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Penetrating Rectal Injuries

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History

- 51 year old male brought in as Trauma Code s/p single GSW to the suprapubic area
- Patient complained of diffuse abdominal pain
- He felt urinary urgency but was unable to void
- No other traumatic injury

Past Medical History

- Hypertension

- PSH: cataract surgery, brain tumor resection
- Medications: BP med
- NKDA
- Social Hx: 1-2 cigarettes/day, occasional etoh, denies other drugs
- Family Hx: no significant hx

Physical Exam

- T 98.2, BP 184/99, HR 81, RR 20
- Gen: AAOx3, in acute distress
- HEENT: normocephalic, EOMI, R pupil reactive
- CVS: S1S2 normal, RRR
- Chest: CTA b/l, equal air entry
- Extremities: normal pulses, no deformities
- Abd: soft, distended, diffuse tenderness, rebound, single GSW midline just above pubis
- Rectal: normal tone, no gross blood

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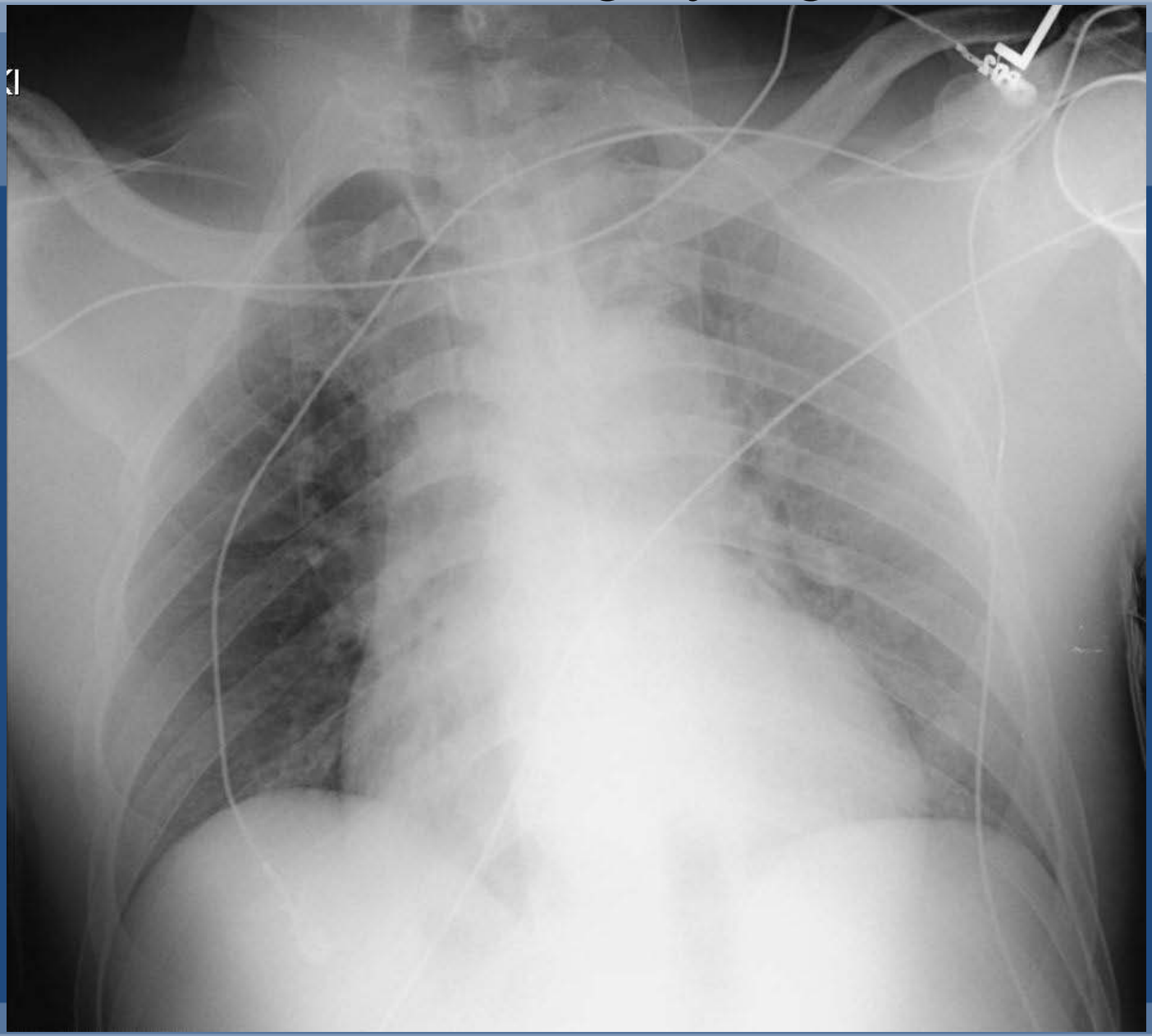
CXR



