UROLOGICAL DISORDERS: COMMON CLINICAL CASES

For Medical Students & House Officers

BY

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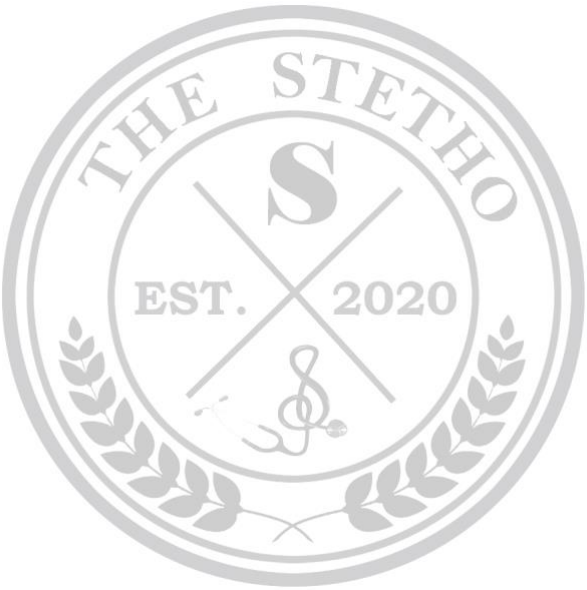
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ACKNOWLEDGEMENT

Foremost, I am thankful to God for the good health and wellbeing that were necessary to complete this Book and present a clear picture of what has been done during the book completion. After this I would like to express my sincere gratitude to **THE STETHO medical Publishing forum** to provide me with an opportunity to share my knowledge and add something meaningful to the medical literature.

Dr Yasir Amir Khan

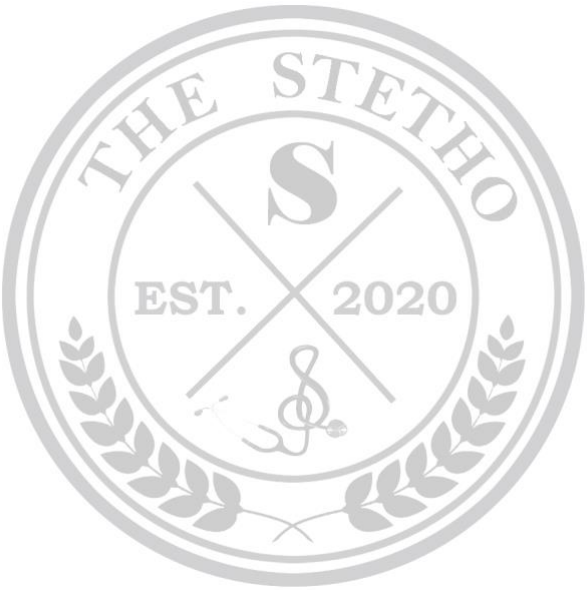
"William Osler"

" There are only two sorts of doctors: those who practice with their brains, and those who practice with their tongues"

CHAPTERS

D. **PAEDIATRICS** Dr. Khan YA

E. **EMERGENCIES** Dr. Khan YA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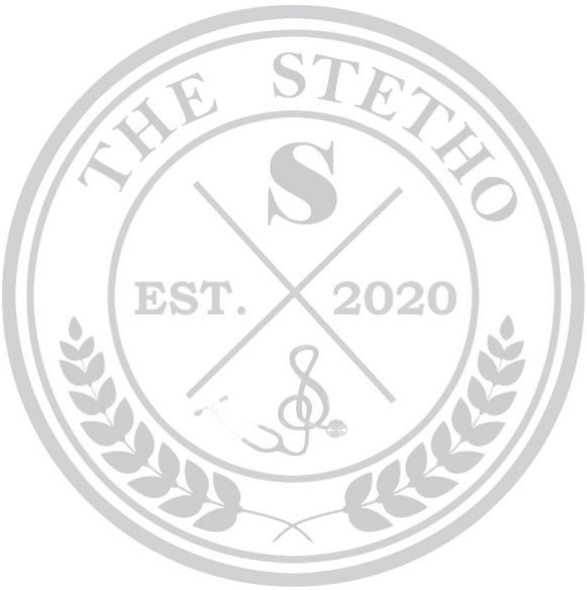
CHAPTER 1

INFECTIONS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CASE 1

Balanitis / Balanoposthitis

Balanitis is inflammation of the glans penis, while balanoposthitis is inflammation of the foreskin and glans. Both occur predominantly in uncircumcised individuals.

• Boys tend to have bacterial invasion, while men suffer from a combination of intertrigo, irritant dermatitis, maceration injury and bacterial or candida overgrowth.

• Poor hygiene, STD exposure, diabetes, and immune compromise are known risk factors.
• Balanitis xerotica obliterans (BXO) is characterized by white, featureless, contracted skin around the urethral meatus, causing meatal stricturing.

Work Up:
• Diabetic screening (if adult male)

• Begin meticulous personal hygiene, keeping glans and foreskin clean and dry (soap and water daily, expose glans to air as often as possible)

• Topical antibiotics, antifungals, or steroids as indicated

• Biopsy of discrete lesion if topical therapy fails Urology Referral

• Circumcision if recurrent or refractory

• Biopsy of persistent lesion (may see Dermatology as alternative)
• Meatal dilatation if outflow obstructed by BXO

CASE 2
Condyloma Acuminata

• Soft, fleshy, vascular anogenital lesions, usually appearing on moist surfaces (diagnosis based on observation of characteristic lesions)

• Increased risk with number of sex partners, frequency of sexual activity, and presence of condyloma on partners

• Cigarette smoking may be associated with increased risk

• Possible association with cervical cancer

Work Up:

• Check for associated STD's

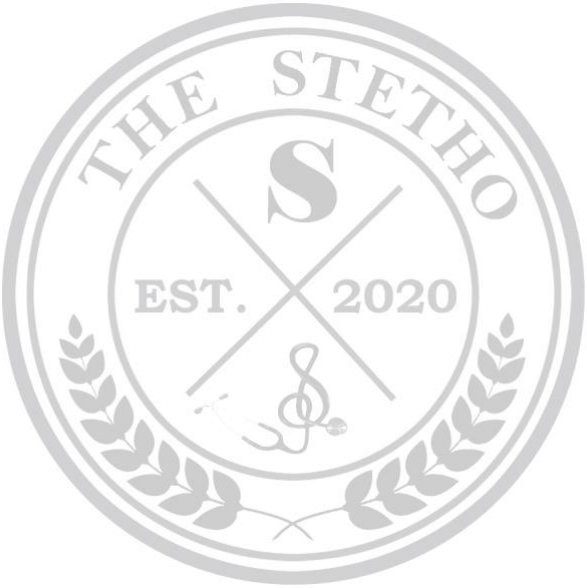
• Careful inspection of anal region for warts also Urology Referral

