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ISCHEMIC COLITIS

Nefertiti A. Brown, MD
SUNY Downstate Medical Center
Morbidity and Mortality Conference
June 14, 2012

Case Presentation

- xx yo male with 1 dy h/o abdominal pain and non-bloody diarrhea

PMH: Parkinson's dz, Dementia, Prostate CA, Bedridden

PSH: none

Meds: Amantidine

ALL: NKDA

SH: lives with wife and daughter

Case Presentation

PE:

Vitals: 98.2F, 108, 24, 97/59

- Thin, sarcopenic
- Scaphoid,(?) diffusely tender abdomen. +BS
- Rectal: Formed impacted stool

Labs:

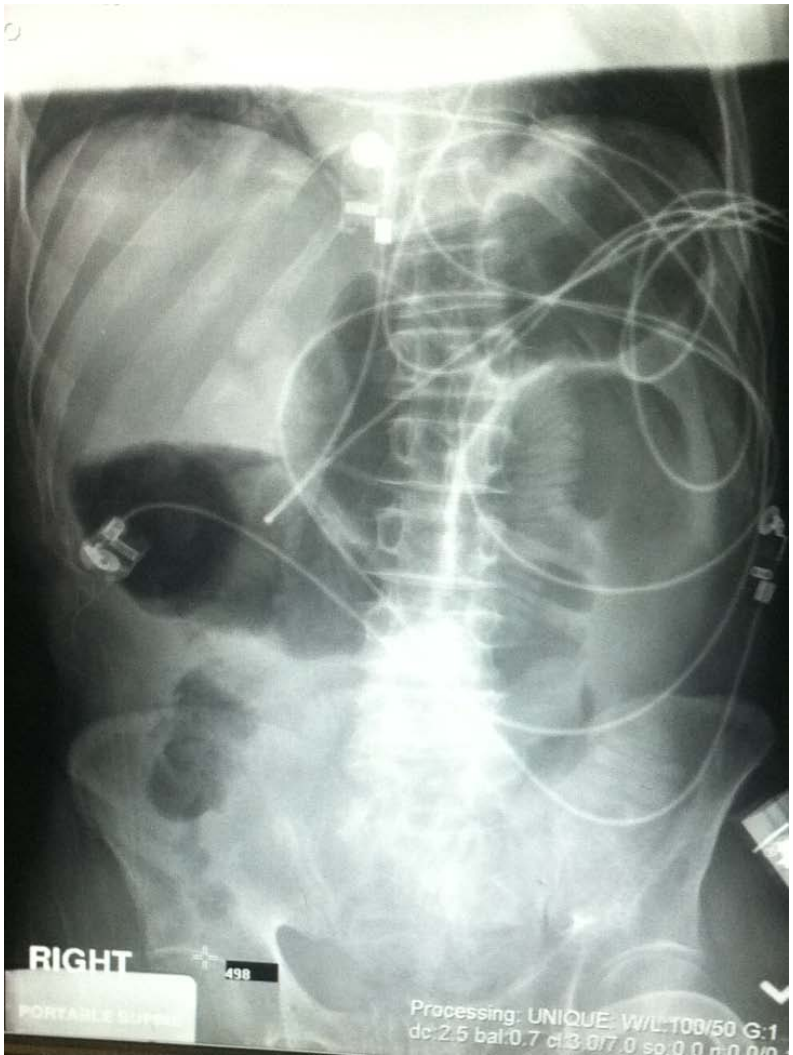
CBC: 5.6/9.9/32.1/174 (46% bands)