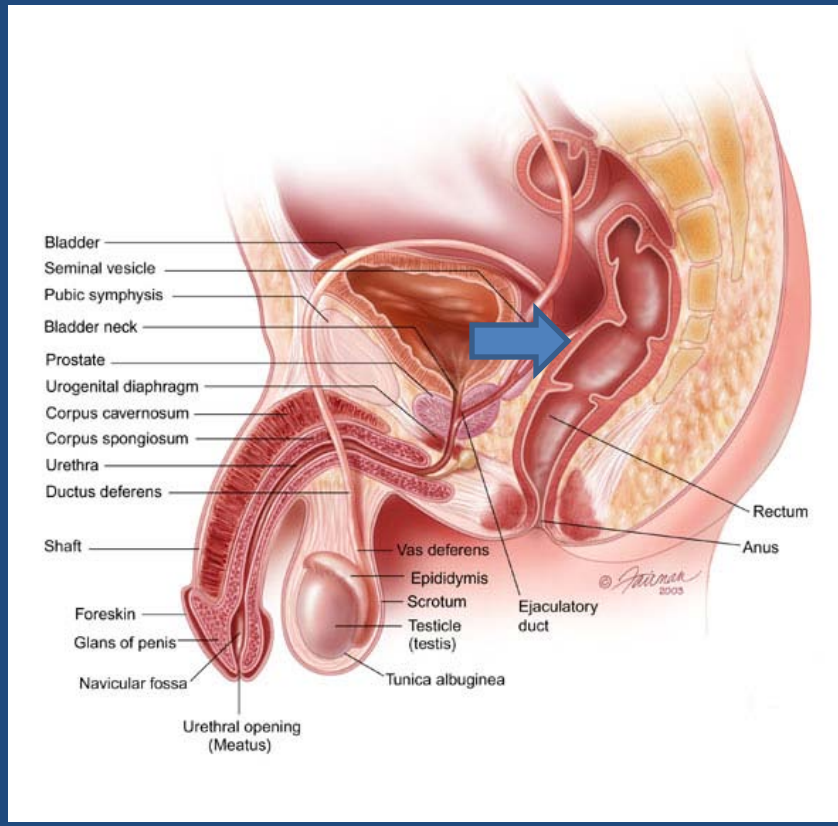
AXR

Labs

- CBC: 7.37>12.2/35.8<207
- BMP: 142/4.2/103/27/22/1.38/169/9.4
- LFT: 7/4.3/31/17/49/0.2
- Coag: 12/22.5/1.1
- VBG: 7.409/47.3/23.5/31.2/26.8/4.9
- UA: 3+ Hgb, >250 RBC

Operation

- Exploratory laparotomy
- Short segment SBR for small bowel GSW x2
- Bladder exploration and 2 layered repair for GSW x2
- JP drain placed
- GSW at bottom of rectovesical pouch into rectum
- Firm 3cm mass in mid-sigmoid colon



Operation

- Segmental sigmoid resection with end colostomy
- Back table exam of specimen revealed normal mucosa with no involvement

- EBL: 500ml
- Received 2 units PRBC, 5L crystalloid
- UO: 600ml

Post-operative Course

- Transferred to SICU intubated
- POD 1: Extubated
- POD 3: Transferred to floor
- POD 4: Ostomy functioning, tolerated liquid diet, JP creatinine 0.9, JP removed
- POD 5: Tolerating regular diet
- POD 7: Discharged home with wound care and foley to leg bag