• Urethroscopy if haematuria or obstruction present (URETHRAL lesions)

• General Surgery referral if anal lesions present

• Topical therapy (trichloroacetic acid, podophyllin, podofilox, 5-FU) often effective

• Surgical therapy (excision, electrosurgery, CO2 laser, cryotherapy) normally reserved for extensive or refractory cases



CASE 3
Epididymitis / Orchitis

• Clinical syndrome characterized by inflammation of the epididymis and/or testicles (orchitis rarely exists in the absence of epididymitis).

• Painful swelling in the scrotum, usually severe and develops rapidly over 24 to 48 hours (may be even more acute).

• Often associated with dysuria or irritative voiding symptoms

• Prehn's sign: alleviation of pain with scrotal elevation (present with epididymo-orchitis, not usually with testicular torsion). Of note, cremasteric reflex remains intact, in contrast to its decrease with torsion.

• Bacterial etiology most widely accepted:

• E. coli (children)

• E. coli (homosexual men)

• Neisseria gonorrhoeae and Chlamydia trachomatis (heterosexual men less than 35 years old)

• Mumps orchitis rare due to immunization for mumps, occurring in post-pubertal boys older than 10 years, begins 4 – 6 days after onset of parotitis

• Main differential includes testicular torsion and hemorrhage into an occult testicular tumor

Work Up:

• Diabetic screening (if adult male)

• Begin meticulous personal hygiene, keeping glans and foreskin clean and dry (soap and water daily, expose glans to air as often as possible)

• Topical antibiotics, antifungals, or steroids as indicated

• Biopsy of discrete lesion if topical therapy fails

Urology Referral

• Often associated with fever, reactive hydrocele, erythema of overlying scrotal skin, urethral

discharge or voiding complaints as above, and elevated WBC count

• Digital rectal exam to check for prostatitis recommended

• Urinalysis often unremarkable

• Consider scrotal ultrasound with colorflow Doppler if torsion, tumor, or trauma suspected

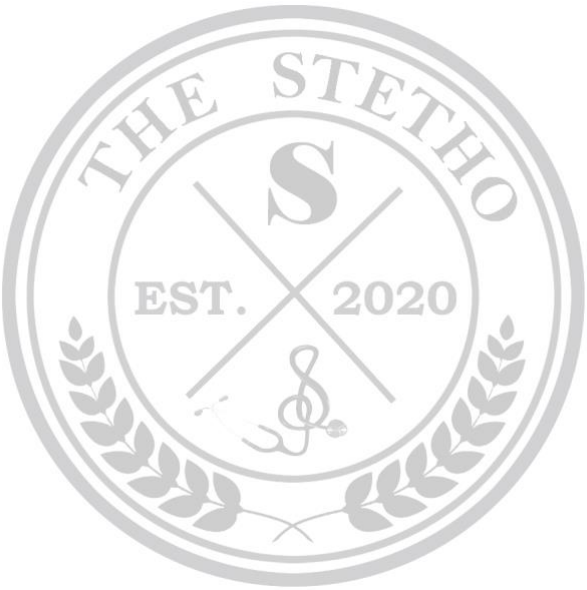
• Antibiotics, bed rest, analgesics and/or anti-inflammatory agents and scrotal elevation are usually effective

• Extend antibiotic course as needed if prostatitis present also (minimum 30 days therapy for prostatitis)

• Always treat the sexual partner if suspected secondary to an STD. Prostatitis and epididymo-orchitis are not themselves considered STDs.

• Patients may require hospitalization for I.V. antibiotics if systemically ill

• Consider follow-up scrotal ultrasound if no resolution with appropriate antibiotics (rule out abscess).



CASE 4
Urinary Tract Infection

• >10 5 CFU bacteria / mL urine in an asymptomatic patient, or
• >10 2 CFU bacteria / mL urine in a symptomatic patient

Work Up:
• (For "complicated" UTI)

• Persistent fevers after 72 hours of treatment

• Proteus in urine culture with pH > 8.0

• Bacterial persistence

• Unexplained hematuria

• Suspected upper tract obstruction

• History of calculi

• Neurogenic bladder dysfunction

• Diabetes

• Renal and Bladder U/S - good initial study to R/O hydronephrosis, abscess, bladder or renal stones

• IVP - appropriate initial study if hematuria, flank pain, or analgesic abuse present, or to further evaluate hydronephrosis on U/S

• Noncontrast spiral CT - when contrast contraindicated

• CT Abd/Pelvis - with and without contrast, with 5mm cuts through kidneys): further evaluation of suspected renal abscess, renal mass, or radiolucent renal calculus

• VCUG - Hx of vesicoureteral reflux or neurogenic bladder, or if urethral diverticulum suspected. (VCUG to be performed 6 weeks after acute infection treated.)

Urology Referral

• Positive findings on imaging studies, for suspected urethral diverticulum, or failure to resolve with appropriate antibiotics. Referral for recurrent uncomplicated UTI requires at least 3 documented infections (nitrite positive or organism identified)

CASE 5
Prostatitis, Acute Bacterial

• Generally associated with infection of both prostate and bladder

• Serious illness, historically requiring treatment with parenteral antibiotics (now often treated with oral fluorquinolones)

• Usually involves an adult male with acute onset of lower back pain, perineal pain, fever, chills, dysuria, hematuria, and general malaise.

• Elderly patients may already be hospitalized with other diagnoses, often with a urethral catheter in place.

Risk factors include:

• Bladder outlet obstruction
• Recent prostate biopsy
• Cystoscopy
• Catheterization
• Anal Intercourse

Work Up:
• Digital rectal exam must be very gentle!

• Bacteremia, hypotension, and sepsis can follow prostate massage with acute prostatitis. Rectal exam should not be avoided, but should be as gentle as possible.