BMP: 134/4.8/111/18/2.2/124

Lactate : 4

VBG: 7.37/52.8/29.4/16.5/-7

Imaging

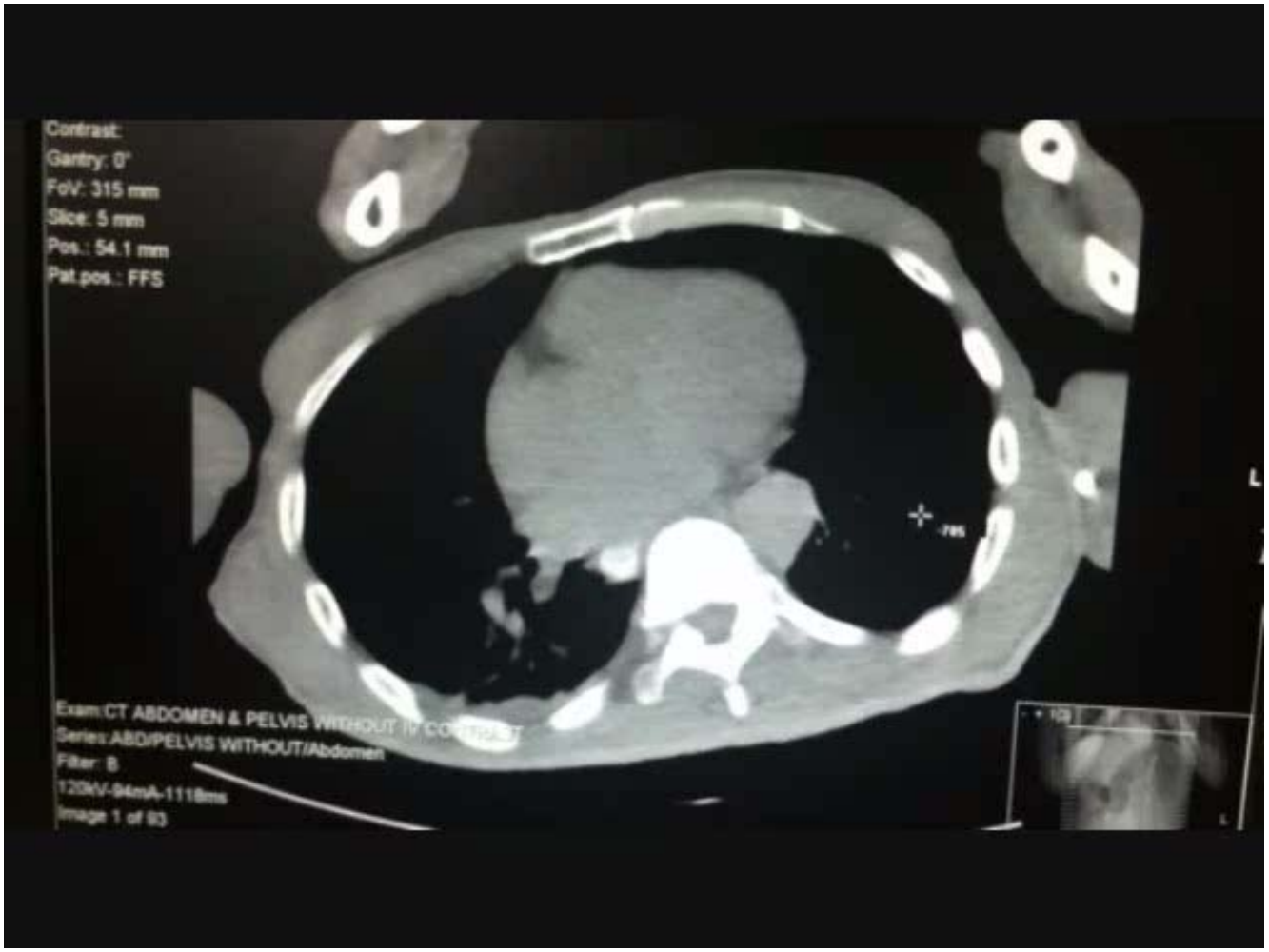


CXR: neg

AXR

- Dilated loops of large bowel

Imaging


Contrast:
Gantry: 0°
FoV: 315 mm
Slice: 5 mm
Pos.: 54.1 mm
Pat.pos.: FFS
Exam:CT ABDOMEN & PELVIS WITHOUT IV CONTRAST
Series:ABD/PELVIS WITHOUT/Abdomen
Filter: B
120kV-94mA-1118ms
Image 1 of 93

- CT

Case Presentation

- Admitted to MICU
- Worsening hypotension
- Abdominal exam (?)

Plan?

