Management of Penetrating Rectal Injuries

Kings County Hospital Center
April 25th, 2013
David Vivas, MD
Case #1

History

• 18 year old male brought in as a Trauma Code after sustaining GSW to right buttock. Patient stated that he was shot from behind

• Upon arrival to CCT, patient was c/o pain at buttock and left thigh

• No other reported injuries

• No PMH

• No PSH

• NKDA
Case #1

Physical Exam

• Vital Signs: BP 136/78, HR 67, RR 23, T 98.8

• Answering questions, AAOx3

• Normocephalic

• CVS: S1S2 normal, RRR

• Chest: CTA b/l

• Abdomen: soft, non tender, non-distended
Case #1

Physical Exam

• Bullet hole at right buttock (superolateral)

• DRE:
  • Gross blood on rectal exam, normal rectal tone
  • 2 palpable defects in the rectal wall:
    • 1 to right side and other to the left side
    • Approximately 2-3 cm proximal to anal verge

• LLE: bullet hole present at left anterior thigh
Case #1

Physical Exam

- Moving all upper and lower extremities
- Sensation grossly intact
- DP, PT 2+ b/l LE
- Foley inserted: No hematuria
Case #1

**Labs:**

- VBG: 7.30/64/21/28.5/25/4.0
- CBC: 10.9/14.4/44.5/268
- BMP: 140/3.9/101/25/15/1.18/113
- Coag: 10.7/19.1/1.0
Case #1

Surgery

Proctosigmoidoscopy:

- Advanced up to 22 cm from the anal verge
- 2 injuries: lateral aspect of the rectum, left and right
- Each wound site approx 1 cm in diameter, located 2 cm proximal to dentate line
- No other injuries were observed up to 22 cm
Case #1

Surgery

- Active bleeding appreciated at the right sided rectal wound
- Hemostasis was obtained with a running 2-0 Vycril suture
- Midline incision below the umbilicus
- No free fluid or blood in abdominal cavity
- No hematoma or bleeding observed in the distal sigmoid colon, proximal rectum or retroperitoneum
Case #1

Surgery

• An end sigmoid colostomy was created extracting the loop through the left lower quadrant and stapling the distal end
Case #1

Post-operative Course

- Patient was extubated and transferred to PACU in stable condition

- POD#2:
  - Patient afebrile, doing well
  - Ostomy functioning
  - Liquid diet tolerated
  - Advanced to regular diet

- POD#3
  - Discharged home
History

- 35 years old male brought in as a Trauma Code after sustaining multiple GSW to buttock and lower extremities. Patient heard multiple gunshots and fell to the ground. No LOC.

- Patient c/o pain at buttock and lower extremities

- No PMH

- No PSH

- NKDA

- Social: ex-smoker, EtOH socially, occasional marijuana
Case #2

Physical Exam

• Vital Signs: BP 180/110, HR 110, RR 35, T 98.9

• AAOx3

• Head: Normocephalic, no external signs of trauma

• CVS: S1S2, RRR

• Chest: CTA b/l, no external signs of trauma

• Abdomen: soft, non tender, non-distended

• Pelvis stable
Case #2

Physical Exam

- Bullet wounds noted:
  - Right anterior hip region
  - Left posterolateral buttock
  - RLE distal to knee with palpable bullet fragment
  - LLE 2 wounds 1cm from each other, proximal to the knee join

- BL 2+ DP pulses, BL 2+ femoral pulses

- DRE (Limited exam in ED due to pain)
  - No gross blood or injuries noted

- Foley inserted: No hematuria
Case #2

Labs:

- VBG: 7.28/40.3/49.8/18.1/-7.0
- CBC: 9.7/14.9/44.2/216
- BMP: 141/4.4/102/16/11/1.33/119
- Coags: 10.6/22.2/1.0
Case #2

Surgery

- Exam under anesthesia:
  - Gross blood

- Large 2-3 cm defect in the posterior wall of the rectum just above the dentate line

- Mild sphincter tone appreciated. Sphincter appeared grossly intact
Case #2

Surgery

• Lower abdominal midline incision

• No ascites or hemorrhagic fluid

• No obvious hematomas in the pelvis

• An end sigmoid colostomy was created extracting the loop through a left lower quadrant and stapling the distal end
Case #2

