27 y/o M BIB EMS
- Level 1 Trauma Called
- Working under boat
- Explosion
- Boat falls on patient
A: Speaking clearly
B: Breath sounds equal B/L
C: Vitals stable, no active hemorrhage
Pain in Rt. Shoulder; Rt. Hip, & Groin
Case

- PMHx: Denied
- PSHx: Denied
- Meds: Denied
- All: NKDA

P.E.:
- A&OX3
- C-Collar in place, no sign of injury to neck
- No evidence of thoracic trauma
- Abd: anterior abd. wall bruising, Soft, NT/ND
- Rt. Shoulder deformity & burn, Rt. Arm tenderness, no Rt. wrist pulses or Doppler signals
- Rt. Leg decreased ROM due to pain, good lower ext pulses
- Blood @ urethral meatus
downstatesurgery.org

X-Ray
X Ray
CT Scan
CT Scan
CT Scan
CT Scan
CT Scan

- CXR
- Pelvic Xray
- CT Retrograde Cysto-Urethrogram
- CT of C/A/P with Rectal & IV Contrast
- CT Angio of RUE

MULTIPLE PELVIC FRACTURES. EXTRAVASATED CONTRAST MATERIAL WITHIN THE PELVIS AND ADJACENT STRUCTURES WHICH IS BELIEVED TO BE ORIGINATING FROM A TRANSECTED URETHRA. THE URINARY BLADDER AND RECTUM ARE BELIEVED TO BE INTACT. THERE IS NO EVIDENCE OF ACUTE INJURY TO THE THORAX OR UPPER ABDOMEN. THERE IS A COMMINUTED FRACTURE OF THE RIGHT PROXIMAL HUMERUS. DIMINISHED CALIBER OF THE ADJACENT BRACHIAL ARTERY IS BELIEVED TO BE DUE TO VASOSPASM.
Case

Urology Consult: SPT attempted in ER
- Unsuccessful

Ortho Consult – RUE Splint → Palpable Radial Pulse, Recommended eventual transfer for pelvic fracture

OR with Urology:
- Cystoscopy,
- Cystogram
- Foley Placement
- Retrograde Urethrogram
Case

- **POD #1**
  - Abd CT = No evidence of intraperitoneal bladder rupture
CT Scan
EXTENSION OF EXTRAVASATED FLUID WHICH IS BELIEVED TO BE A COMBINATION OF URINE AND BLOOD FROM THE SITE OF INJURY TO THE PELVIS, PELVIC WALL, LOWER ABDOMINAL WALL, SCROTUM, RETROPERITONEAL AND INTRAPERITONEAL PORTIONS OF THE ABDOMEN. NO EVIDENCE OF INJURY TO THE URINARY BLADDER, RECTUM OR SIGMOID COLON. LOCALIZED COLLECTION OF URINE AND BLOOD WITHIN THE ANTERIOR PELVIS AS DESCRIBED.
Case

- POD#2
  - Developed Abd pain & distention
  - IR consult → CT guided drainage
  - Clinically Improved
Case

- **POD # 5**
  - IR Drain removed

- **POD # 6**
  - Transferred to Floor from SICU
  - Transferred to HJD for Pelvic fixation
Pelvic Trauma

Agenda:

- Mechanism
- Associated Injuries
- Pelvic Fractures
- Initial Management
- Urethral + Bladder Injuries
Pelvic Trauma

Mechanisms

- MVC & Motorcycle Accidents (43 – 58 %)
- Pedestrians struck (20 - 22 %)
- falls (5 - 30 %)
Pelvic Trauma

Associated Injuries

- Hemorrhage
  - Venous Bleeding (80-90%)
  - 34 - 38.5 percent of hospitalized trauma patients with pelvic fractures required transfusion
  - Factors associated with hemorrhage requiring angiographic embolization:
    - sacroiliac joint disruption
    - prolonged hypotension (SBP <100 mmHg)
    - female gender

→ Hemorrhage in pelvic fracture: who needs angiography?. Curr Opin Crit Care 2003; 9:515
Pelvic Trauma

Associated Injuries (Cont.)

- Concomitant Intra abdominal Injury
  - 16.5% of patients with pelvic trauma
  - Solid or Hollow Organs

- Bladder and urethra
  - The bladder 5.8%
  - Urethra in 6.6%
Pelvic Trauma

Associated Injuries (Cont.)

