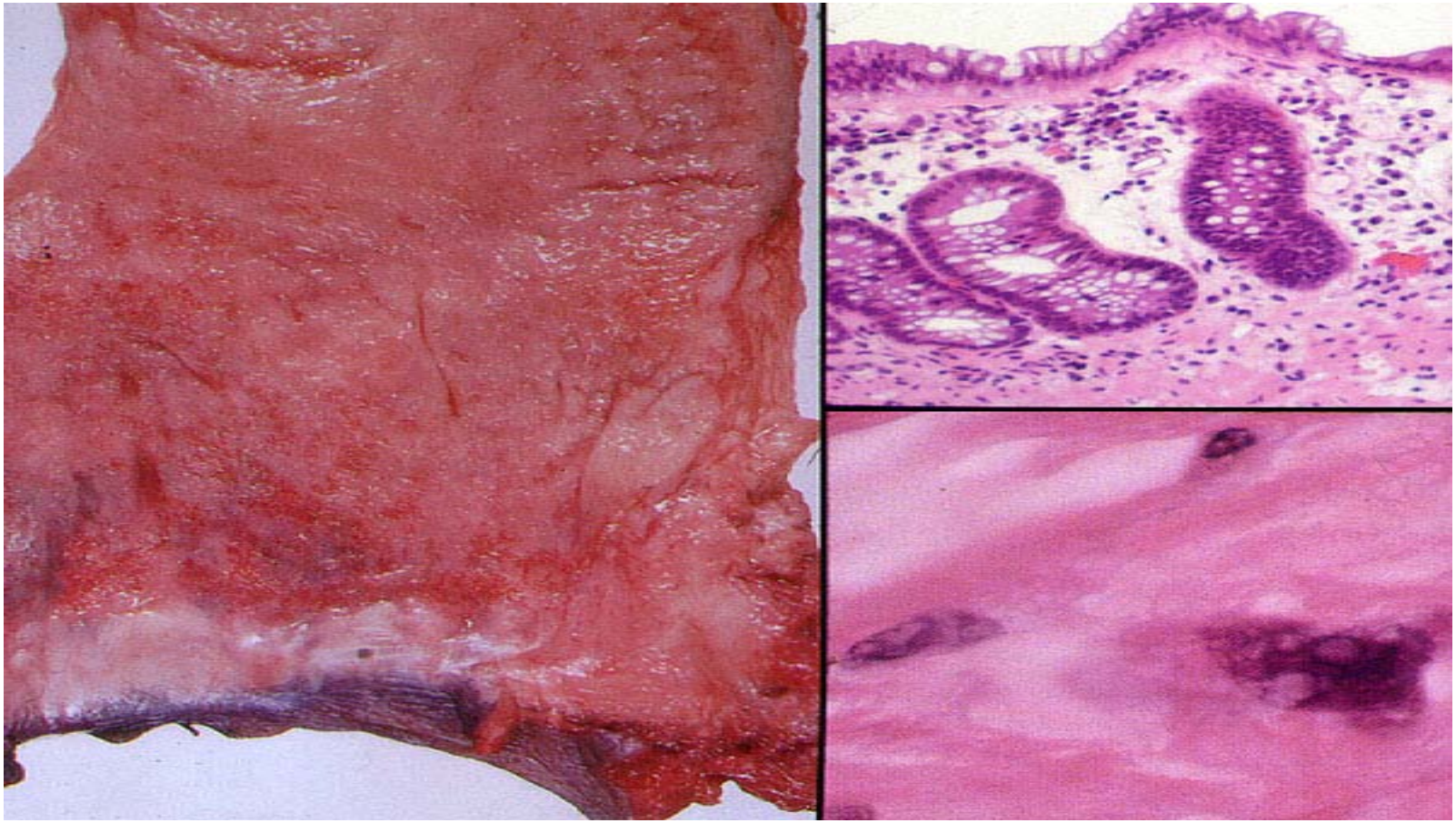
Chronic Injury

- 6-12 months after therapy
- Chronic:
  - Obliterative endarteritis
  - Endothelial degeneration
  - Mucosal telangiectasias
  - Intestinal fibrosis
  - Epithelial distortion

Permanent and irreversible damage

- Stasis and inefficient oxygen delivery to tissues
- Painful ulcers, draining fistulous tracts, pelvic sepsis or cancer

Pathologic changes in radiation proctitis



Epidemiology

- Early injury → 50-75% -abdominopelvic radiation therapy
  - Self-limited
  - < 3-6 weeks of treatment
- Chronic Injury → 5-15% incidence
  - 1-20 years after radiation exposure
  - ~50% will eventually need surgery

Which organs get most affected?

- Cecum
- Sigmoid colon

How does it present?

Complications:

- **Hemorrhage**
- **Fistula formation**
- **Obstruction**
- **Incontinence**

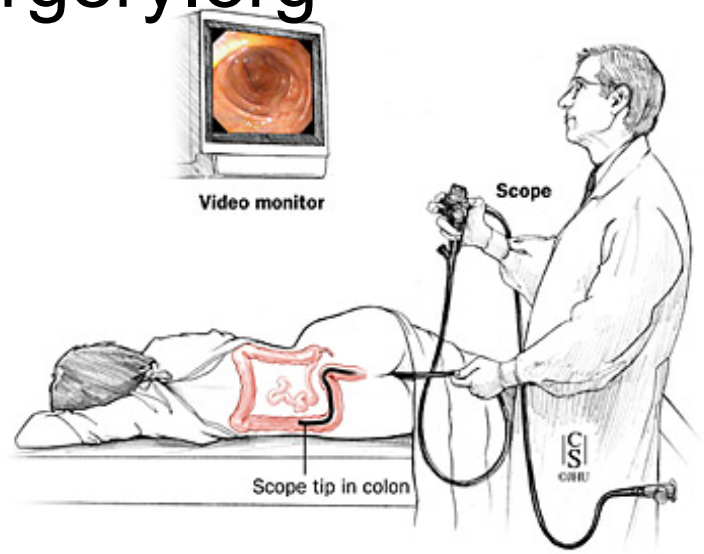
Chronic Radiation Proctitis

- Bleeding
- Diarrhea
- Mucous discharge per rectum
- Urgency/incontinence
- Perianal dermatitis
- Tenesmus

RECTAL BLEEDING – 95%

Increases risk of secondary malignancy!