Post-operative Course

- Patient was extubated and transferred to SICU in stable condition
- POD#1: febrile 101.5
- POD#2: febrile 102.0, WBC: 18.000, Cultures negative
- POD#3: Afebrile, WBC: 10.800. Stoma functioning. Liquid diet started
- POD#4: Transferred to floor
- POD#4-7: Doing well, afebrile, tolerating diet. Abx discontinued on POD#6
Case #2

Post-operative Course

• POD# 8:
  • Afebrile, c/o pain on left buttock
  • On exam: area of induration over the left buttock
  • CBC: 12.4/11.5/34.3/521
  • Patient started on antibiotics
  • CT of abdomen ordered:
- 2 x 4 fluid and contrast-filled collection with minimal peripheral enhancement, stable in size when compared to prior study
- Hyperemia along bullet tract
- No drainable intramuscular abscess
Case #2

Post-operative Course

• POD# 9:
  • Patient febrile to 103.0 with chills
  • Transient hypotension that responded to fluids
  • On exam, unchanged area of induration over left buttock, tender to palpation
  • Decision was made to take patient to OR for EUA
Case #2

Surgery

- Exam under anesthesia:
  - Spontaneous drainage of foul smelling purulence coming through the anus
  - DRE: 2 abscess cavities were identified in the peri-rectal spaces, one smaller at 7 O'clock and one bigger, tracking proximally, at 4 o'clock

- Presacral drainage

- Incision, drainage and irrigation of perirectal abscesses with placement of penrose drains via counter incisions
Case #2

Post-operative Course

- Patient was extubated and transferred to SICU in stable condition.
- POD#10/1-12/3: WBC trending down, remains febrile, tolerating diet. Perianal wounds were clean with min discharge.
- POD#13/4 Patient febrile. WBC: wnl. Swollen right thigh is noted. CT scan of pelvis and right thigh ordered.
  - Perirectal inflammation improved. No residual abscess
  - New complex fluid collection in right thigh over bullet tract
- POD#14/5 Patient underwent IR drainage of right thigh abscess:
  - 80 ml of purulent material aspirated
Case #2

Post-operative Course

• POD#16/7 Patient underwent EUA and I&D of right thigh collection
  • Perirectal area with min discharge
  • Min amount of purulent material drained from right thigh

• Currently patient is doing well, remains afebrile, tolerating diet and receiving daily wound care
Questions?
Penetrating Rectal Injuries

- Rectal injuries are rare, and may not be readily apparent

- Untreated rectal injuries that results in a continued septic source are associated with almost 100% mortality rate
Rectal injuries may be the result of penetrating or blunt external accidental trauma.

- Firearm wounds are the most frequent cause of rectal injuries in the civilian population (82% to 94%)

- Stab wounds to the lower abdomen, pelvis, and buttocks may rarely injure the rectum

- In victims of blunt trauma, major pelvic fractures can be associated rectal injuries.
Penetrating Rectal Injuries

- Management of rectal trauma has undergone many changes with many principles evolving from wartime experience
The overall complication rate of rectal trauma is greater than 50%.

Rectal injury–related septic complications occur in 11% of patients:
- Intraabdominal and pelvic abscesses
- Rectocutaneous fistulas, rectovesical fistulas
- Wound infections
- Missile tract infections
Penetrating Rectal Injuries

Anatomy

- The rectum is about 15 cm long and is only partially intraperitoneal.
- Upper two thirds anteriorly and the upper one third laterally are covered by peritoneum.
- Lower third of the rectum is completely extraperitoneal.
The therapeutic principles evolved from lessons learned from wartime experiences.

Mortality related to rectal trauma has decreased from 67% during WWI to 0-10% in current civilian reports.
Mortality from rectal gunshot wounds > 60% in the early part of World War II

- Army Surgeon General mandated colostomy for all colon and rectal injuries
- Presacral drainage was added in 1943, and appeared to further improve mortality
Historical Perspective

- During Vietnam war, with more destructive injuries, colostomy and presacral drainage alone were found to be inadequate.

