

## SURGICAL INJURIES TO THE URETER

Incidence: since 1960's, incidence has increased dramatically, paralleling laparoscopic techniques

Increased incidence in patients who have inflammation/malignancy, making visualization more difficult / possible ureteral deviation.

Presentation: often immediately symptomatic

Flank pain, fever, ileus, abdominal distention and urinary fistula  
+/- hematuria

late presentation: fever, peritonitis, leukocytosis, pelvic mass (urinoma)

Without treatment, patients can suffer lasting complications or require nephrectomy

Risk Factors:

Pelvic surgeries (e.g. hysterectomy-54%, colorectal-14%), retroperitoneal (e.g. vascular-6%; higher risk with those undergoing reoperation / vascular graft anterior to ureter / large dilated aneurysms of arteries causing retroperitoneal inflammation involving ureter).

Repeat C-sections (20%)

Urologic surgeries (21%)

Previous radiation therapy

Prevention: Intraoperative hydration, preoperative stenting of ureters

Diagnosis: methylene blue dye into renal pelvis (Intraoperative)

CT – absence of contrast in ureter on delayed images

Retrograde ureterography

Management:

Upper 2/3 ureteral injuries: ureteroureterostomy (end to end) – 90% success rate

Complications: urinary leak, 10-24%

Abscess

Fistula

Stenosis

Dehiscence – percutaneous nephrostomy + catheter x 6 weeks

Minor injury: stent placement

Caution: debride fully to avoid later breakdown

Proximal avulsion: reimplant into renal pelvis – fine absorbable suture

Significant loss of length / previous failed attempts: autotransplantation

Ileal interposition: ileal conduit

Midureteral injuries: Transureteroureterostomy (end to side)

Lower ureter: ureteroneocystostomy when psoas hitch / Boari procedure not indicated

- create submucosal tunnel (3:1)
- create new ureteral orifice
- stent postoperatively

Psoas bladder hitch: especially lower third – 95% success

Boari flap: bladder pedicle swung cephalad , made into tube to bridge gap

Partial transection: primary repair indicated with stenting and retroperitoneal drain placement

Ligation: Remove ligature immediately  
Recommended to place stent  
If in doubt: ureteroureterostomy

Transection:

IMMEDIATE:

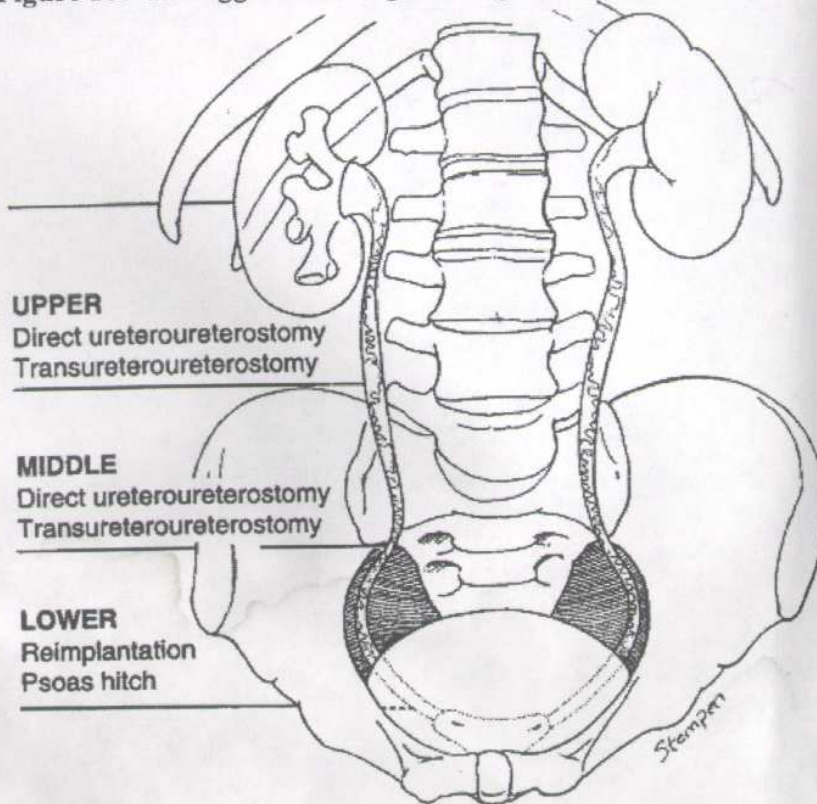
- In case of vascular graft surgery: critical not to contaminate:
- nephrectomy VS ureteroureterostomy and omental isolation of repair

DELAYED:

- can be missed, especially in laparoscopic procedures
- Patients may present with anuria / urogenital fistula / persistent fever or pain / urine leak from wound / hydronephrosis / hematuria
- Diagnostic triad: fever, leukocytosis, peritoneal signs
  - Place double-J stent retrograde (may not be possible if obstructed)
  - Anterograde stent (gentle)
  - Nephrostomy tube for 1-2 weeks before reattempt stenting
- → open repair

Kathryn T. Kavanagh, MD PhD  
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**Figure 105-11** Suggested management options for ureteral injuries at different levels.



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**Figure 105-12** Technique of ureteroureterostomy after traumatic disruption: *A*, defining the injury site with ureteral mobilization; *B*, débridement of margins; *C*, spatulation; *D*, approximation with 5-0 absorbable suture; *E*, internal stent placement.

