

## Vesalius SCALpel™ : Genitourinary (see also: genitourinary folios)

### Trauma

#### kidney

< 5% incidence renal injury in blunt trauma, requires hi energy, associated with other injuries  
mandatory imaging: shock with hematuria, contrast CT or IVP pre-op or in OR  
non-operative management: grade I-III lacs, hemodynamically stable, 90% success  
late consequence: Page kidney = capsule scarring, increased renin, hypertension  
operative management: grade IV, V; pulsating hematoma, penetrating  
control pedicle first, nephron sparing surgery  
back table repair if sole kidney and would need transplant after nephrectomy  
persistent bleeding, pseudoaneurysm embolize

#### ureteral injury

rare, most iatrogenic (ligated, disrupted), distal 1/3  
transection, partial, cautery, devascularize, kink by suture, crush  
points of injury: broad ligament during hysterectomy (3/4 of injuries), sigmoid resection (2<sup>nd</sup> most common), IMA ligation, lateral pedicles of rectum, reperitonealization  
risk factors: large tumor, prior pelvic surgery, radiation, infection (diverticulitis), endometriosis  
stent doesn't prevent, but helps identify injury (late Dx: increased morbidity)  
partial injury: closure with absorbable suture over stent  
cautery injury: debride to bleeding, spatulate, repair over stent (leave 6w), drain  
late discovery: tube nephrostomy to temporize  
surgical maneuvers: psoas hitch, Boari flap, ileal conduit (proximal injury), transureteroureterostomy, renal mobilization, autotransplant

#### bladder injury

80% of bladder injuries due to pelvic fracture, bone spicule  
10% of pelvic fractures have bladder injury  
70% extraperitoneal  
blunt, seat belt injuries more likely intraperitoneal rupture  
contrast urethrogram (at least 300cc)  
Rx:  
intraabdominal: open repair  
double layer absorbable, suprapubic catheter  
extraabdominal: Foley (2-3wks)

#### urethra/prostate

associated with pelvic fx  
urethral injury usually below urogenital diaphragm  
inability to void, blood at the meatus  
high riding boggy prostate  
Dx: retrograde urethrogram (pericath)

place suprapubic cath if in doubt  
movement toward primary realignment  
cystoscope through bladder  
complications: stricture, impotence

penile fracture/testis rupture: repair tunica albuginea

## Adrenal

Cushing's disease/syndrome

measure plasma and 24h urine ACTH

lo ACTH image for adrenocortical tumor, excise

hi ACTH do dexamethasone suppression test

cortisol suppressed = pituitary adenoma (Cushing's disease)

MRI to identify pituitary adenoma, excise

cortisol not suppressed = ectopic ACTH

look for tumor

Conn's syndrome/aldosteronoma

high Na, low K, elevated urine aldosterone

non-suppressible with salt load

CT/MRI to localize, differentiate adenoma from hyperplasia

adenoma excise

hyperplasia medical Rx (spironolactone)

pheochromocytoma

plasma catechols: moderate elevation 500-1,000, medium 1-2K, hi > 2K

moderate: glucagon stimulation, if high do MIBG scan, bright T2, to OR

medium: clonidine suppression, if suppresses " " "

high: right to MIBG

if adrenal does not light up look for extraadrenal pheo

incidentalomas on CT

check K, cortisol, catechols

functional: surgical excision

non-functional: > 4-5cm excise, < 3-4 image Q 6mo

## Renal tumors

90% asymptomatic, 10% flank pain, mass, hematuria

Dx: IVP non-functioning, collecting system effacement

contrast enhanced CT: mass, adenopathy

PET lo reliability, renal angio not necessary

no bx (vascular) unless pt has only one kidney, suspicion of met to kidney, infection

Bx 50% positive rate

hi fat signal suspect angiomyolipoma (tuberous sclerosis pts)

MRI, TEE R/O tumor extension to IVC, RA  
Rx: early (< 5cm) incidental discovery, excellent results (95% 5y) with partial nephrectomy  
(nephron sparing), 3mm margin  
other indications for partial: 1 kidney, renal insufficiency, bilateral tumors  
radical nephrectomy for most renal carcinomas  
tumor extension/thrombus:  
4 levels of tumor extension: renal vein orifice, sub-hepatic, intrahepatic, atrial  
IVC to hepatics do venous bypass, extract tumor; if atrial, hypothermic arrest  
metastatic: alpha interferon &/or II-2, 20% survival benefit  
chemo and radiotherapy little long term benefit

