Key Principles of Pediatric Genitourinary and Anorectal Trauma

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Key points

• Genitourinary Trauma
  • Renal trauma → nonoperative management is highly successful
  • Intraperitoneal bladder injuries → should be repaired surgically
  • Extraperitoneal bladder injuries → nonoperative drainage vs repair

• Anorectal Trauma
  • Complex and often combined with associated injuries
  • Washout, washout, washout → think → plan ahead

• NON-accidental Trauma evaluation should not be forgotten

Pediatric Genitourinary & Anorectal Trauma: Mechanism

• Uncommon in children
  • Rare injury → missed or delayed diagnosis is common
  • Results in increasing morbidity/mortality
  • Draw on adult experiences in management to compliment the pediatric physiology to successfully manage these injuries

• Blunt Trauma is responsible for majority of injuries
  • Multisystem injuries are common
  • Pelvic fractures are associated with:
    • Upper and lower GU injuries
    • Rectal injuries
    • Vaginal lacerations
    • Sacral nerve injuries

• Blunt Trauma
  • Motor vehicle collision
  • Pedestrian struck by motor vehicle
  • Fall from heights
  • Bicycle injuries
  • Sports related [football, horseback riding, rodeo sports, etc]

• Penetrating Trauma
  • Gun shot wounds
  • Non-accidental trauma
  • Impalement injuries [fence pole, water ski (jet enema), etc]
Pediatric Genitourinary & Anorectal Trauma: Work-up

Trauma to the abdomen/pelvis

- Stable
  - CT Abdomen/pelvis with IV contrast
  - Consider delayed CT urogram
- Unstable
  - FAST
    - Positive → OR
    - Negative → DPA

Pediatric Genitourinary & Anorectal Trauma: Injuries

- Genitourinary
  - Renal [1-5% of all trauma cases]
  - Ureter
  - Bladder
  - Urethral
  - Vagina/Penile Injuries
- Anorectal
  - Rectal injuries
  - Anal sphincter

Genitourinary Trauma: Upper and lower GU Track

Genitourinary Trauma: Upper collective system injury

- Blunt renal trauma
  - >90% success rate in non-operative management in hemodynamically stable patients
  - Nephrectomy is RARE
  - Grade IV & V
    - Collecting system evaluation
    - Devascularized segments can be managed non-operatively
  - Blunt renovascular trauma
    - Revascularization is rarely successful
    - Few published reports

- Resolves spontaneously in 75-85% of cases
- Most cases of urine leak resolve with retrograde stent
- Percutaneous nephrostomy tube is rarely needed

Genitourinary Trauma: Blunt renal trauma - active extravasation

- Resolves spontaneously in 75-85% of cases
- Most cases of urine leak resolve with retrograde stent
- Percutaneous nephrostomy tube is rarely needed
Genitourinary Trauma: Penetrating Renal trauma [~10% cases]
- Penetrating injuries to the abdomen
- Exploration based on hemodynamic stability and evaluation of other organs
- Renal intervention may be low/rarely needed

Genitourinary Trauma: Blunt Renal trauma
- Functional outcomes
  - Nonoperative management successful in 90-95% of cases
  - >90% of patients in follow up: normotensive + normal renal function
- Operative intervention should be reserved for hemodynamically unstable children
- Return to school/play
  - Follow other solid organ rules

Genitourinary Trauma: Pseudoaneurysm
- Pseudoaneurysm evaluation should be considered
- 0-9% in reported cases
- Spontaneous thrombosis vs rupture (>1cm → thrombosis rare)
- Management should be based on institutional experience

Genitourinary Trauma: Bladder injuries
- Often associated with Pelvic fracture
- Intraperitoneal (25%)
  - Surgical repair in 2 layers
- Extraperitoneal (60-65%)
  - Catheter drainage
- Combined (10-15%)
  - Surgical repair

Genitourinary Trauma: Intraperitoneal bladder rupture
- Most commonly seen in blunt trauma [MVC]
- Gross hematuria + peritonitis
- Exploration and 2 layer primary repair

Genitourinary Trauma: extra-peritoneal bladder rupture
- Associated with pelvic fractures
- Catheter drainage is successful in majority of cases
- Surgical repair indicated:
  - Bone fragment in bladder
  - Foreign body in bladder
  - Associated rectal/vaginal injury
  - Laparotomy for other causes
Anorectal trauma: rectum + sphincter

Anorectal trauma - RARE

- Pediatric anorectal trauma mechanism:
  - Blunt Trauma ~ motor vehicle collisions
  - Penetrating Trauma
    - Shot gun blast
    - Jet ski injury (jet enema)
    - Abusive trauma ~ blunt + penetrating

Anorectal trauma

- LOCATION
- OTHER INJURIES
  - BLADDER
  - URETER
  - UTERUS
  - VAGINAL CANAL
  - FEUHS
  - SACRAL NERVE ROOTS
  - ANAL SPHINCTER

Anorectal trauma: Topics of management

- Fecal diversion with colostomy
  - Anorectal injury ➔ high mortality until 1948
  - Destructive rectal injuries mandate diversion
  - Nondestructive EP rectal injuries
    - <50% circumference ➔ primary repair
    - >50% circumference ➔ repair + diversion
  - Presacral drainage and distal washout
    - Popularized during the Vietnam war
  - Not recommended by EAST 2016 Guideline
  - Distal washout ➔ conditional recommendation
Anorectal trauma

15 yo girl s/p fall off Jet Ski

- Intraperitoneal rectal blow out
- Right lateral anal sphincter laceration –
  - Midline posterior anal sphincter laceration with distal rectal mucosa 3.5cm in length from anal verge
- Rectal stump: 7cm from anal verge

**MANAGEMENT:**
- Primary repair + diverting loop ileostomy
- Primary repair of sphincter and EP rectum

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Anorectal trauma

8 year old s/p shot gun wound to pelvis

- Intraperitoneal anterior rectal wall blow-out (>50%)
- Extraperitoneal posterior wall and right lateral wall rectal laceration
- Apex of vagina anterior and posterior laceration
- Multiple small bowel blast contusions
- Left mesosalpinx laceration
- Anterior bladder wall laceration and posterior wall laceration
- Right ureterovascular junction injury

**MANAGEMENT:**
- End colostomy
- Distal washout → primary repair of rectal injuries
- Presacral drain placement
- Primary repair + stent placement of bladder/ureter injury
- Nonoperative management of sacral fracture
Anorectal trauma – case example
20 month old girl presents in shock s/p “dog bite”

• MANAGEMENT:
  - Diverting loop colostomy
  - Distal washout → primary repair of rectum & sphincter
  - Primary repair of vaginal laceration

• LOCATION

• OTHER INJURIES
  - Bladder
  - Ureter
  - Uterus
  - Vaginal Canal
  - Pelvis
  - Sacral nerve roots
  - Anal Sphincter

Anorectal trauma
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