OR

Case Presentation

Plan: Exploratory Laparotomy

Findings:

Small area of necrosis at rectosigmoid junction

Sigmoidectomy ⟹ opened on back table

Operation performed: Total colectomy with end ileostomy

Case Presentation

POD 2: off pressors, extubated

POD 4: transferred to floor, clears

POD 5: Regular diet

POD 7: Fever, lethargy

- Cx's neg

Today: awaiting Subacute rehab placement

Stool Cx: C. diff neg

Pathology: Ischemic colitis

Objectives

- Definitions
- Anatomy Review
- Ischemic Colitis
  - Introduction
  - Pathophysiology
  - Underlying Causes
  - Phases of IC
  - Clinical Picture
  - Investigations
  - Management

Definitions

<u>Mesenteric ischemia</u> - reduction in intestinal blood supply

- Acute Mesenteric Ischemia
  - Most often involves SMA
  - from emboli, arterial and venous thrombi, or vasoconstriction secondary to low flow
- Chronic Mesenteric Ischemia
  - postprandial abdominal pain, marked weight loss
  - caused by repeated transient episodes of inadequate intestinal blood flow

AGA guideline: Intestinal Ischemia. Gastroenterology 2000; 118:

Definitions

Colonic ischemia

A sudden and usually temporary reduction in blood flow insufficient to meet metabolic demands of discrete regions of the colon

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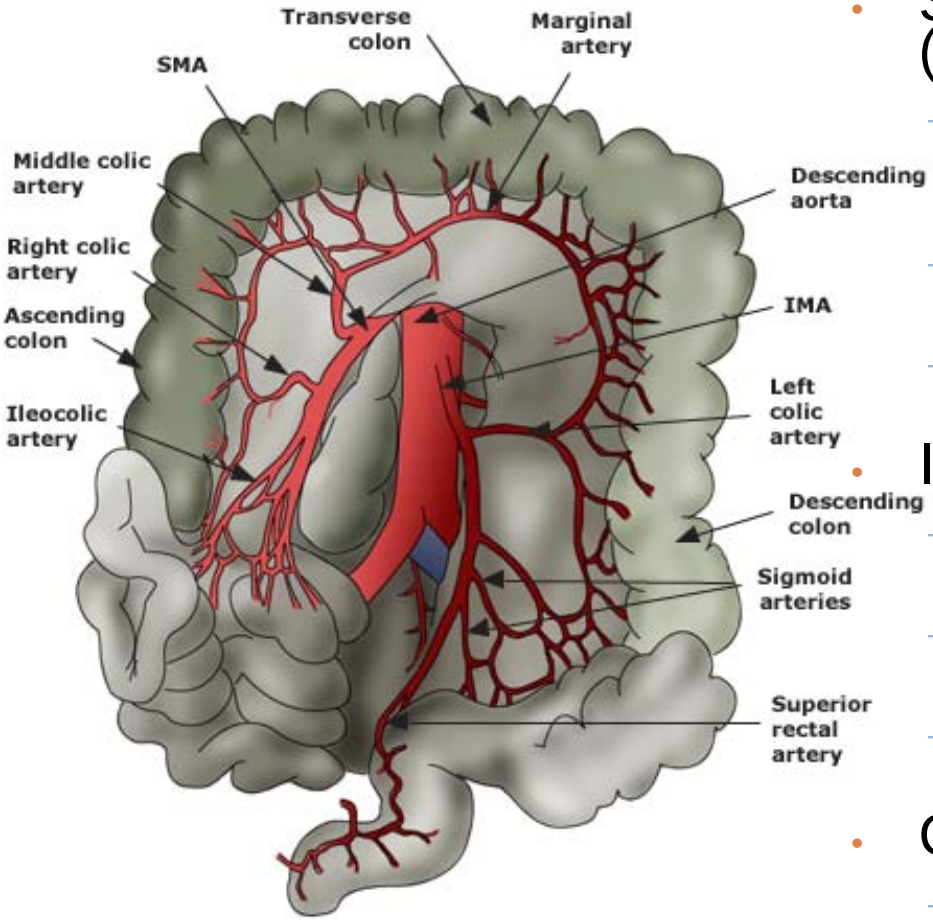
Vascular Supply of the Colon