## **Bladder cancer**

2<sup>nd</sup> most common GU tumor  
85% transitional cell, occasional squamous, adeno  
smoking, dyes, schistosomiasis, bladder stone (squamous & adeno)  
gross/microhematuria, occasional irritability  
Dx cystostopy, Bx  
Rx  
superficial: transurethral resection, electrocoagulation, 6 weeks intravesical BCG  
(therapeutic and prophylactic), monitor Q3mo  
deep invasive (muscle, prostate) TURP, urinary diversion, cystectomy  
options: orthotopic bladder substitute, ileal/colon conduit  
metastatic: chemotherapy (MVAC-cytosin) +/- XRT

## **Prostate cancer**

most common male cancer  
asymptomatic, not associated with BPH  
risk factors: >50, black, family Hx  
screen: PSA > 2.5 (age specific: > 75 PSA of 5 is normal)  
> 0.75/y increase (volume of prostate proportional to PSA level)  
abnormal digital rectal exam  
PSA also elevated in BPH, prostatitis  
PSA mostly free/unbound in BPH, if < 20% more likely cancer  
transrectal needle bx if life expectancy > 10y  
95% adeno from acini: Gleason grade of differentiation: 1-2, 3-4, 4-5  
localized: XRT, brachytherapy, radical prostatectomy (esp. young with aggressive, curable  
disease)  
nerve sparing/continence sparing: 50-75% potency, 95% continence  
metastatic (bone): hormonal blockade (several log cell kill)  
almost never curative  
chemo ineffective  
emergency treatment spinal cord compression, pathologic fracture  
ketoconazole suppresses all hormones

incontinence: artificial sphincter, must deflate before inserting Foley or risk urethral necrosis

## Testicular cancer

most common GU cancer younger (15-40)

risks: cryptorchidism, intersex

gynecomastia, supraclavicular mass, cough, wt. loss

Dx: scrotal US solid intratesticular mass, no Bx (violates tumor, chance inguinal node spread)

staging: CT chest/abdomen/pelvis

I limited to testis

II regional nodes

III distant nodes

IV extranodal

radical orchiectomy initial step

seminoma: radiosensitive, no alphafetoprotein (AFP)

non-seminomatous

mets common at Dx

tumor markers:

endodermal sinus/yolk sac: alphafetoprotein (AFP)

choriocarcinoma: beta HCG, LDH

(pure seminoma no AFP, 10% express beta HCG)

most cured by chemotherapy, resect residual disease

teratoma most common post-chemo met to mediastinum

staged resection residual: retroperitoneal lymph node dissection before mediastinum

Rx

stage I, II: radical orchiectomy

seminoma XRT

non-seminoma: primary chemo, surveillance (if clinically localized to testicle),  
or retroperitoneal lymph node dissection (RPLND)

full or modified template, N-sparing (save L2-3 sympathetics:  
emission/ejaculation)

stage IIb, III: bulky & metastatic

primary chemotherapy (PEB: platinum, etoposide, bleomycin)

post chemo may need RPLND if residual mass and markers normalized

if markers still elevated, more chemo

seminoma remove residual mass > 3cm

non-seminoma: 40% fibrosis, 20% viable tumor, 20% teratoma

follow-up all: late recurrent to 10y, then XRT seminoma

non-seminoma increase AFP, beta HCG = mets, to chemoRx

## Penile cancer

rare in US, squamous, circumcision prevents

risks: human papilloma virus (HPV), herpes

small: circumcision/MOHs surgery (successive frozen section excision to free margins)

invasive: partial or total penectomy (perineal urethrostomy)  
metastatic, node +, give chemo: bleo/MTX/cisplatin  
inguinal lymphadenectomy (4w trial keflex) do superficial groin dissection  
if positive nodes do deep dissection

## Hematuria

differential: infection, tumor (renal, ureter, bladder), calculus, BPH, primary renal disease  
(rarest)

emergency bleeding:

radiation cystitis common cause  
cystoscopy, clot evacuation, fulguration, continuous bladder irrigation  
(alum drip, formalin drip), embolize, urinary diversion

