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

Trauma

kidney

< 5% incidence renal injury in blunt trauma, requires high 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 (2nd most common), IMA ligation, lateral pedicles of rectum, repertitonealization

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 supression test
cortisol supressed = pituitary adenoma (Cushing’s disease)
  MRI to identify pituitary adenoma, excise
cortisol not supressed = ectopic ACTH
  look for tumor

Conn’s syndrome/aldosteronoma
  high Na, low K, elevated urine aldosterone
  non-supressible with salt load
  CT/MRI to localize, differentiate adenoma from hyperplasia
    adenoma excise
  hyperplasia medical Rx (spironolactone)

pheochromoctyotoma
  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 supression, if supresses “ “ “
  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

2nd 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-cytoxan) +/- 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 supresses all hormones

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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/ejactulation)

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 recurrences 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, electrohydrolitic lithotripsy, extracorporeal shockwave lithotripsy (ESWL) via ureteroscope 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

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acute retention: catheter, clean intermittent catheterization
medical Rx: alpha block of smooth muscle in prostatic urethra
    hytrin, cardura, flomax
5 alphareductase 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