UROLOGIC TRAUMA MANAGEMENT

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Supersedes:	JTTS Clinical Practice Guidelines for Urologic Trauma, updated Feb 2008			

1. Goal. To provide guidance for management of genitourinary (GU) trauma in combat casualties.

2. Background. GU trauma accounts for approximately 5% of all combat casualties. As with all operative management, treatment of these injuries adheres to established surgical principals of hemostasis, debridement, and drainage. Whenever possible, proper radiographic evaluation of the GU system should be undertaken prior to operative intervention. For far forward surgical units, the preservation of as much tissue as possible – particularly when dealing with the external gentialia - is indicated, followed by rapid evacuation to a higher level of care where definitive urological management can be undertaken.

3. Recommendations. See Appendix A

4. Responsibilities. It is the trauma team leader's responsibility to ensure CPG adherence.

5. Reference.

[1] *Emergency War Surgery Handbook*

Approved by CENTCOM JTTS Director, JTS Director and Deputy Director and CENTCOM SG

APPENDIX A

MONITORING & LAB EVALUATION	INDICATIONS & GUIDELINES
HEMATURIA	• During trauma evaluation, place foley catheter unless contra-indicated. Perform RUG first if blood at the meatus, high riding prostate or other evidence urethral injury. **RUG - Obtain a KUB plain film first, then 14-16 fr foley, primed with contrast to rid air, is placed in the urethra past the balloon. 1-2 cc saline to fill the balloon snugly in the fossa navicularis. A pelvic film in a semi-lateral position is obtained after injecting approximately 30cc of straight contrast (con-ray) under steady, gentle pressure. Study is considered normal only if contrast enters the bladder without any extravastaion.** • If anterior urethral injury, plan to repair in OR. If posterior urethral injury, attempt to gently place a foley catheter. If unable, then place supra-pubic tube in EMT or in OR. • If catheter passes, and gross hematuria noted, proceed with GU diagnostic evaluation for bladder injury or a renal/ureteral source. CT scan with delayed images + a CT cystogram is ideal imaging study (see technique description following).
LABS	CBC, Chem 10, PT, PTT, UA. Type and Screen or Type and Cross x 4 units.
GENERAL MANAGEMENT PRINCIPLES	
RENAL INJURY Penetrating renal injury = Abdominal exploration	• Blunt Trauma: All patients with gross hematuria (regardless of initial SBP) ***and*** those patients with microscopic hematuria ***whose initial SBP is less than 90*** should undergo contrast enhanced CT scan ***if/when they become hemodynamically stable***. • Renal Injury Grading Grade 1: Sub-capsular hematoma Grade 2: Small parenchymal laceration Grade 3: Deeper parenchymal laceration without entry into collecting system Grade 4: Laceration into collecting system with extravasation; vascular injury with contained hemorrhage Grade 5: Shattered kidney or renal pedicle avulsion • Hemodynamically stable patients can usually be managed without operation. • Vascular repair is indicated for salvageable kidneys with renal

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	artery or vein injury. • Ureteral stent may need to be placed for persistent urinary extravasation.
RENAL EXPLORATION DURING ABDOMINAL OPERATION	• Absolute indications: persistent bleeding or expanding/pulsatile hematoma • Relative indications: urinary extravasation, nonviable tissue (> 20%), and segmental arterial injury on pre-op study. • Urinary extravasation from a grade IV parenchymal laceration or forniceal rupture can be managed nonoperatively in most patients.
RENAL REPAIR AND PARTIAL NEPHRECTOMY PRINCIPLES	• Complete renal exposure, débridement of nonviable tissue, hemostasis by individual suture ligation of bleeding vessels, watertight closure (absorbable suture), drainage of the collecting system, and coverage/approximation of the parenchymal defect. Perform partial nephrectomy if reconstruction not possible: the collecting system must be closed and the parenchyma covered with omentum. • Place ureteral stent for persistent urinary extravasation
NEPHRECTOMY	• Total nephrectomy is immediately indicated in extensive renal injuries when the patient's life would be threatened by attempted renal repair: **vascular control of renal pedicle prior to exploration is desirable but may not be feasible.** • Damage control by packing the wound to control bleeding and attempting to correct metabolic and coagulation abnormalities, with a plan to return for corrective surgery within 24 hours **is an option.**
URETERAL INJURIES	• Hematuria not universal: a high index of suspicion must be maintained. • Can be diagnosed with IV contrast and a delayed KUB or CT • Middle and upper 1/3 ureteral contusion is treated by excision and ureteroureterostomy: mobilize injured ureter, sparing adventitia widely to prevent devascularization; débride ureter liberally until edges bleed; repair ureter (absorbable suture) under magnification with spatulated, tension-free, stented, watertight anastomosis, and drain. Consider omental interposition to isolate repair. • UPJ avulsion injuries should undergo re-anastamosis of the ureter to the renal pelvis. A stent and drains need to be placed.

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	• Lower 1/3 ureteral injuries should be reimplanted into the bladder. Use a psoas hitch or Boari flap if required.
BLADDER INJURIES	• Most patients will present with gross hematuria. If CT is planned for other injuries, a CT cystogram ***(use DILUTED conray)*** should be performed. If no CT, obtain a plain film cystogram ***(need minimum 300cc to be adequate study.)*** • **Cystogram**: Obtain scout film. Fill bladder via foley by gravity with at least 350cc contrast (7 cc/kg for pedi). Obtain AP image ± Oblique view. Drain bladder completely and obtain AP image. Many bladder injuries are detected only on the post-drainage film. • **Extraperitoneal** extravasation of contrast can be managed with foley catheterization alone, unless: bone fragment projecting into the bladder, open pelvic fracture, or rectal perforation. Open repair is indicated in these cases (see below). • **Intraperitoneal** ruptures require open repair, two-layer closure with absorbable suture and perivesical drain placement. Last, place a large-bore suprapubic catheter and a urethral catheter to maximize bladder drainage of blood and clots
POSTERIOR URETHRAL INJURIES	• Initial Management – Surgeon to attempt foley placement, consider urethroscopicassisted stenting of the injury with a urethral catheter. • If unable to pass a urethral foley catheter, operatively place an open suprapubic tube. At the time of open s-p tube placement, inspect the bladder to rule out injury.
ANTERIOR URETHRAL INJURIES	• Diagnosis – As with posterior urethral injury, a high index of suspicion must be maintained in all patients with blunt or penetrating trauma in the urogenital region, and a RUG should be performed in any case of suspected urethral injury. • Anterior urethral injuries may also be associated with large hematoma or swelling from extravasated urine. In severe trauma, Buck's fascia may be disrupted, resulting in blood and urinary extravasation into the scrotum. • Management- Initial suprapubic urinary diversion is recommended after high-velocity gunshot wounds to the urethra, followed by delayed reconstruction.

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EXTERNAL GENITALIA INJURIES	• **Penis** - superficial wounds can be irrigated and closed primarily. Corporal injures are repaired by approximation of the tunical margins with absorbable sutures. Associated anterior urethral injuries should be closed primarily with a watertight, spatulated, catheter-stented technique and absorbable suture; posterior urethral injuries should be managed in staged fashion with suprapubic catheterization. • **Scrotum/Testicle** - Diagnosis by physical exam and ultrasound. Equivocal cases should be explored. Explore all testicles with overlying shrapnel on pelvic film or if there is a scrotal laceration and any abnormality on exam. Necrotic testicular tissue should be débrided and the capsule closed with running absorbable suture. In some cases, loss of capsule requires removal of intratesticular tissue to allow closure.