Evaluation



- Rigid or flexible sigmoidoscopy
- Contrast studies if colonoscopy is not feasible (stricture)
- Lab work: nutritional status

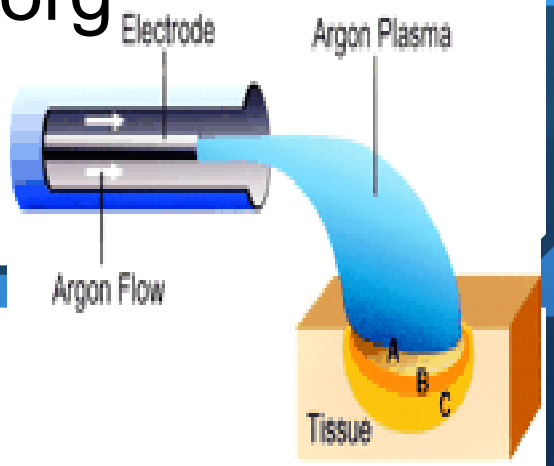
Nonoperative Treatment

- Acute injury- Temporizing measures
  - Antidiarrheal medication
  - Perianal skin care
  - Sucralfate or 5-ASA enemas
  - Patience
- Chronic injury- no cure, poor tissue quality
  - Antidiarrheals
  - Anti-inflammatory enemas
  - Metronidazole
  - Vitamin C and E
  - Laser ablation

Formalin treatment

- First described in mid-1980s
- Evacuate rectum
- 4% formalin solution applied directly to the areas of bleeding
  - Contact for several minutes or until bleeding ceases
- Effective 80% of patients after 1-2 applications
  - 30% - recurrent bleeding
- **Complications: stictures, anococcygeal pain**

Laser coagulation



- Rigid proctoscope or flexible endoscope
  - Several treatments
- Argon plasma coagulator (APC)
  - "painting" the surface of the bowel
  - Uniform 2-3mm burn penetration
  - Blood is "blown" off the tissue surface by argon gas flow,

Side effects:
- ✧Bloating
- ✧Anal Pain

Direct effect of electrocoagulation current on the bleeding lesion

Operative Treatment

- Indications:
  - Refractory symptoms – hemorrhage, tenesmus, discharge, incontinence
  - Pelvic sepsis
  - Obstruction
  - Fistula formation
- Consider:
  - Nutrition and overall health
  - type of radiation therapy
  - life expenctancy
- Preoperatively:
  - Optimize nutrition
  - Correct anemia
  - Broad spectrum antibiotics
  - Ureteric stents

Diverting Ostomy

- Alleviate a deep anal ulcer and help control sepsis
- Bypass a rectal stricture
- Low morbidity and mortality rates
- Important points:
  - Do not use irradiated bowel for stoma creation
  - Right transverse colon is the best place to form a colostomy

Resection

- Resection and primary anastamosis for localized disease
- If cecum is affected ⟶ ileocolic resection with non – irradiated proximal ileum and ascending or transverse colon
- After proctosigmoidectomy- a low rectal or coloanal anastamosis is feasible
  - An omental pedical graft should be placed around the anastamosis

Fistulas

- Rectovaginal- most common
  - Ileorectal, ileovaginal, and vesicovaginal
- Studies:
  - Fistulograms
  - Small bowel studies
  - Contrast enemas
- Approach to rectovaginal fistula:
  - Dissection of rectum to level below fistula
  - Interposition of omental pedicle flap to prevent recurrent fistula
  - Coloanal pull-through and diverting ostomy

Hyperbaric Oxygen Therapy for radiation induced proctopathy in Men treated for prostate cancer

- 27 patients (4- brachytherapy; 16- XRT, 7- combination)
- 100% oxygen in a multiplace hyperbaric chamber for 90 min; 5-7 days weekly for 36 sessions

TABLE 3. *Patient characteristics*

No. pts	27	
Mean age (range)	71.8	(53–82)
No. bleeding via rectum (%)	25	(93)
No. pts requiring blood transfusions before HBO_2 (%)	6	(22)
No. pain (%)	8	(30)
No. fecal urgency (%)	4	(15)
No. rectal ulceration on endoscopy (%)	14	(52)
Median mos symptom duration before HBO_2 (range)	8	(1–132)
Mean mos XRT completion–beginning HBO_2 (range)	19	(3–240)
Mean no. HBO_2 treatments (range)	36	(29–60)

TABLE 4. *Patient outcomes*

Response	No. Pts (%)
Bleeding:	25
Resolved	12 (48)
Improved	7 (28)
Unchanged	5 (20)
No data	1 (4)
Fecal urgency:	4
Resolved	2
Improved	1
Unchanged	0
No data	1
Pain:	8
Resolved	0
Improved	6
Unchanged	1
No data	1
Rectal ulcer:	14
Resolved	2
Improved	5
Unchanged	6
No data	1
Overall response:	27
Good	10 (37)
Partial	8 (30)
No change	9 (33)

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