• Acutely ill patients require hospitalization for IV antibiotic therapy (can switch to oral antibiotics when afebrile for 48 hours)

• Urine and blood cultures may guide therapy, but don't wait for culture results before starting treatment

• Avoid urethral instrumentation if possible (including catheters)

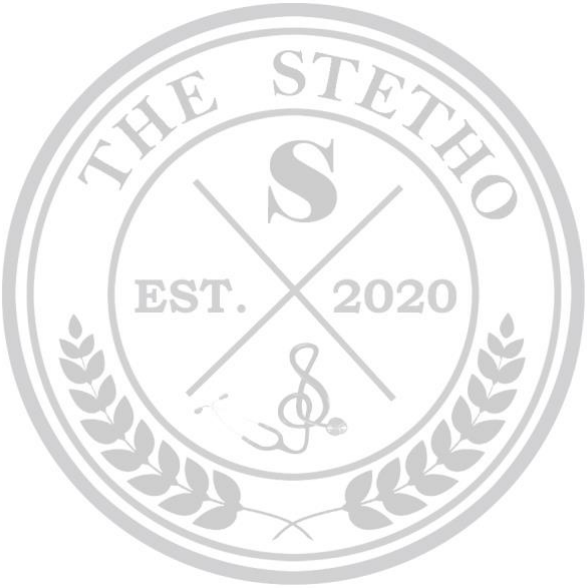
• Check post-void urinary residual volume with bladder ultrasound. If urinary retention develops, consider suprapubic cystostomy tube drainage rather than urethral catheterization which may perpetuate the disease process.

• Bedrest, analgesics, antipyretics and stool softeners are recommended along with the antibiotics

• Antibiotic course minimum of 30 – 45 days to prevent chronic bacterial prostatitis

Urology Consult (If)

• Suprapubic cystostomy tube placement required
• Single course of antibiotics fails to alleviate symptoms (suspect prostate abscess)



CASE 6
Pyelonephritis

• Inflammatory process involving renal parenchyma and renal pelvis, most often result of bacterial infection but may involve fungi, parasites, or viruses

Onset usually sudden, with

• Fever and chills (80 – 90%)

• Flank pain (85 – 100%)

• CVA tenderness

• Ileus with nausea and vomiting

• Abdominal pain and tenderness

• Frequency, urgency, dysuria

• E. coli accounts for 80% of cases

Risk Factors

• Vesicoureteral reflux
• Neurogenic bladder

• Bladder outlet obstruction
• Calculus disease
• Indwelling catheters
• Diabetes mellitus
• Immunosuppression
• Alcoholism
• Female gender

Work Up:

• CBC, Chem 7 (Renal failure uncommon without sepsis)

• Urinalysis, blood and urine cultures

• No imaging necessary in uncomplicated cases

• If no response to appropriate antibiotic therapy within 72 hours, consider imaging to rule-out obstruction, abscess, or other anatomic abnormality

• Renal ultrasound may demonstrate calculi, perinephric abscess (mild hydronephrosis common – does not necessarily indicate obstruction – endotoxins impair ureteral peristalsis)

• IVP may demonstrate stones, obstruction (normal in 75%)

• CT abdomen with and without contrast may demonstrate renal and perinephric abscesses, stones, obstruction, renal parenchymal gas (emphysematous pyelonephritis), and gives a qualitatitive measure of renal function.

• Any pediatric patient requires work-up with renal ultrasound, VCUG and nuclear renal scan (do not perform VCUG until 4-6 weeks after UTI resolved to prevent false positive "reflux" call)

• If I.V. antibiotics required, continue until patient is a febrile for 48 hours

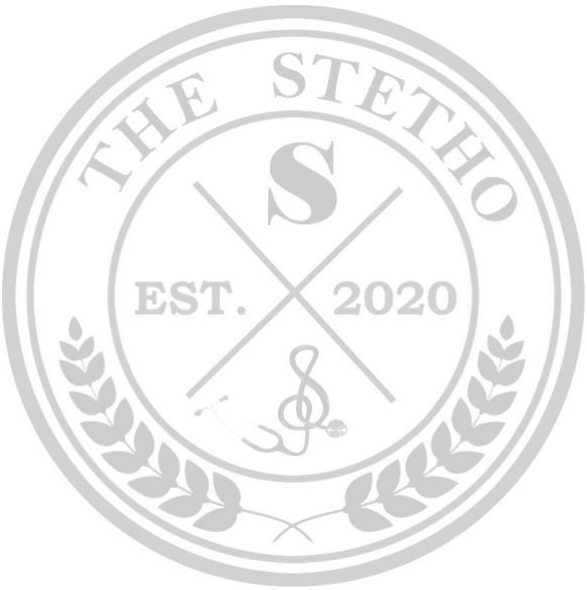
• Antibiotic course: full 14 days required

Urology Referral

Complications (calculi, obstruction, perinephric or intrarenal abscess, etc.)

CHAPTER 2

MALIGNANCIES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CASE 7
Epididymal Mass

• Solid paratesticular mass, with or without associated pain

Work Up:

• Urinalysis

• Urine culture and sensitivity (if suggested by UA)

• CBC with differential

• Scrotal ultrasound (to determine testicular-vs-paratesticular, cystic-vs-solid

• CXR, PPD (if tuberculosis suspected)

CASE 8
Elevated Prostate Specific Antigen (PSA)

• Serum PSA drawn on routine screening for prostate cancer greater than 4.0 usually considered "elevated" may represent any condition involving inflammation of the prostate, including prostate cancer, acute or chronic prostatitis, benign prostate hyperplasia (BPH), or recent instrumentation.

Work Up:

• Determine history suggestive of prostatitis or recent instrumentation, or exam consistent with prostatitis. If prostatitis present, treat for 30 – 45 days with lipophilic antibiotics (TMP-SX, Doxycycline, or quinolones) and repeat PSA two weeks after antibiotics completed. If no prostatitis present, or if PSA remains elevated (greater than 4.0) after course of appropriate antibiotics, refer to Urology for consideration of prostate biopsy.