- Neurologic
  - pelvic ring disruptions (10 to 15%)

- Thoracic Aorta Rupture / Dissection
  - 0.3% in all blunt trauma patients
  - 1.4% of blunt trauma patients with pelvic fractures
Pelvic Trauma

Anatomy

- Veins parallel Arteries
  - Sacral Venous plexus
  - Pubic Bridging Veins

Nerves

Bladder

Rectum

Prostate

Uterus

Ovaries
Pelvic Trauma

A

I

II

III

B

I

II

III

C
Pelvic Trauma

FRACTURE TYPES

- A = Lateral Compression
  
  Type 1 - Sacral compression fracture on the side of impact with either unilateral or bilateral rami fractures
  
  Type 2 - Crescent (iliac wing) fracture on the side of impact
  
  Type 3 - Force extends to opposite hemipelvis, creating an open book injury on the side opposite the impact (also known as the "wind-swept pelvis").
  
  Type 3 Most associated with major hemorrhage


Pelvic fracture pattern does not always predict the need for urgent embolization. J Trauma 2005; 58:973.

Pelvic Trauma
Pelvic Trauma
Pelvic Trauma

FRACTURE TYPES (Cont.)

- B = Anteroposterior Compression
  
  - Type 1 - Widening of the pubic symphysis, intact posterior pelvic ring ligaments
  
  - Type 2 - Widening of the anterior sacroiliac joint, anterior pelvic ring can demonstrate either a widened pubic symphysis or rami fractures
  
  - Type 3 - Complete disruption of the sacroiliac joint
  
  - Types 2 & 3 most associated with Major Hemorrhage


Pelvic fracture pattern does not always predict the need for urgent embolization. J Trauma 2005; 58:973.

Pelvic Trauma
Pelvic Trauma
Pelvic Trauma

Initial Management:

- ABCs
- FAST (Sens = 26-81%, Specif = 87-96%)
- Pelvic Wrap
- Algorithm
- Portable AP pelvis radiograph
- CT Scan
- ?? Angio
- Retrograde cystourethrogram
Pelvic Trauma

DPA: diagnostic peritoneal aspirate; FAST: focused assessment with sonography for trauma; MDCT: multidetector computed tomography.
Pelvic Trauma
Pelvic Trauma / Bladder Trauma

Anatomy:

- **Male Urethra**-
  - Anterior (bulbous and pendulous) & Posterior (prostatic and membranous)
  - Anterior urethra injuries may be inflicted by direct blows
  - Posterior urethral injuries usually occur in the setting of significant pelvic fractures
  - Weakest point of the posterior urethra is the bulbomembranous junction
Pelvic Trauma / Bladder Trauma

- **Bladder** -
  - Empty = protected
  - Weakest portion – Peritoneal surface of dome
  - Contusion
  - Intraperitoneal rupture - blunt force injury to the lower abdomen in a patient with a full bladder
  - Extraperitoneal rupture - in association with a pelvic fracture
Pelvic Trauma / Bladder Trauma
Pelvic Trauma / Bladder Trauma
Pelvic Trauma / Bladder Trauma
Pelvic Trauma / Bladder Trauma

Sg/Sx-
- blood at the urethral meatus
- gross hematuria
- inability to void
- absent or abnormally positioned prostate on DRE
- ecchymosis or hematoma involving the penis, scrotum, or perineum
- classic findings may be absent in up to 57% of urethral injuries
Pelvic Trauma / Bladder Trauma

Management (Urethral Injury)-

- If low risk pelvic fracture (single ramus fractures and ipsilateral rami fractures without posterior ring disruption) & no evidence of urethral injury on physical examination, it is reasonable to make one attempt at passage of a Foley
- Resistance $\rightarrow$ remove the catheter and obtain a retrograde urethrogram
- SPT vs Cysto guided foley
Pelvic Trauma / Bladder Trauma

Management (Bladder Injury):
- Keep the bladder completely decompressed
- Contusion \(\rightarrow\) Foley
- Intraperitoneal rupture \(\rightarrow\) OR
- Extraperitoneal rupture \(\rightarrow\) Nonoperative unless associated with other pelvic organ trauma, or associated with bladder neck injury
THANK YOU!

downstatesurgery.org
References

References