## Stone disease

lucent stones: uric acid

Rx: hydration, alkalinization, dissolve

opaque stones:

calcium oxalate, most common, cannot be dissolved  
associated with irritable bowel, Crohn's

calcium phosphate associated with parathyroid disease

oxalate, phosphate stones affected by pH

struvite (ammonia, magnesium, phosphate) associated with infection

cysteine: genetic defect renal absorption

Dx

non-con CT best initial ER test

IVP for degree of obstruction, single delayed image

Rx

< 5mm toridol, strain urine

emergency: large, fever, urinary tract infection, unresponsive to pain meds, solitary  
kidney

percutaneous nephrostomy or ureteral stent

definitive Rx: laser, US, electrohydrolic lithotripsy, extracorporeal shockwave

lithotripsy (ESWL) via ureteroscopy or percutaneous nephrostomy tubes

ESWL effective for stones anywhere along GU tract

ureter: stent decreases risk of missing ureteral injury

## BPH

not a cancer risk

50% or all males over 50, lower urinary tract symptoms

Dx: flow rate, post-void residual, urodynamics (pressure/flow)

differential Dx: urethral stricture, bladder neck contraction, neurogenic bladder

acute retention: catheter, clean intermittent catheterization  
medical Rx: alpha block of smooth muscle in prostatic urethra  
hytrin, cardura, flomax  
5 alpha reductase inhibitors (proscar)  
30% reduction size prostate by decreasing stroma, not epithelium  
surgery: TURP (> 100g, greater risk water intoxication), transurethral laser vaporization,  
open/suprapubic prostatectomy/retropubic/transvesical  
water intoxication: dilutional hyponatremia  
Rx lasix

### **Testicular torsion** (acute scrotum)

sudden pain (often night), high riding testis, loss of cremaster reflex  
color Doppler US  
emergent restoration blood flow < 4-6h  
surgical exploration, bilateral orchidopexy with permanent sutures  
examine for testicular tumor

### **Epididymitis**

slower onset than torsion, young men  
atypical bacteria: gonorrhea, chlamydia, ureaplasma  
older pts.: coliforms: e. coli, proteus  
Rx: antibiotics, scrotal support

### **Varicocele**

L more common (compression L renal v by SMA, longer gonadal v, result incompetent  
pampiniform valves)  
retarded testicular growth, atrophy young man  
unilateral R rare: suspect renal cancer with new varicocele either side  
infertility related, (does not affect spermatogenesis)  
scrotal or retroperitoneal (open/laparoscopic) ligation  
treat for size and symptoms, questionable effect on infertility

### **Fournier's gangrene**

perianal/rectal abscess, urethral abscess  
emergency wide debridement, possible urinary/fecal diversion; broad spectrum antibiotics  
if missed 50% mortality

### **Penis**

priapism: hi or lo flo  
aspirate old blood, clots  
intracavitary injection alpha adrenergic agent

surgery: fistula, shunt  
treat underlying cause, eg. sickle cell disease  
phimosis: inability to retract foreskin  
usually not emergency  
if need to catheterize circumcise or do dorsal slit  
paraphimosis  
more emergent, trap glans, ischemia  
dorsal slit, circumcision under penile block

## **Impotence**

most from organic causes: vascular, diabetes, trauma, venous leak, hypertension, smoking,  
post prostatectomy  
IMA ligation risk injuring sympathetics, impair ejaculation  
N. eregentes parasympathetic(T12-L2) (erection) and sympathetic (S2-4)(ejaculation)  
hormonal testing (testosterone, prolactin, LH, FSH) not done anymore since Viagra  
meds: viagra, levitra, cialis: work through nitric oxide effect on smooth muscle of corpus  
cavernosum  
prostaglandin urethral insert (alprostadil)  
penile injection: caverject/tri-mix  
vacuum erection pump  
penile prosthesis (malleable/inflatable)

## **Colovesicle fistula**

most common cause: diverticulitis (abscess decompresses into bladder leaving fistulous  
tract)  
second cancer, third Crohn's  
Dx cystoscopy: bullous edema