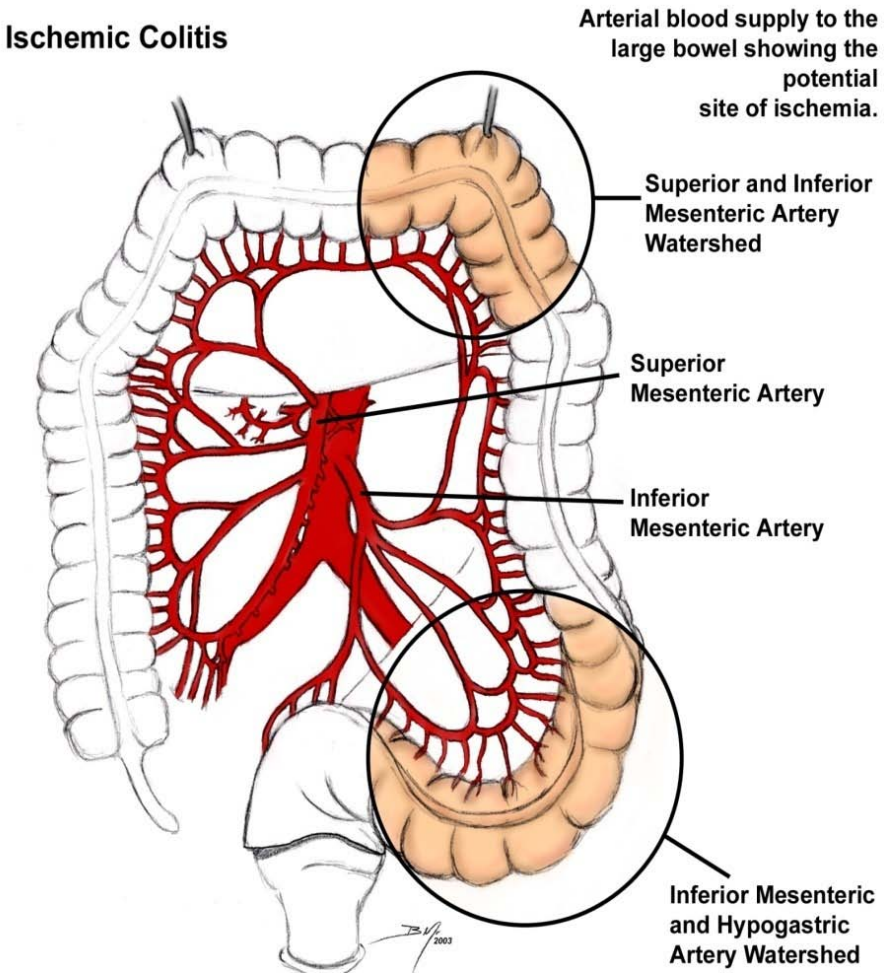
- Superior mesenteric artery (SMA)
  - Ileocolic artery – terminal ileum, cecum, appendix, prox ascending colon
  - Right colic artery – ascending colon, hepatic flexure
  - Middle colic artery – transverse colon
- Inferior mesenteric artery (IMA)
  - Left colic artery – descending, transverse colon, splenic flexure
  - Sigmoid arteries – sigmoid and descending colon
  - Superior rectal artery – proximal rectum
- Collateral flow
  - Marginal artery of Drummond – collateral connection between SMA and IMA along the mesenteric border

Anatomy

- Colon receives less blood supply compared to the rest of the GI tract so its **most vulnerable during systemic hypotension**

Watershed areas

1. Splenic flexure
2. Rectosigmoid junction



Anatomy

Right Vs. Left

- The vasa recta are smaller and less developed in the right colon
- These vessels sensitive to vasospasm

This explains the susceptibility of the ***right*** colon to ischemia

Ischemic Colitis

- Most frequent form of mesenteric ischemia
- Commonly left colon
- Mostly elderly population (>60y)
- M:F ratio 1:1

Risk Factors

- Hypotension
- Hypertension
- Tobacco use
- Peripheral vascular disease
- Coronary artery disease