CASE 9
Renal Mass

Most Common

• Simple renal cyst

Most Common Solid Tumor (85%)

• Renal cell carcinoma

Work Up:

• Urinalysis

• Urine culture (if indicated by UA)

• Urine cytology

• CBC, Chem 20 (BUN, creatinine, glucose, liver function tests, calcium)

• CXR (PA, lateral)

• CT abdomen / pelvis, with 5-7mm cuts through kidneys, with and without contrast

Urology Referral

• When above studies are complete

CASE 10
Scrotal Mass

• Painful or painless “lump” in the scrotal sac

Work Up:
• Urinalysis

• Urine culture and sensitivity (if UA, clinical evaluation suggests)

• Urethral swab for GC, Chlamydia (if urethral discharge)

• CBC

• Tumor markers (AFP, LDH, quantitative HCG if testicular mass on ultrasound)

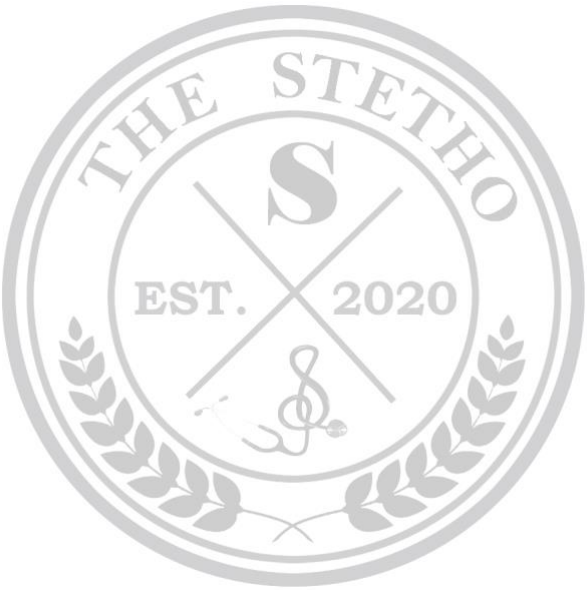
• Scrotal ultrasound

• Note: Do not delay surgical evaluation to obtain ultrasound if testicular torsion is strongly suspected.

Urology Referral
• Urgent / Emergent Urology referral for suspected testis cancer

CHAPTER 3

GENERAL UROLOGY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CASE 11
Erectile Dysfunction

• Consistent inability to obtain and / or maintain an erection sufficient for satisfactory sexual relations (90% primarily organic)

Work Up:

Per 1993 NIH Consensus Conference Panel:

• CBC

• Chem 7 with random glucose level

• TSH (other thyroid function tests only if TSH abnormal)

• Early-morning total serum testosterone level (serum free testosterone, LH and prolactin only if initial testosterone abnormal)

CASE 12
Frequency and Urgency

• Frequency is voiding more often than normal (5-6 times per day, 0-2 times per night).

• Urgency is the sudden impulse to void, without leakage.

Work Up:

• Urinalysis

• Urine culture and sensitivity (If indicated by UA)

• Chem 7 (BUN / creatinine)

• Renal ultrasound (if renal insufficiency or urinary retention)

• Bladder ultrasound (if urinary retention suspected)

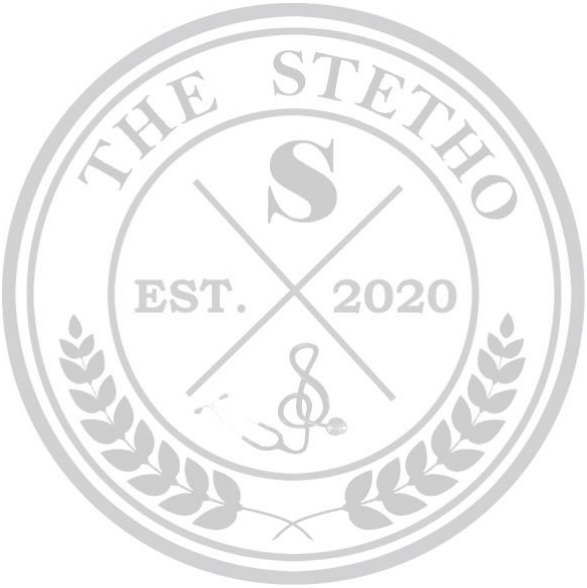
Urology Referral

• Cystoscopy IF

• Hematuria

• Pyuria

•Persistent/worsening symptoms



CASE 13
Hematuria – Adult

• More than 2 RBCs per high power field on microscopic exam of fresh urine (not dipstick), confirmed on repeat urinalysis.

Work Up:

• Recommended for all patients with gross hematuria and all adult patients with microscopic hematuria

• CBC, Chem 7

• Urine for cytology

• Urine for culture and sensitivity (if indicated by positive leukocyte esterase and nitrite)

• IVP with tomograms and obliques (May substitute renal ultrasound for IVP in contrast allergic patients or those with elevated serum creatinine. This often commits the patient to later retrograde pyelograms under anesthesia, so get the IVP whenever possible.)

Urology Referral

• Cystoscopy after other work-up complete

CASE 14
Hematospermia

Visible blood in the ejaculate (or "rust-colored" semen)

Work Up:

• Urinalysis and urine culture

• Urine cytology

• Urethral swab for GC, Chlamydia

• PSA

• Consider course of antibiotics for prostatitis

Urology Referral

• With repeat studies and Urology referral if hematospermia persists or studies abnormal

CASE 15
Male Infertility

Inability of couple to conceive within 1 year of unprotected intercourse. (Note – evaluation may begin upon presentation, need not wait for 1 year of attempted conception)

Work Up:

• Evaluation of partner by OB-GYN

• Three separate semen analyses (SFA) for: volume, count, motility, and fructose (following three days' abstinence from intercourse)

• Mycoplasma and Chlamydia urethral swabs if clinically indicated (urethral discharge)

• FSH, A.M. Testosterone if sperm count <20 million / mL

• LH, prolactin if A.M. Testosterone low

• Scrotal ultrasound to confirm varicocele if found on exam

Urology Referral

• Persistent low volume (< 1.5 mL) +/- low fructose

• Varicocele

• Associated hypospadius, penile chordee, abnormal scrotal ultrasound
May not need Urology Referral (If)

• Bilateral testicular atrophy and FSH > 2x normal (primary testicular failure)

CASE 16
Urinary Incontinence

• Stress incontinence - leakage with coughing, sneezing, lifting

• Urge incontinence – leakage with sudden uncontrollable urgency

• Overflow incontinence - leakage from distended bladder

• Total incontinence - continual drainage or urine regardless of position, due to anatomic abnormality (fistula, ectopic ureter, etc.)