- Rectal repair and distal rectal washout were added to the management.
Historical Perspective

- The triad of colostomy, presacral drainage, and rectal washout remained the standard of care of these injuries over the next several decades, despite the lack of any solid scientific evidence.

- The validity of these principles was challenged in the 1990s with new studies suggesting that routine colostomy may not be necessary, presacral drain may have little or no value, and rectal washout may be harmful.
Intraperitoneal rectal injuries

- Clinical signs and diagnosis are the same as for colonic injuries
- The majority of patients have signs of peritonitis
- The diagnosis is usually made intraoperatively
Penetrating Rectal Injuries
Diagnosis

- Extraperitoneal rectal injuries
  - More challenging because of the lack of peritoneal signs
  - Based on a high index of suspicion
  - Mechanism suspicious for rectal injury
    - Gluteal, perineal, transpelvic GSW
    - Pelvic fractures, foreign body
Penetrating Rectal Injuries

• Extraperitoneal rectal injuries

• Cornerstone for diagnosing extraperitoneal injuries is combination of digital rectal examination (DRE) and rigid proctosigmoidoscopy
Penetrating Rectal Injuries

Diagnosis

- Extraperitoneal rectal injuries
  - Intraluminal blood on proctoscopy should be considered positive
- First pass of scope is critical
  - Blood in subsequent passes can be iatrogenic
Penetrating Rectal Injuries
Diagnosis

• Extraperitoneal rectal injuries
  • Diagnostic accuracy of the DRE and rigid proctosigmoidoscopy ranges from 80% to 95%
  • False-negative rate of these two exams has been reported to be as high as 31%
Extraperitoneal rectal injuries

Any suggestion of rectal injury with a normal DRE and proctoscopic exam should prompt further evaluation

- Water soluble contrast studies (CT scan)
<table>
<thead>
<tr>
<th>Grade</th>
<th>Injury Description</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>(a) Contusion or hematoma without devascularization</td>
</tr>
<tr>
<td></td>
<td>(b) Partial thickness laceration</td>
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<tr>
<td>II</td>
<td>Laceration ≤50% of circumference</td>
</tr>
<tr>
<td>III</td>
<td>Laceration &gt;50% of circumference</td>
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<tr>
<td>IV</td>
<td>Full-thickness laceration with extension into the perineum</td>
</tr>
<tr>
<td>V</td>
<td>Devascularized segment</td>
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</table>
Penetrating Rectal Injuries
Operative Management

Intraperitoneal Injuries

• There are no class I or class II data supporting any specific management algorithm for intraperitoneal rectal injuries

• Due to similarities between the intraperitoneal rectum and the distal left colon
  • Intraperitoneal rectal injuries are managed like colon injuries
  • The vast majority amendable to primary repair
Penetrating Rectal Injuries
Operative Management
Extraperitoneal Injuries

Fecal diversion

Repair of the injury, when possible

Presacral drainage
Distal rectal washout
Penetrating Rectal Injuries
Operative Management
Extraperitoneal Injuries

Fecal Diversion or Primary Repair

• Fecal diversion remains an useful and unchallenged therapeutic modality in most cases with extraperitoneal rectal injuries

• A properly constructed loop colostomy may achieve complete fecal diversion

• The Hartmann's procedure should be reserved for patients with extensive destruction of the rectum
Penetrating Rectal Injuries
Operative Management

Extraperitoneal Injuries

Fecal Diversion or Primary Repair

• Currently is a common practice to perform primary repair without proximal fecal diversion in selected cases with small perforations

• Some extraperitoneal injuries may be difficult to repair because they are too low for transabdominal repair and too high for transanal repair

• These cases can safely be managed with a proximal diverting colostomy alone, without suturing of the perforation
Penetrating Rectal Injuries
Operative Management
Extraperitoneal Injuries

Presacral Drainage

• Presacral drainage was added to the armamentarium in WWII in an effort to decrease the pelvic sepsis rate

• This approach has been challenged:
  • It requires extensive dissection of normal soft tissues in order to place the drain in the proximity of the rectal injury

• Its use has remained controversial

• Over the last 15 years, the use of presacral drainage has diminished considerably
Penetrating Rectal Injuries
Operative Management
Extrapерitoneal Injuries

Presacral Drainage
The Role of Presacral Drainage in the Management of Penetrating Rectal Injuries