Pathology

- Small bowel resection: multiple traumatic lacerations with hemorrhage, congestion, and peritonitis. Histologically viable resection margins.
- Sigmoid resection: Diverticulosis and diverticulitis with intramural abscess formation

Penetrating Rectal Injuries

Introduction

- Rectal injuries are rare and may not be readily apparent
- Can result from blunt or penetrating trauma
  - 82-94% in the civilian population are due to firearms
  - Stab wounds to the lower abdomen, pelvis, and buttocks rarely injure the rectum
  - Major pelvic fractures may be associated with blunt rectal trauma
- Overall complication rate >50%

Cameron J, Cameron A. Current Surgical Therapy, 10th ed. USA: Elsevier Saunders, 2011.

History

- Management of colorectal injuries has taken a 360° course
  - Primary repair -> diversion -> primary repair
- Before World War I, non-operative management. Mortality 90%
- During World War I, primary repair was favored. Mortality ~60%
- By World War II, Ogilvie recommended colostomy for military rectal injuries. Mortality was still 53%
  - Surgeon general mandated fecal diversion with presacral drainage. Mortality 30%
- In the 1970's, seminal reports would began to challenge the surgical dogma of mandatory colostomy
- Vietnam War, primary repair with distal rectal washout. Mortality 15%

Feliciano D, Mattox K, Moore E. Trauma. USA: McGraw-Hill Co, Inc., 2008.
Cleary RK, Pomerantz RA, Lampman RM: Colon and rectal injuries, *Dis Colon Rectum 49:1203–1222, 2006.*

Clinical Exam

- Intraperitoneal perforation may cause peritonitis
  - Anterior and lateral upper 2/3 of rectum
- Extraperitoneal perforation may not cause immediate symptomatology
  - Posterior upper 2/3 and lower 1/3 of rectum
- Careful digital exam to check for intraluminal blood or mucosal defect
- Mental reconstruction of trajectory

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Imaging

- Plain films can help to reconstruct the trajectory
- Helical CT has essentially substituted for plain films in rectal trauma
  - Should be routinely obtained for suspected rectal perforation
- Rectal contrast may be helpful for both plain films and CT
- Trajectory can be predicted with the CT
  - Must remember that bullets don't always travel in a straight line

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Sigmoidoscopy

- Rigid sigmoidoscopy is an essential diagnostic tool that should be used if DRE and CT are suggestive of injury
- Can help locate the injury more precisely and plan for operative strategy
- Frequently reveals only intraluminal blood
  - Implies full thickness injury after penetrating trauma and should be a reason to operate
- Can allow for transanal repair of low rectal injuries or removal of foreign bodies

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Treatment

- Diverting colostomy, rectal washout and presacral drainage defined the operative management of rectal injuries for many years
- One by one, scientific evidence has doubted their necessity
- Treatment also depends on location
  - Intraperitoneal: upper 2/3 anterior and lateral
  - Extraperitoneal: upper 2/3 posterior, lower 1/3