Work Up:

• Post-void residual urine volume

• Urinalysis

• Urine culture (treat UTI if present)

• Urine cytology (if hematuria present)

• Chem 7 (BUN / creatinine, glucose)

• IVP for:

• Total incontinence in pediatric patient

• Associated hematuria or recurrent UTI

• Renal and bladder ultrasound (if BUN / creatinine elevated)

• Complex urodynamic study for:

• Female with prior anti incontinence surgery or pelvic radiation tx

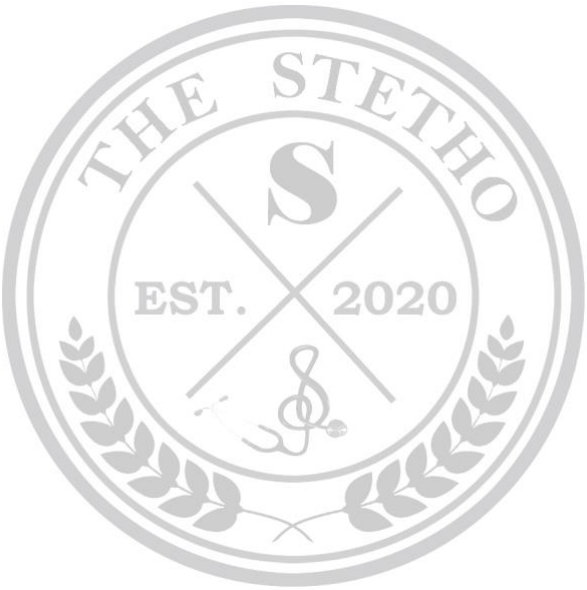
• Male with prior prostate surgery or pelvic radiation tx

• Suspected neurologic etiology

Urology Referral

• Behavioral therapy (timed voiding with increasing intervals) and Kegel exercises
fail or if evidence of obstruction or anatomic abnormality found

• Note: Patients must present to Urology clinic with a voiding diary, to include time and amount of each void, of three days duration



CASE 17
Paraphimosis

• Painful swelling of the foreskin distal to a phimotic ring after retraction of the foreskin for a prolonged period

Pathophysiology

• In children, caused by a congenitally narrowed preputial opening, with the foreskin retracted behind the glans penis and not promptly reduced. This leads to venous congestion, edema, and enlargement of the glans, followed by arterial occlusion and necrosis of the glans. In adults, usually occurs in elderly men and may be associated with poor hygiene and balanoposthitis. Chronic inflammation leads to formation of a fibrotic ring of tissue at the opening of the prepuce, resulting in constriction when the foreskin is retracted behind the glans, venous congestion and edema, and necrosis of the glans penis if not promptly reduced.

Risk Factors

• Chronic balanoposthitis

• Chronic indwelling catheter

• Phimosis

• Diabetes mellitus

History and Physical Exam

• Edema and swelling of penile shaft proximal to glans and corona

• Tight phimotic ring proximal to corona

• Late – swelling of the glans, venous congestion, necrosis of the glans

Treatment

• Penile block (12cc or dosage appropriate for pediatric patients) 1% lidocaine without epinephrine, followed by wrap of edematous tissue with cool, moistened Kerlex and Ace wrap for 15 minutes

• Steady pressure against glans with both thumbs, pulling the foreskin forward over the glans with the fingers

• Use gauze to facilitate traction on the foreskin

• May require multiple stab wounds in the edematous foreskin with 25-gauge needle to help remove edema fluid

• Dorsal slit – after penile block

• Consider antibiotics for several days if dorsal slit necessary

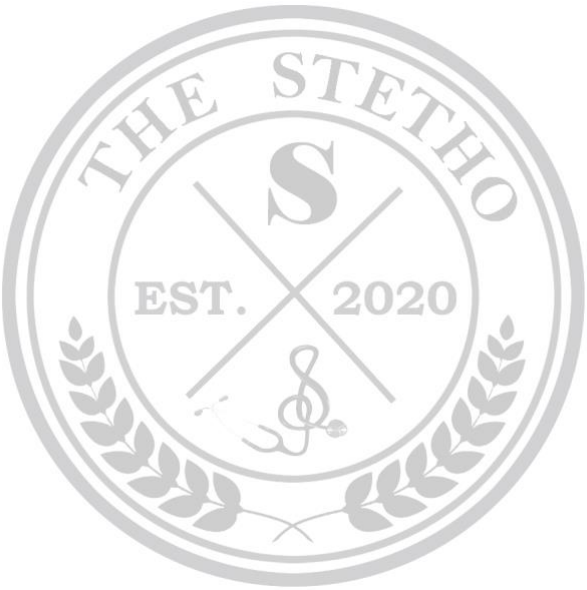
• Completion circumcision should be performed when inflammation and edema resolve

Prevention

• When inserting or changing Foley catheters, or perfoming clean intermittent catheterization, foreskin must be completely reduced following the procedure.

CHAPTER 4

UROLOGY OF PAEDIATRICS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CASE 18
Hematuria – Paediatric

• More than 2 RBC's per high power field on microscopic exam of fresh urine (not dipstick), confirmed on at least three separate urinalyses

Work Up:

• CBC, Chem 7, C3 / C4 levels, CH50, ANA, plasma IgA levels, anti-streptolysin-O titer, calcium:creatinine ratio

• Renal and bladder ultrasound

• Voiding cystourethrogram (VCUG)

• Note: cystoscopy rarely indicated

• Pediatric Nephrology referral if U/S, VCUG are normal

CASE 19
Hydrocele (Adult and Pediatric)

• Collection of serous fluid within the tunical vaginalis, either congenital or acquired

• Congenital: Failure of the processus vaginalis to close completely following testicular descent results in a "communicating" hydrocele. Closure of the canal with fluid present results in a "non-communicating" hydrocele.

• Acquired: May be primary (idiopathic) or secondary to disease of the testis (association with infection, torsion, or trauma usually involves pain)

Work Up:

• Transillumination in the office favors simple hydrocele, but is NOT diagnostic

• Testes must be palpated bilaterally to rule-out undescended testis and attempt to feel for testicular mass

• Groin must be examined for evidence of inguinal hernia

• Lab: UA / C&S if epididymitis suspected

• Tumor markers (quantitative HCG, LDH, alphafetoprotein)

• Scrotal ultrasound documents condition, location, and size of testes as well as documenting nature of hydrocele fluid and absence of tumor. Presence of testicular blood flow on colorflow Doppler assures viability of testis.

