AUA Guideline: Urotrauma

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Objectives: at the end of the session participants will be able to:

- Determine how to apply evidence-based care guidelines to manage complex trauma cases
- Identify relevant tools within the care guidelines to support complex trauma case handling

I do not have any relevant financial interests to disclose.

AUA Urotrauma Panel

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<tr>
<th>Allen F. Morey, MD</th>
<th>Jeff Holzbeierlein, MD</th>
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<td>Steve Brandes, MD</td>
<td>Steven J. Hudak, MD</td>
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<td>Daniel David Dugi, III, MD</td>
<td>Jeffrey H. Pruitt, MD</td>
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<td>Bradley A. Erickson, MD</td>
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Methods

- Systematic MEDLINE® and EMBASE literature review 1/1/90-9/19/12
- Evidence base: 372 urotrauma studies with keywords related to renal, ureteral, bladder, urethral, and genital trauma

Exclusion Criteria

- Preclinical studies (animal models)
- Meeting abstracts
- Editorials
- Non-English studies
- Pediatric studies (except for renal, UPJ, bladder neck injuries)
- Studies with < 10 patients

Guideline Statements

- Standards, Recommendations, and Options
  - Level of Evidence—assigned strength rating of Grade A (high), B (moderate), or C* (low)

- Clinical Principles and Expert Opinions—when evidence insufficient for statement
### Renal

1. Clinicians should perform diagnostic imaging with intravenous (IV) contrast enhanced computed tomography (CT) in stable blunt trauma patients with gross hematuria or microscopic hematuria and systolic blood pressure < 90mmHg. *(Standard; Evidence Strength: Grade B)*

### Renal Trauma Imaging: Indications

- Mechanism or physical findings suggestive of renal injury *(Recommendation, Grade C)*

### Renal

2. Clinicians should perform diagnostic imaging with IV contrast enhanced CT in stable trauma patients with mechanism of injury or physical exam findings concerning for renal injury (e.g., rapid deceleration, significant blow to flank, rib fracture, significant flank ecchymosis, penetrating injury of abdomen, flank, or lower chest). *(Recommendation; Evidence Strength: Grade C)*

3. Clinicians should perform IV contrast enhanced abdominal/pelvic CT with immediate and delayed images when there is suspicion of renal injury. *(Clinical Principle)*

4. Clinicians should use non-invasive management strategies in hemodynamically stable patients with renal injury. *(Standard; Evidence Strength: Grade B)*
Renal Trauma Imaging

• IV contrast enhanced abdominal/pelvic CT with immediate and delayed images (Clinical Principle)

Renal Trauma Management

• Should use non-invasive management if hemodynamically stable (Standard, Grade B)

Renal

5. The surgical team must perform immediate intervention (surgery or angioembolization in selected situations) in hemodynamically unstable patients with no or transient response to resuscitation. (Standard; Evidence Strength: Grade B)

6. Clinicians may initially observe patients with renal parenchymal injury and urinary extravasation. (Clinical Principle)

Renal Stab Wound: Unstable After 6u PRBC → Nephrectomy

High Speed MVC, Pulse 180

Renal Pedicle Avulsion
7. Clinicians should perform follow-up CT imaging for renal trauma patients having either (a) deep lacerations (AAST Grade IV-V) or (b) clinical signs of complications (e.g., fever, worsening flank pain, ongoing blood loss, abdominal distention). (Recommendation; Evidence Strength: Grade C)

8. Clinicians should perform urinary drainage in the presence of complications such as enlarging urinoma, fever, increasing pain, ileus, fistula or infection. (Recommendation; Evidence Strength: Grade C)

Drainage should be achieved via ureteral stent and may be augmented by percutaneous urinoma drain, percutaneous nephrostomy or both. (Expert Opinion)
**Post Embolization:**
Stent, Foley, Drain

1 Month Later

**Ureteral**

9a. Clinicians should perform IV contrast enhanced abdominal/pelvic CT with delayed imaging (urogram) for stable trauma patients with suspected ureteral injuries. *(Recommendation; Evidence Strength: Grade C)*

**Abdominal Stab Wound**

LUQ GSW → 50% Transection
(False Negative)

**Ureteral**

9b. Clinicians should directly inspect the ureters during laparotomy in patients with suspected ureteral injury who have not had preoperative imaging. *(Clinical Principle)*

**Ureteral**

10a. Surgeons should repair traumatic ureteral lacerations at the time of laparotomy in stable patients. *(Recommendation; Evidence Strength: Grade C)*
### Ureteral