HYPOXIA

Etiologies and Prevalence by Region

- **Etiologies**

****Low-flow states**

Thromboemboli

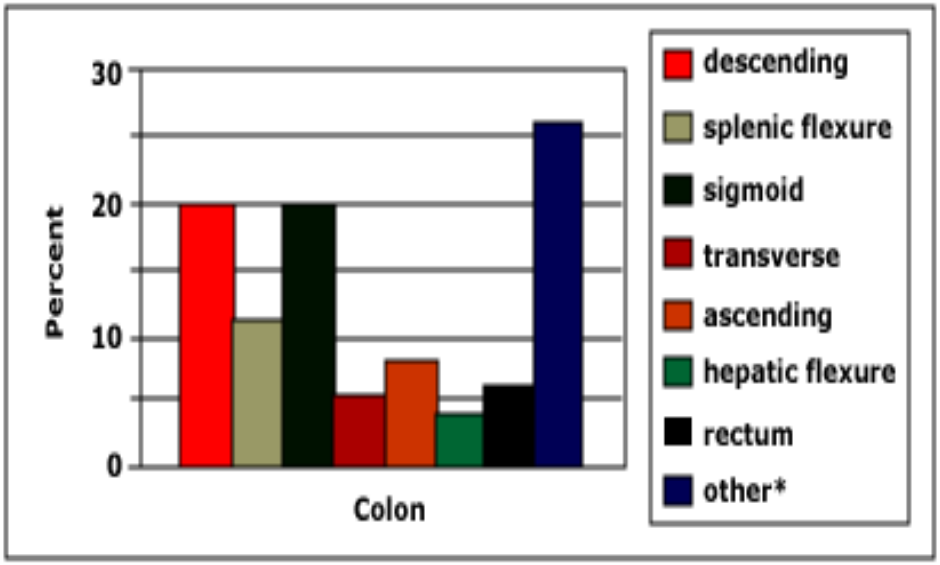
Intestinal Obstruction

Certain systemic conditions
- Vasculitides
- Infection
- Coagulopathies

Medications

After strenuous and prolonged physical exertion

Prevalence



Other: multiple locations

Reinus, JF, Brandt, LJ, Boley, SJ, Gastroenterol Clin North Am 1990; 19:319

Pathophysiology

Mechanism of Injury

- Hypoxia causes detectable injury to superficial mucosa within one hour

- Prolonged severe ischemia – necrosis of villous layer
  - Leads to transmural infarction in 8 to 16 hrs

Phases of Ischemic Colitis

1. Transient Ischemia	Mucosal infarction in which ischemic damage is confined to the mucosa
2. Partial thickness ischemia	Mural infarction in which the injury extends from the mucosa into the muscularis mucosa
3. Full thickness infarction	Transmural infarction

Presentation

- Rapid mild onset abdominal pain and tenderness
- Diarrhea , +/- blood
- +/- Anorexia, Nausea or emesis
- +/- distention

- Hyperactive phase
  - Soon after initiating event, severe pain with frequent bloody, loose stools
- Paralytic phase
  - Pain diminishes, more continuous, and diffuse
  - Abdomen more distended, tender, without BS
- Shock phase (10 to 20%)
  - Massive fluid, protein, and electrolyte leakage through gangrenous mucosa
  - Severe, shock and metabolic acidosis, may develop
  - Rapid surgical intervention required

Diagnosis

- History & Physical exam
- Labs
  - Elevated white count >20,000
  - Increase serum lactate, LDH, alkaline phosphatase
  - Metabolic acidosis
  - Stool cultures for suspected infectious cause