• Adults are referred to urology only if hydrocele causes discomfort or cosmetic concerns, or if there is significant underlying cause (i.e. tumor).

• Children are referred to urology if hydrocele fails to resolve by the age of two years, or if a hernia is felt to be present.

Urology Referral

• Intractable pain despite optimized analgesic medication

• Recurrent UTI's

• Persistent bleeding

• Stone in solitary kidney

• Immune compromised patient

• Chronic steroid use

• Diabetic

• Stone > 6 mm in diameter

• Intractable nausea and vomiting

• Urosepsis

• Elderly / debilitated patient

• Clot or debris in renal pelvis, or perinephric abscess on studies

CASE 20
Undescended Testicle

• Testicle not present in scrotum on exam

Work Up:

• Rule out "retractile" testis – examiner with warm hands, patient supine (consider frog-leg)

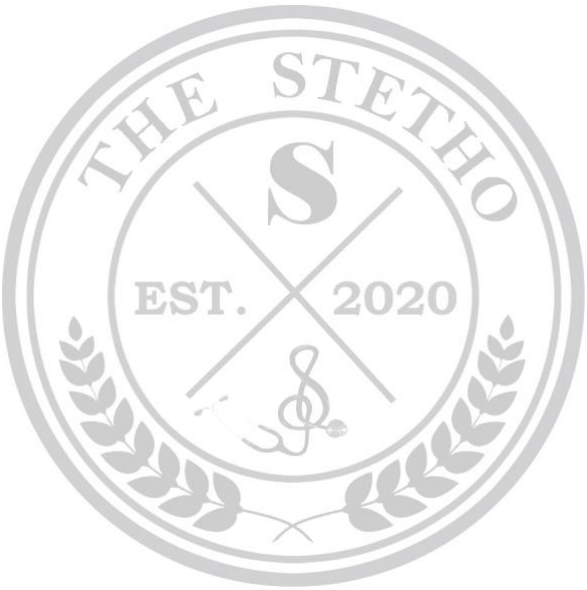
• Scrotal and Inguinal Ultrasound

• If neither testis palpable, consider intersex disorder (female with congenital adrenal hyperplasia most likely)

Urology Referral
• With ultrasound if indicated

CHAPTER 5

EMERGENCIES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CASE 21
Priapism

• Prolonged erection developing in the absence of sexual stimulation and unrelieved by ejaculation lasting >6 hours. Categorized as either veno-occlusive (ischemic, low-flow) or arterial (non-ischemic, high-flow).

Pathophysiology

• Ischemic form results from persistent relaxation of the erectile smooth muscle (pharmacologic) or from sludging of blood (hematologic) with subsequent prevention of venous outflow, resulting in failure of blood to drain from the erectile chamber.

• Arterial form results from blunt or penetrating trauma, with unregulated inflow of arterial blood into the corpora cavernosa secondary to a fistula between the cavernous artery and the corpus cavernosum.

Risk Factors

• Erectile dysfunction (on injectable medication)

• Sickle cell (40% have at least one episode)

• Perineal trauma

• Psychiatric patients (psychotropic medications)

• Recreational drugs

• Toxins (spider venom, rabies)

History and Physical Exam

• Ischemic form

• Painful erection, typically fully rigid (often turgid corpora with flaccid glans)

• Careful questioning regarding above etiologies

• Time elapsed from onset (longer ischemic time = higher risk for permanent tissue damage -- priapism of 24 hours duration associated with 50% incidence of permanent erectile dysfunction

• Arterial form

• Erection usually less than fully rigid and painless

• Usually history of penile or perineal trauma

Laboratory

• Corporal blood gas analysis

• Oxygen content <40mmHg suggests ischemic etiology

• Oxygen content >70mmHg suggests arterial form

Imaging

• Ischemic – none

• Arterial - Penile and perineal ultrasonography confirms dx

• Pudendal arteriography allows definitive diagnosis and angioembolization treatment

Treatment

• Ischemic - Intracavernosal injection with alpha-adrenergic agonist (Neosynephrine)

• Requires strict blood pressure and pulse monitoring (occasional hypertension and bradycardia)

• No safe maximum dose defined

• Consult cardiologist if significant cardiac history

• Use 10 mg (10,000 microgm) / mL stock solution, diluted 9:1 (9mL normal saline : 1mL Neo) for 1,000 microgm / mL solution

• Inject 500 microgm (0.5cc) intracavernosally, over 1 minute

• Repeat at 5 to 10 minute intervals; for erection duration <8 hours, 2 to 4 injections usually successful

• If injection does not produce detumescence, corporal aspiration necessary

• Place 19-gauge butterfly needle into corporal body and aspirate all possible blood

• Irrigate with normal saline and repeat Neo-Synephrine injection

• Failure to achieve detumescence requires surgical creation of shunt between corpus cavernosum and corpus spongiosum

• In Sickle Cell patients, must correct underlying abnormality

• Oxygenation, I.V. hydration, and alkalinization mandatory (consider hyperbaric oxygen if refractory)

• Plasmaphoresis may be required

• Intracorporal Neo-Synephrine injection still useful

• All efforts intended to reverse corporal smooth muscle paralysis resulting from intracorporal acidosis

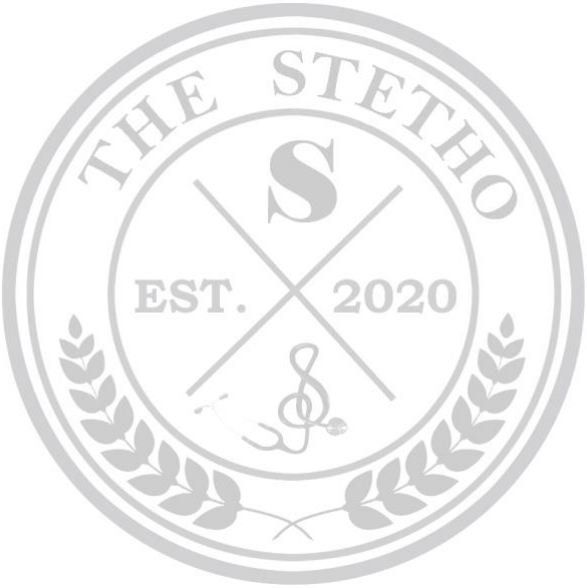
• Arterial -- Not a true medical emergency