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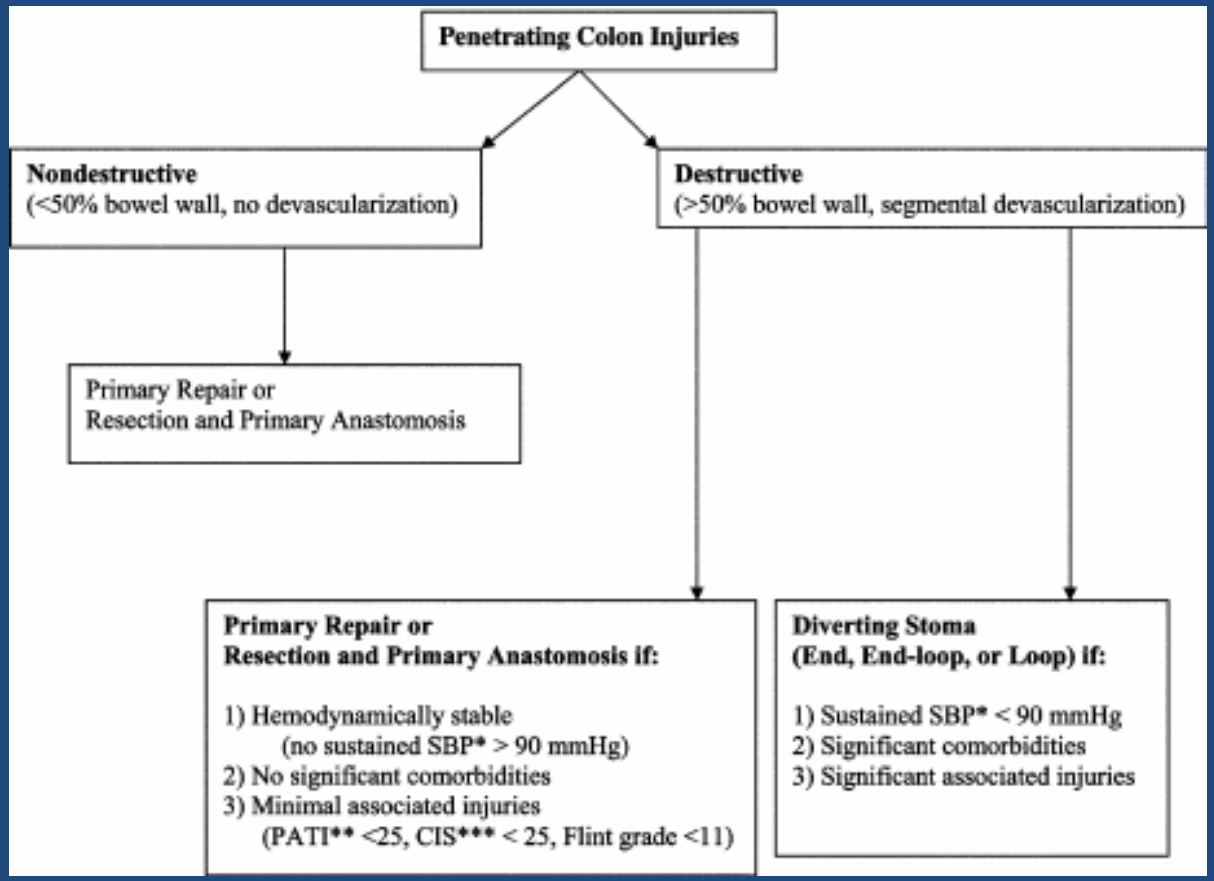
Intraperitoneal Rectal Injury

- Intraperitoneal rectum is essentially a pelvic extension of the colon but with a thicker muscular layer
- Nondestructive intraperitoneal rectal injuries can be treated as pelvic colon injury



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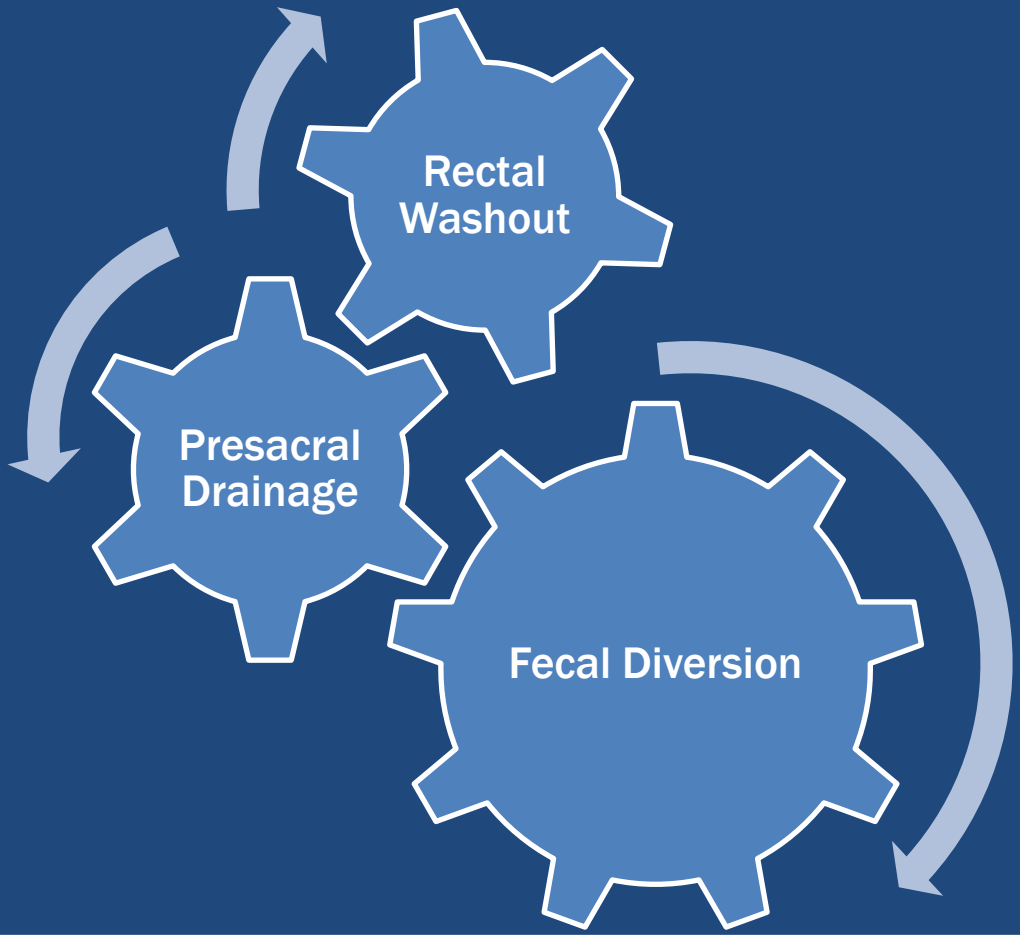
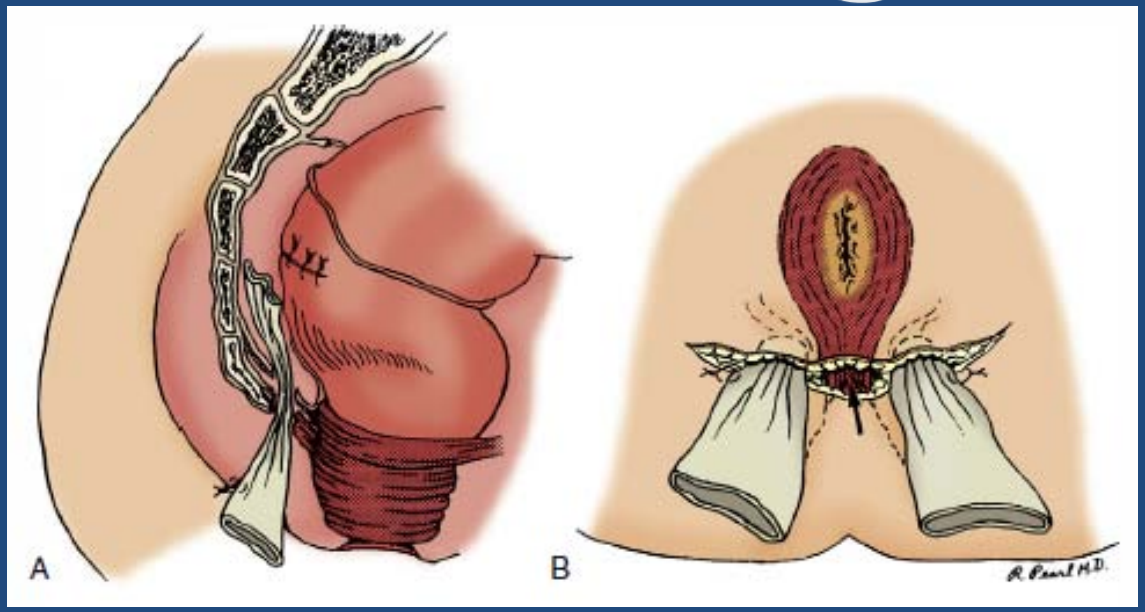
Extraperitoneal Rectal Injury



Presacral Drainage



- Incision posteriorly between anus and coccyx
- Divide anococcygeal ligament and enter presacral space
- Place 2 drains at the site of injury
- May prevent infection of pararectal and retroperitoneal spaces

Cameron J, Cameron A. Current Surgical Therapy, 10th ed. USA: Elsevier Saunders, 2011.

Presacral Drainage

- Many authors have advocated presacral drainage but only 1 paper showed a statistically significant benefit in civilian injuries
- Recent prospective randomized trial showed no difference in M&M when fecal diversion was performed with vs without presacral drainage
- When should presacral drainage be considered?
  - Injury can't be identified and repaired
  - Destructive injury that communicates with presacral/pararectal soft tissues
- Unless there is a high velocity, destructive injury, dissecting these uncontaminated planes increases risk of contaminating them

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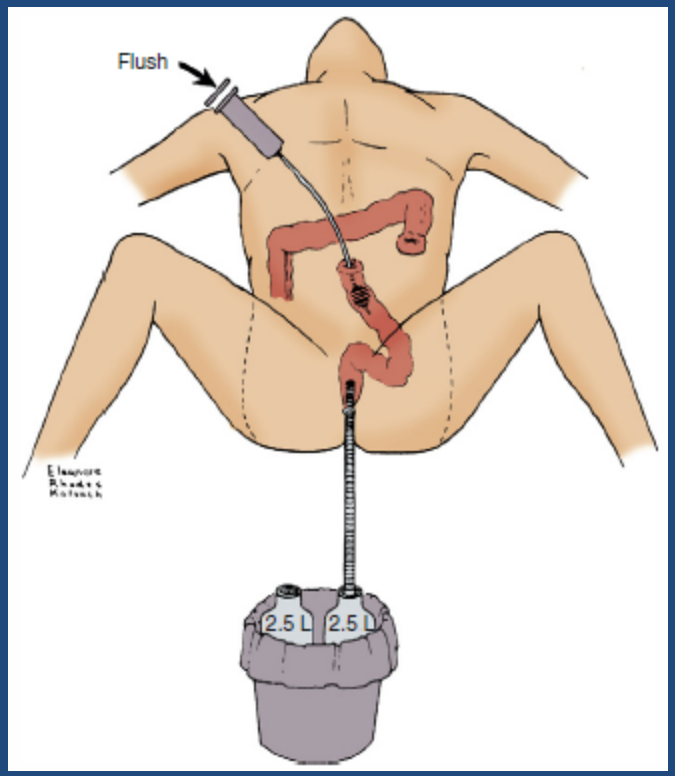
Herr MW, Warscher RA, Gagliano RA: Historical perspective and current management of traumatic injury to the extraperitoneal rectum and anus, *Curr Surg 62:625–632, 2005.*

Distal Rectal Washout

- Method used to minimize pelvic contamination by stool
- Decreased morbidity and mortality during Vietnam War
- Only 1 study has shown statistically significant benefit favoring distal washout
  - Authors noted benefit was mostly in those with high energy, destructive injuries
- Recent subsequent studies showed no statistical difference



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Diverting Colostomy

- Main principle is complete diversion of fecal stream from the injury
- End colostomy (e.g. Hartmann's) can lead to difficulty and complications at time of colostomy reversal
- Properly constructed sigmoid loop colostomy with bridge is completely diverting and easier to take down
  - Technique involves a rod is to support the loop above the skin, longitudinal incision along tenia coli, and immediate maturation
  - May have difficulty with stoma care due to the bridge
  - Alternative is to staple the distal limb

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Diverting Colostomy

- Primary repair vs. diverting colostomy
- Primary repair without diversion is feasible in selected patients with less severe injuries, minimal contamination, and treated within 8 hours
  - Transanal repair of low-lying lesions
  - Intraperitoneal lesions according to colon injury criteria
  - Injury easily visualized without extensive dissection, low grade, and without other significant associated injuries
- Aggressive attempts at repair risking exposure of uncontaminated pararectal planes is discouraged
- If there is doubt about presence or extent of injury -> colostomy
- Extraperitoneal injury due to low velocity mechanism can be managed by diversion alone

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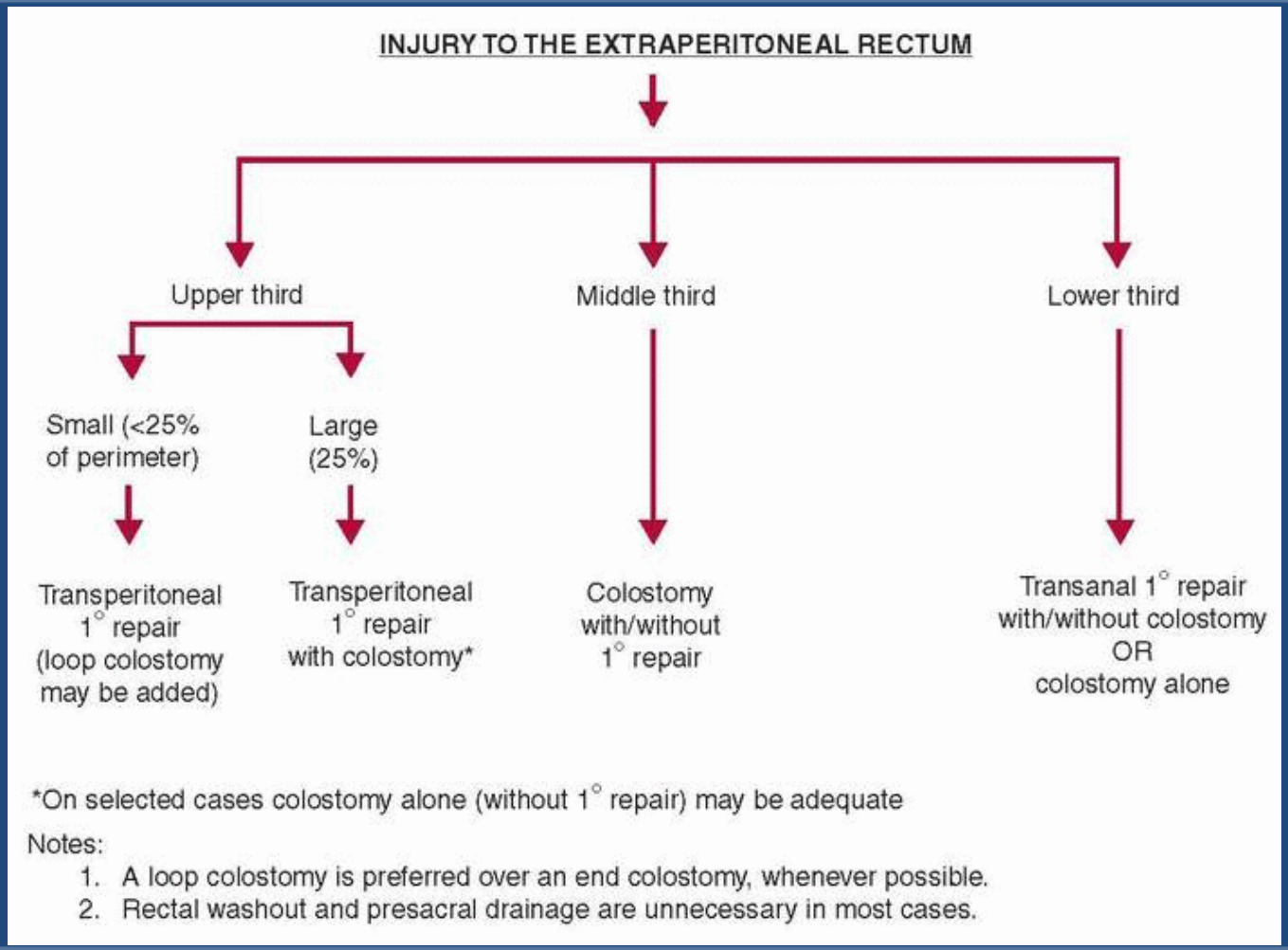

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Colostomy Closure

- Timing is debated; usually 1-6 months after initial operation
- Same admission colostomy closure has been shown to be safe and cost-effective
  - Even unrepaired rectal injuries usually heal in 7-10 days
  - Rectal healing is confirmed with contrast study
  - Closure is done within 7-14 days after 1st operation
- Type of colostomy determines need for closure through stoma site or redo laparotomy

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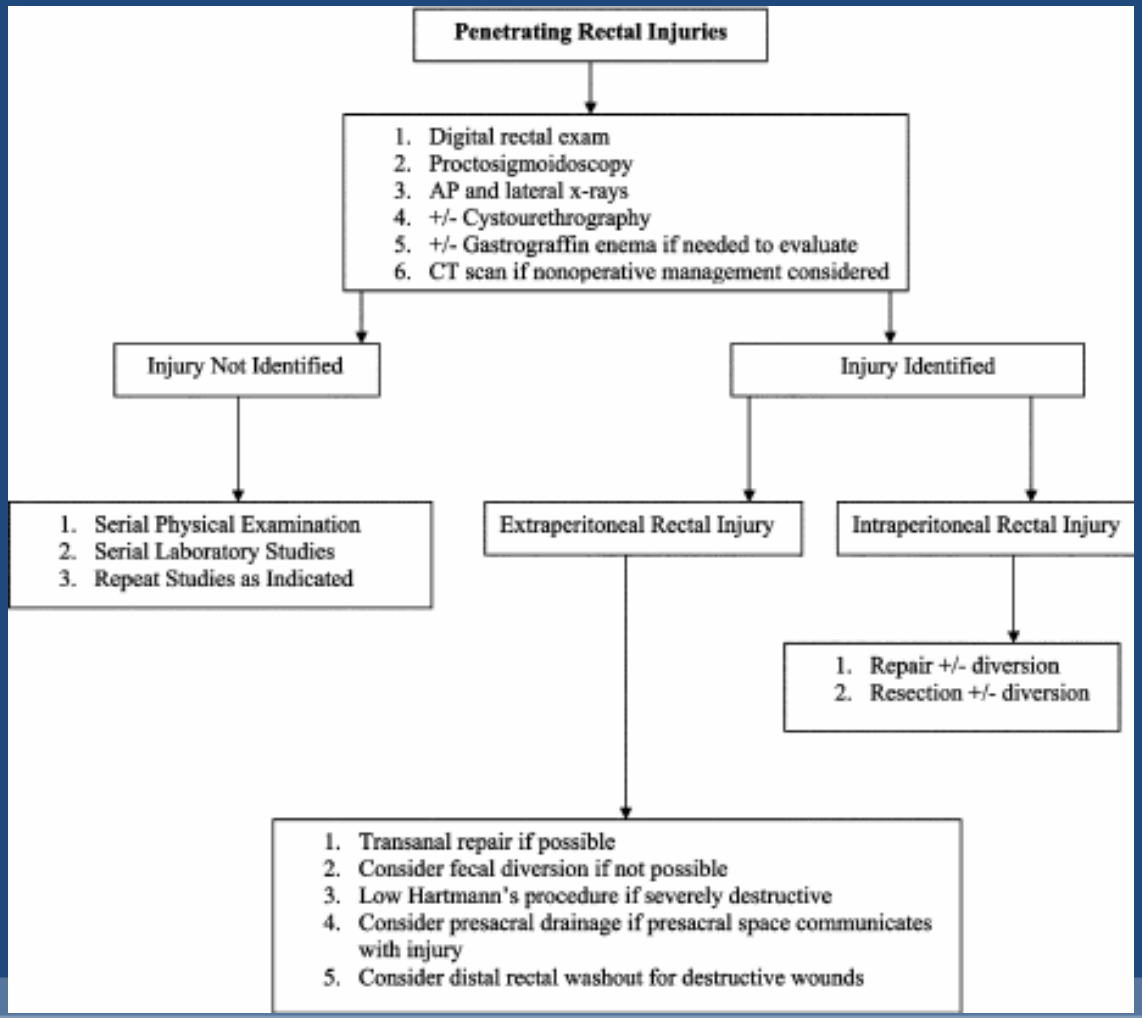
Summary



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