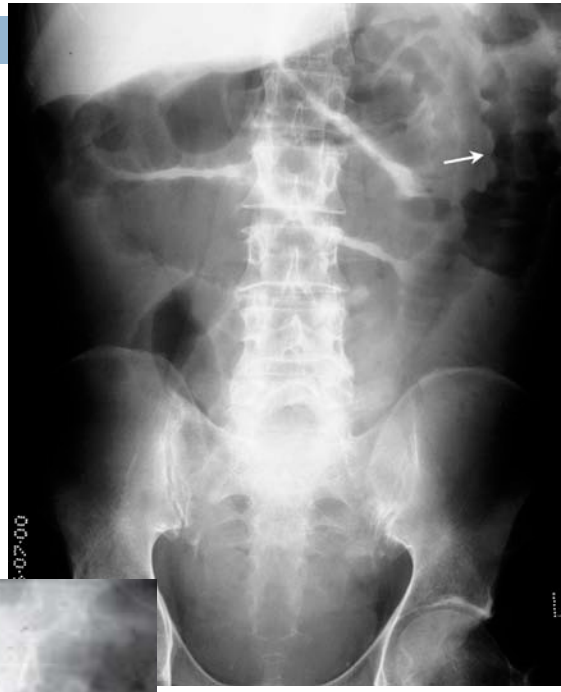
Diagnosis

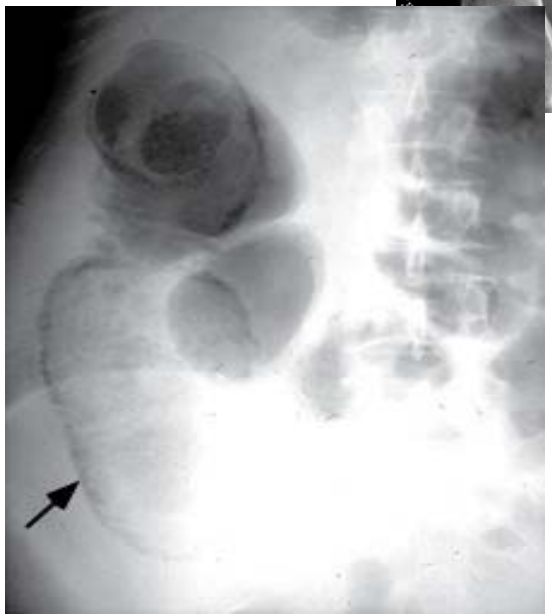
Imaging

- Plain Radiography

  Dilatation of a part of the colon (early)

  loss of haustrations, pneumatosis





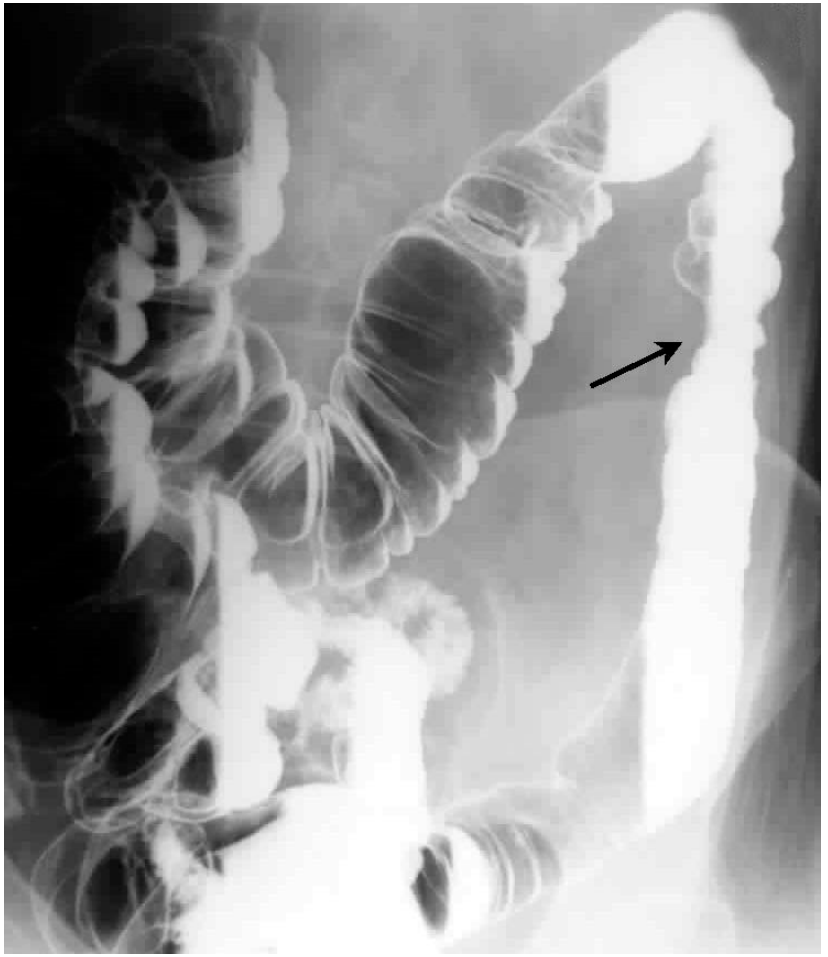
Imaging

- Barium Enema

Acute stage (spasm associated with thickening and blunting of the mucosal folds. Multiple mucosal thumbprinting)

With progression of mucosal edema, the folds become thickened and illdefined.

The final outcome is a long stricture with proximal bowel



Imaging

CT

Depicts changes in the blood vessels , also changes in the bowel wall. It may show:

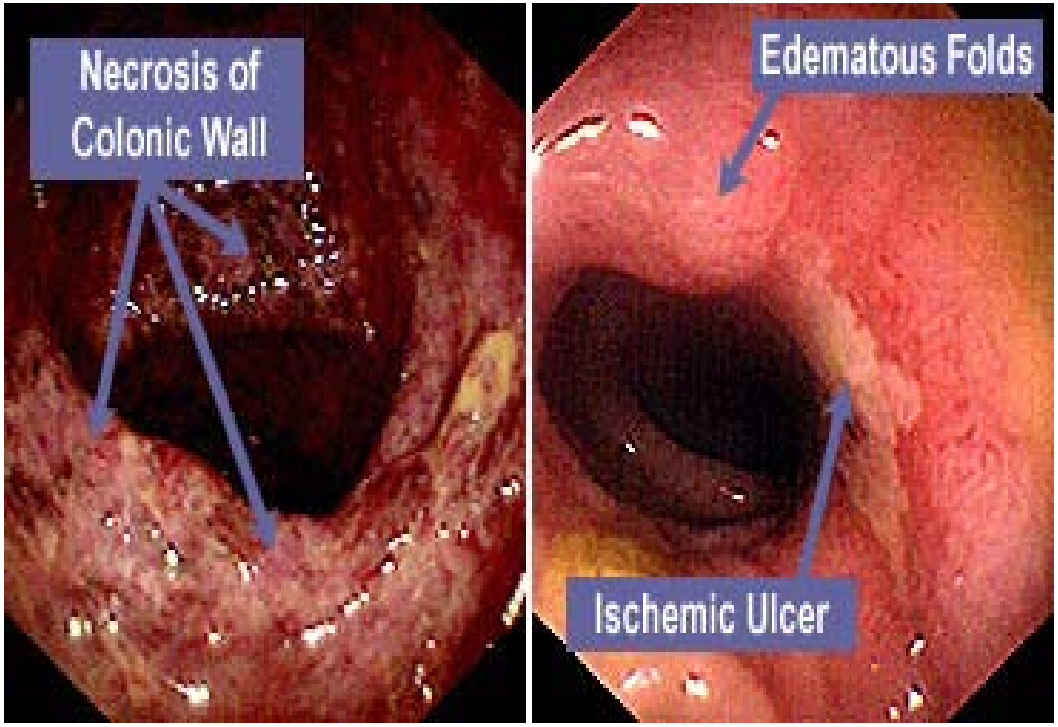
-Thromboembolism in the mesenteric vessels

-Irregular narrowing of the bowel lumen (thumbprinting)

-Possible bowel dilatation proximal to the ischemic segment of the bowel

-Pneumatosis an portal venous gas suggest transmural infarction (severe ischemia)

Colonoscopy



- More sensitive in detecting mucosal lesions
- Better definition of the anatomy
- Ability to sample tissue
- Findings vary

Invasive Studies

- Angiography- rarely helpful
- Laparoscopy
  - Particularly in elderly with comorbid disease and may not tolerate laparotomy or if the diagnosis is unclear
  - “Second-look” to assess viability of remaining bowel
  - Only serosal gut visualization, which may appear normal in early stages; progressive phase, dark peritoneal fluid, edematous bowel, or patchy hemorrhages, frank gangrene, or perforation may be present
- Laparotomy

Management

Treatment of the patient is dictated by the severity of the ischemia .

1. Transient Ischemia	Treated symptomatically Observation with Bowel rest, IVF, O2 and optomise cardiac function
2. Partial thickness ischemia	-Close observation, IVF, broad-spectrum antibiotics -If stricture develops and is symptomatic, resection may be required.
3. Full thickness infarction	Surgical resection

Indications for Surgery

URGENT

- Peritoneal Signs

(Perforation, Fulminant colitis, Gangrene)

- Persistent fever or sepsis

ELECTIVE

- Symptomatic Strictures
- Persistent diarrhea (>2 weeks)
- Bleeding(>2 weeks)