• Expectant management is an option

• Angioembolization may be attempted to close the fistula

Prevention

• Careful, precise instruction to patients beginning intracorporal injection therapy for erectile dysfunction (with first injection in the clinic to document correct dose)



CASE 22
Fournier's Gangrene

• Rare, progressive, necrotizing fasciitis of the genitalia and/or perineum

Pathophysiology

• Aerobic and anaerobic organisms synergistically produce a progressive endarteritis leading to vascular thrombosis and gangrene

• Local ischemia allows further proliferation of organisms

• Most common organisms: E. coli, Bacteroides, streptococci, and staphylococci

Risk Factors

• Immunosuppressed conditions

• Recent procedures (groin, perineal, rectal, or genital)

• Children: trauma, insect bites, circumcision, burns, and perineal skin infections
History

• Urinary frequency, urgency, dysuria, cloudy urine, urethral discharge, decreased force of stream or straining to void

• Rectal pain or bleeding, history of anal fissures, fistulae, or hemorrhoids

• Scrotal infections, genital drug injection

• Diabetes, alcoholism, malignancy, or immune suppression

• Recent surgery as above

Physical Exam

• Genitalia and perineum

• Assess for pain, inflammation, or crepitus

• Presence / extent of erythema or eschar

• Skin findings often underestimate the extent of involvement

• Abdomen

• Note extent of skin findings on abdomen also

• Rectal exam

• Assess for perirectal abscess or anal sphincter involvement

Lab Tests

• CBC , Chem 7, UA, Cultures of blood, urine and any wounds (Assess for leukocytosis, elevated BUN / Creatinine, hyperglycemia, glucosuria or pyuria, and any positive cultures)

Imaging

• Plain film KUB -- may show subcutaneous gas

• Retrograde urethrogram -- reveals urethral stricture, disruption, urinary extravasation

• Ultrasound -- sensitive for soft-tissue gas and allows examination of scrotal contents, perineum and abdomen

• CT abdomen, pelvis, perineum -- helpful for intraabdominal and retroperitoneal processes, demonstrates extent of subcutaneous emphysema

Treatment – Medical

• Broad spectrum I.V. antibiotics

• Unasyn and gentamicin, or

• Zosyn and gentamicin, or

• Third-generation cephalosporin and gentamicin (not as good against gram (+) organisms

• Tetanus toxoid

Treatment – Surgical

• Prompt, aggressive surgical debridement

• Proctoscopy if perirectal disease suspected

• May need to surgically divert both fecal and urinary streams if urethra or rectum involved

• Wound should be packed with Dakin's solution (25%), Clorpactin, or saline

Treatment

• Adjunctive

• Hyperbaric oxygen (increased oxygen tension is bacteriocidal and promotes epithelialization, wound healing)

• Follow-up

• Monitoring

• Allow culture results to guide antibiotic regimen

• Wet-to-dry dressing changes 3 times per day (may add Silvadene cream to dressings once granulation begins)

• Daily whirlpool

• Frequently requires return trips to the operating room for further debridement

• Nutritional support vital; most patients are in a catabolic state and require early enteral feeding or TPN

• Must correct underlying cause (urethral stricture, uncontrolled DM, etc.)

CASE 23
Testicular Torsion

• Vascular event that involves cessation of blood flow to the testes, ultimately leading to testicular loss unless blood flow is restored

Pathophysiology

• Extravaginal torsion -- Testis, spermatic cord, and tunica vaginalis all twist together, due to lack of fixation in the scrotum (prenatal and neonatal)

• Intravaginal torsion -- Spermatic cord twists inside the tunica vaginalis due to its high insertion on the cord, allowing the testis to turn freely within the scrotum. Often occurs around puberty due to increase in testicular size.

• Vascular compromise results in rapid onset of swelling, with tissue necrosis after 6 to 8 hours

Risk Factors

• Extravaginal - incomplete testicular descent (antenatal / neonatal)

• Intravaginal - horizontal lie to testis, most common, early puberty

History

• Acute onset of testicular pain, often with nausea and vomitting, may awaken patient from sleep (suggests torsion)

• Mild onset over a few days (suggests torsion of testicular appendage)

• UTI symptoms (suggests epididymo-orchitis)

• History of trauma (cannot rule-out torsion)

• Prior inguinal / scrotal surgery (cannot rule-out torsion)

Physical Exam

• Look for pain on ambulation, scrotal asymmetry, elevated ("high-riding") testis

• "Blue dot sign" over testis suggests torsed appendix testis

• Palpate normal testis first, looking for horizontal position in relation to affected testis

• If only upper aspect of involved testis is tender, suspect torsed appendix testis

• If spermatic cord is tender also, consider torsion

• Presence of intact cremasteric reflex argues against torsion

• Co-existing reactive hydrocele is a common (and non-specific) finding

Laboratory

• UA / Culture and sensitivities if urinary complaints present. (Positive results do not rule out torsion.)

Imaging

• Color flow Doppler

• Excellent for showing presence or absence of blood flow to testis, ruling out testicular tumors

• Operator dependent and may be difficult in small patients

• Nuclear testis scan (Technetium-99m)

• Documents presence or absence of perfusion

• Expensive

• Invasive

• May be difficult to obtain after hours

Treatment - Surgical

• Prompt referral to urology (requires high index of suspicion)

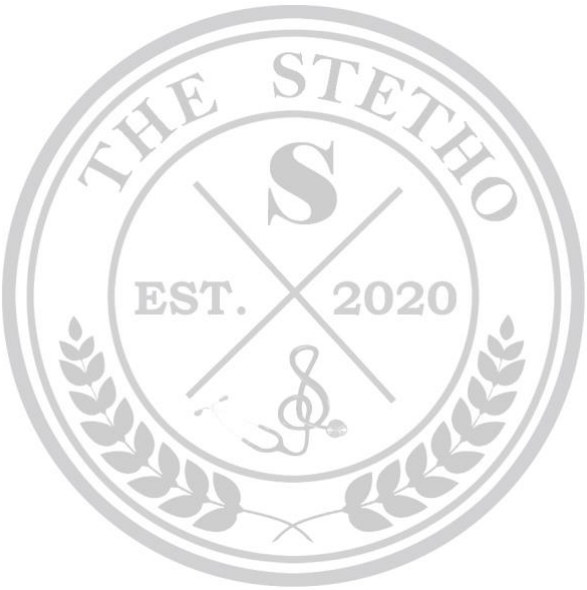
• Testis examined, detorsed and warmed, then secured with three-point fixation orchiopexy if considered viable

• Orchidopexy for contralateral testis as well

Prevention

• High index of suspicion

• Strongly consider testicular ultrasound of any patient with testicular complaint prior to sending them home.