<table>
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<th>10b. Surgeons may manage ureteral injuries in unstable patients with temporary urinary drainage followed by delayed definitive management. <strong>(Clinical Principle)</strong></th>
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### Ureteral Transection: Unstable Patient

![Image of Unstable Patient]

### Ureteral

<table>
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<tr>
<th>10c. Surgeons should manage traumatic ureteral contusions at the time of laparotomy with ureteral stenting or resection and primary repair depending on ureteral viability and clinical scenario. <strong>(Expert Opinion)</strong></th>
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### Ureteral

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<th>11a. Surgeons <strong>should</strong> attempt ureteral stent placement in patients with incomplete ureteral injuries diagnosed postoperatively or in a delayed setting. <strong>(Recommendation; Evidence Strength: Grade C)</strong></th>
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### Delayed Presentation

![Endoscopic Management]
### Ureteral

**11b.** Surgeons should perform percutaneous nephrostomy with delayed repair as needed in patients when stent placement is unsuccessful or not possible. *(Recommendation; Evidence Strength: Grade C)*

### Ureteral

**12a.** Surgeons should repair ureteral injuries located proximal to the iliac vessels with primary repair over a ureteral stent, when possible. *(Recommendation; Evidence Strength: Grade C)*

### Ureteral

**12b.** Surgeons should repair ureteral injuries located distal to the iliac vessels with ureteral reimplantation or primary repair over a ureteral stent, when possible. *(Recommendation; Evidence Strength: Grade C)*

### Upper Ureteral Repair

**Delayed Ureteroureterostomy with Downward Nephropexy**

### Ureteral

**Left Buttock Gunshot Wound**

**Gross Hematuria**
Right Distal Ureteral Transection: 10 Minute View

Ureteral Reconstruction: Psoas Hitch

Ureteral

13a. Surgeons should manage endoscopic ureteral injuries with a ureteral stent and/or percutaneous nephrostomy tube, when possible. (Recommendation; Evidence Strength: Grade C)

13b. Surgeons may manage endoscopic ureteral injuries with open repair when endoscopic or percutaneous procedures are not possible or fail to adequately divert the urine. (Expert Opinion)

Lower Ureteral Reconstruction

Bladder

14a. Clinicians must perform retrograde cystography (plain film or CT) in stable patients with gross hematuria and pelvic fracture. (Standard; Evidence Strength: Grade B)
Bladder Injury - Extraperitoneal
- Free fluid in the pelvis
- Space of Retzius
- Contrast leak into:
  - Anterior abdominal wall
  - Space of Retzius

Bladder Injury - Intraperitoneal
- Free intraperitoneal fluid surrounding bowel loops
- Cul de sac fluid

Intraperitoneal Bladder Injury
- Free fluid in paracolic gutters
- Contrast outlines bowel and opacifies cul-de-sac

Plain Film Cystography: Extraperitoneal Injury
- Extravasation on delayed films
14b. Clinicians should perform retrograde cystography in stable patients with gross hematuria and a mechanism concerning for bladder injury, or in those with pelvic ring fractures and clinical indicators of bladder rupture. *(Recommendation; Evidence Strength: Grade C)*

15. Surgeons must perform surgical repair of intraperitoneal bladder rupture in the setting of blunt or penetrating external trauma. *(Standard; Evidence Strength: Grade B)*

16. Clinicians should perform catheter drainage as treatment for patients with uncomplicated extraperitoneal bladder injuries. *(Recommendation; Evidence Strength: Grade C)*

17. Surgeons should perform surgical repair in patients with complicated extraperitoneal bladder injury. *(Recommendation; Evidence Strength: Grade C)*

18. Clinicians should perform urethral catheter drainage without suprapubic (SP) cystostomy in patients following surgical repair of bladder injuries. *(Standard; Evidence Strength: Grade B)*
Bladder Trauma Management

- **Should** perform surgical repair in patients with complicated extraperitoneal bladder injury. *(Recommendation; Evidence Strength: Grade C)*

Complicated ExtraP Bladder Injury

- Bladder neck and ExtraP injury

Foley Alone After Bladder Repair

Urethral Trauma Imaging

- **Should** perform retrograde urethrography in patients with blood at the urethral meatus after pelvic trauma. *(Recommendation; Evidence Strength: Grade C)*

Urethral

19. Clinicians should perform retrograde urethrography in patients with blood at the urethral meatus after pelvic trauma. *(Recommendation; Evidence Strength: Grade C)*

20. Clinicians should establish prompt urinary drainage in patients with pelvic fracture associated urethral injury. *(Recommendation; Evidence Strength: Grade C)*

RUG technique