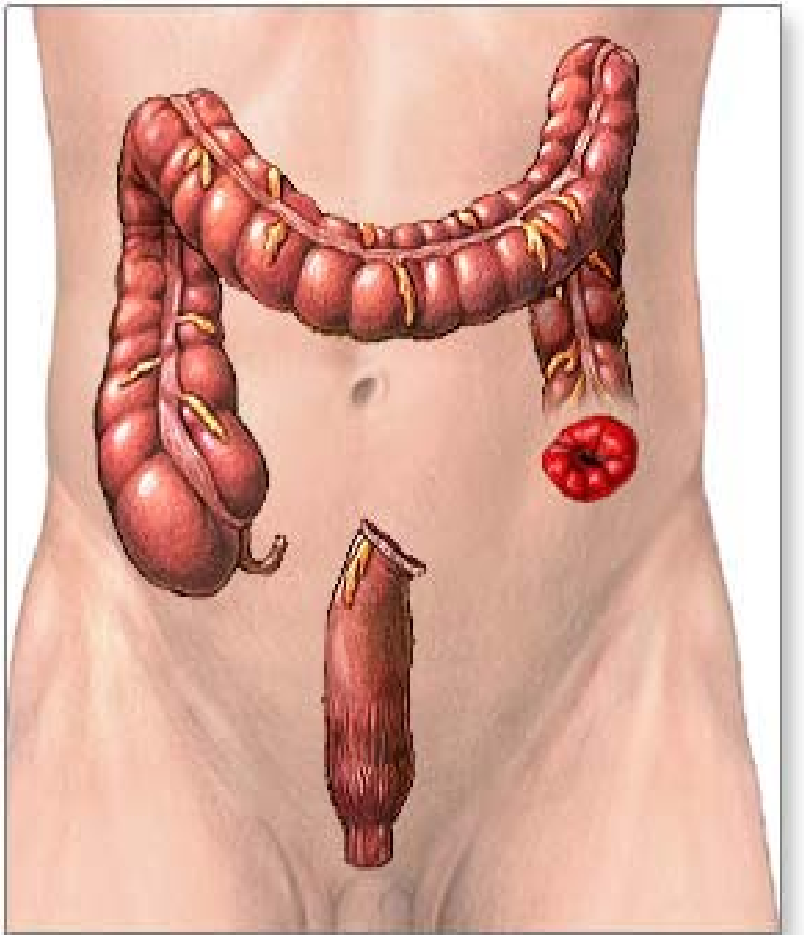
Increased risk of bowel perforation

Surgery

- All affected bowel is resected
- **The mucosa of the specimen is examined in OR to ensure normal surgical margins.**
- Questionably viable areas of colon are generally resected unless extensive and a second-look operation is planned 12 to 24 hours later to document viability.

Surgical Technique

- Primary anastomosis is usually not performed
- An ostomy is formed with the proximal bowel loop , the distal loop is either exteriorized as a mucous fistula or closed to form a Hartman pouch.



Surgical Technique

- Right-sided ischemia/necrosis
  - Right hemicolectomy with terminal ileostomy mucous fistula
- Left-sided involvement
  - Proximal stoma and distal mucous fistula or Hartmann's procedure
  - Ostomy closure delayed 4 to 6 months
- Fulminating type (rare)
  - Total colectomy with end-ileostomy
- Despite resection, mortality following large bowel infarction as high a *50 to 75%*

Evidence Based Medicine

- No randomized controlled or prospective trials available for the management of ischemic colitis

Consensus

- Identifying high-risk groups improve survival
- Prompt surgical intervention
- Reexploration if indicated
- Delayed intestinal anastomosis

Risk factors in Predicting development of Ischemic Colitis

- 467 patients
- Lower abdominal pain, +/- bloody stools
- Lower Endoscopy

Ischemic Colitis in 147 (grossly and histologically)

Compared to controls

-older (>60 yrs)

- on hemodialysis

- hypertensive

- diabetic

- on constipating medicines

- hypoalbuminemia

Park, et al. Dis Colon Rectum. 2007

Conclusions

- Most frequent form of intestinal ischemia
- Spectrum of conditions and predisposing factors
- The diverse causes, variable clinical presentations, and severity makes the diagnosis and management of ischemic colitis a challenge.
- Colonoscopy is the gold standard for diagnosis
- Most patients will respond to supportive care; however, 20% of patients will require surgery.
- Early recognition and aggressive treatment essential to survival

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