CASE 24
Bladder Calculi

• Calculus material in the bladder that does not pass with normal micturition

• Bladder outlet obstruction most common etiology in U.S.

• Benign prostate hyperplasia (BPH) in men

• Cystocele (bladder prolapse) in women

Work Up:

• UA and urine culture (treat any associated infection)

• Pelvic U/S readily diagnoses most bladder calculi

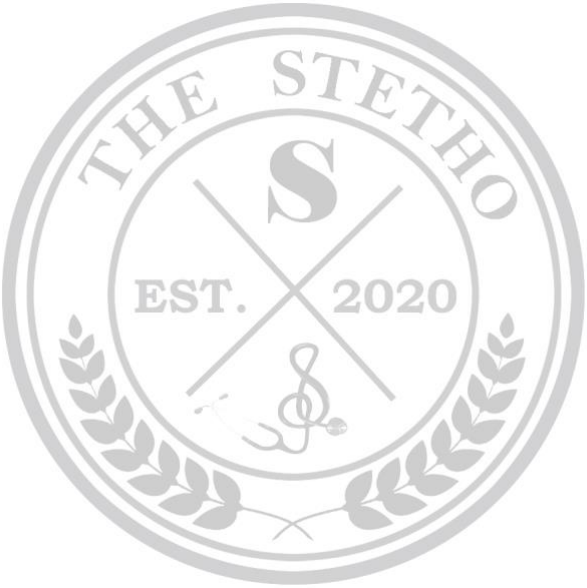
• CT stone search (non-contrast) has excellent sensitivity and specificity for upper and lower tract calculi

• KUB often fails to demonstrate radiolucent stones (uric acid, ammonium acid urate)

• IVP or contrast CT needed only if cancer suspected

Urology Referral

• Definitive therapy as soon as imaging study done and infection treated (if necessary)



CASE 25
Edema – External Genitalia

• Either generalized edema or confined to scrotum and/or penis

Work Up:

• Urinalysis and urine culture (look for proteinuria)

• Chem 7

• Scrotal ultrasound (with colorflow Doppler if available)

• Retrograde urethrogram if urethral trauma suspected

CASE 26
Nephrocalcinosis

• Radiographically detectable diffuse renal parenchymal calcifications, in contrast to nephrolithiasis in which calcifications are located in the pyelocalyceal lumina

• Associated with multiple renal diseases (not a single entity)

• A specific disorder can be identified in many cases (hyperparathyroidism, renal tubular acidosis, etc.)

• Sex, familial and racial factors not found to be significant in most series

• Patients may develop nephrolithiasis, with stones causing the typical flank pain / urinary obstruction symptoms

Work Up:

• Diagnosis is based on radiographs (KUB)

• Radiographic extent or degree of renal calcium deposition is not a reliable indication of the degree of impairment of renal function

• Lab (to determine specific etiology):

• Serum BUN / creat, calcium, phosphorus, uric acid, electrolytes, alkaline phosphatase, albumin (PTH if serum calcium elevated)

• 24-hour urine for calcium, oxalate, uric acid, phosphate, creatinine, protein, citrate, magnesium and sodium

• Urinary pH testing by patient with Nitrazine test paper over 48 hours

• UA C&S if UTI suspected

• Treatment is that appropriate for the underlying cause of the Nephrocalcinosis, with urology evaluation reserved for those patients with obstructing calculi requiring surgical intervention. Stones may be treated conservatively as for other patients, with infections treated aggressively with antibiotics to prevent colonization.

CASE 27
Nephrolithiasis

• Formation of crystalline stones within the urinary collecting system, with potential complications of urinary obstruction, infection, and hematuria

• After an initial episode, incidence of recurrence is 50% over the next 10 years

• Males affected more often than females (3:1)

• Infected stones more common in females (3:2)

• Prevalence highest in Europe, North America and Japan (high intake of refined carbohydrate with low intake of crude fiber)

• Pathophysiology remains poorly understood. Involves supersaturated urine, lack of sufficient urinary inhibitors (i.e. citrate), and / or presence of matrix (noncrystalline mucoprotein) in the urinary system.

• Most common types are calcium oxalate, calcium phosphate, or a combination of the two (account for over 90% of all stones), followed by

uric acid, struvite (associated with infection) and cystine (hereditary) which together account for less than 10% of all stones.

• Most common risk factor is low oral fluid intake. Medications associated with urolithiasis include: acetazolamide, antacids, protein supplements, triamterene, vitamins C and D, indinavir.

Work Up:

• Detailed history, including number of prior stones, urinary infections, calcium and fluid intake, occupation, symptoms of hypercalcemia, hypertension, and renal failure.

• Urinalysis, with attention to urine pH, hematuria, and evidence of infection (nitrite, leukocyte esterase)

• Serum calcium, phosphorus, electrolytes, uric acid, creatinine (Parathyroid hormone) if calcium is high

• Spiral CT (usually ordered as "stone search CT") is excellent at detecting both radio-opaque stones and radiolucent stones (i.e. uric acid).

Either spiral CT or IVP with tomograms should be used to evaluate patients with acute renal colic.

• IVP with tomograms allows qualitative evaluation of renal function and excellent localization of ureteral calculi. Delayed films must be carried out until ureter is visualized down to the offending stone. Requires normal creatinine and involves intravenous access and exposure to intravenous contrast.

• KUB will miss radiolucent stones (uric acid, indinavir); ultrasound can detect and localize stones but is often inaccurate in determining stone size.

• Greater than 90% of stones <4 mm pass spontaneously, 50% of stones between 4- and 8-mm pass spontaneously 10% - 50% of stones >8 mm pass spontaneously

Urology Referral

• