Penetrating Rectal Injuries

Christopher Lau
Kings County Hospital Center
SUNY Downstate Department of Surgery
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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
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
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%
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%

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
**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
Rigid sigmoidoscopy is an essential diagnostic tool that should be used if DRE and CT are suggestive of injury. It can help locate the injury more precisely and plan for operative strategy. Frequently reveals only intraluminal blood, which 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.
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

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.

Extraperitoneal Rectal Injury

- Fecal Diversion
- Presacral Drainage
- Rectal Washout
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

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

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

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 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

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

INJURY TO THE EXTRAPERITONEAL RECTUM

Upper third

Small (<25% of perimeter)

Transperitoneal 1° repair
(loop colostomy may be added)

Middle third

Large (25%)

Transperitoneal 1° repair
(with colostomy*)

Colostomy with/without 1° repair

Lower third

Transanal 1° repair
(with/without colostomy OR colostomy alone)

*On selected cases colostomy alone (without 1° repair) may be adequate

Notes:
1. A loop colostomy is preferred over an end colostomy, whenever possible.
2. Rectal washout and presacral drainage are unnecessary in most cases.
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

Summary

References