The Journal of Trauma, October 1998
Gonzalez, Richard P. MD; Falimirski, Mark E. MD; Holevar, Michele R. MD

- First and only class I study involving rectal injuries
- Randomized, prospective study at an urban Level I trauma center
- 2 groups: presacral drainage group or a nondrainage group
- All patients with rectal injuries were included
  - 48 patients with penetrating rectal injuries
    - 25 to no drainage
    - 23 to presacral drainage
- 2 (8%) septic complications in the presacral drainage group
- 1 (4%) septic complication in the nondrainage group
- The study concluded that presacral drainage has no effect on infectious complications associated with the rectal injuries
Distal Rectal Washout

- Was added to the management of rectal injuries during the Vietnam War, and was credited for reducing septic complications.
- There is no evidence that it is of any value in reducing morbidity.
- Washout may liquefy the rectal contents and facilitate fecal spillage into the surrounding extrarectal soft tissues.
Civilian Extraperitoneal Rectal Gunshot Wounds: Surgical Management Made Simpler
Pradeep H. Navsaria, Sorin Edu, Andrew J. Nicol

- Retrospective review
- All patients with a full-thickness penetrating rectal injury
- 92 patients with 118 rectal injuries
  - Intraperitoneal 7
  - Extraperitoneal 59
  - Combined 26
- Only 2 extraperitoneal rectal injuries were repaired
- None had presacral drainage
- 86 sigmoid loop colostomies were done
Intraperitoneal rectal injuries were primarily repaired, with or without fecal diversion.
Extraperitoneal rectal injuries were generally left untouched and a diverting colostomy was done.
Presacral drainage and DRW were not routinely performed.
Complications:
- Two (2.2%) fistula, one rectocutaneous, and one rectovesical
- 9 (9.9%) infectious complications
- No perirectal sepsis occurred

Conclusions: Extraperitoneal rectal injuries due to low velocity trauma can be safely managed by fecal diversion alone.
Civilian Extraperitoneal Rectal Gunshot Wounds: Surgical Management Made Simpler
Pradeep H. Navsaria, Sorin Edu, Andrew J. Nicol
Conclusions

• Rectal injuries can be a challenging problem
• Mortality rates average 10-15% and are a reflection of the particularly dangerous soilage that occurs in the pelvis - an area poor in combating sepsis
• A high index of suspicion and prompt proctoscopy are necessary for diagnosing these injuries in a timely manner
• Any blood on the examining finger and any penetrating injury that crosses the midline in the pelvis warrants rigid proctosigmoidoscopy
Conclusions

• Formation of a proximal diverting colostomy remains an important principle in management of rectal injuries

• Debridement and primary repair of the rectal injury itself is performed if accessible
  • Low injuries - transanal repair
  • Midrectal injuries may not be accessible
  • High rectal injuries can be accomplished intraperitoneally if there is <50% tissue loss or damage to the circumference
Conclusions

• Insertion of presacral drains remains a valuable skill
  • Some studies do not show an added benefit of routine presacral drains in reducing infectious complications
  • Placement requires disturbing normal tissue
  • However, it can be used to decompress foci of contamination

• Distal irrigation was historically beneficial; but in current civilian wounds, there is no benefit
References


5. Gonzalez, Richard P. MD; Falimirski, Mark E. MD; Holevar, Michele R. MD. The Role of Presacral Drainage in the Management of Penetrating Rectal Injuries. J Trauma, October 1998

An otherwise healthy 25-year-old man sustains a gunshot wound to the rectum. Proctoscopy reveals that the injury is located between the first and second valves of Houston. Which of the following is the most appropriate management?

- A. Colostomy without rectal repair
- B. Diverting ileostomy and rectal washout
- C. Primary repair with presacral drainage
- E. Proctectomy
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- B. Primary repair and presacral drainage
- C. Resection and primary anastomosis
- D. Hartmann’s resection
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Which of the following is/are appropriate steps in managing rectal injuries?

A. Presacral drainage
B. Proximal completely diverting colostomy
C. Irrigation of the distal segment with saline
D. Debridement and primary repair of the rectal injury if it is accessible
E. Insertion of a rectal tube if injury cannot be repaired
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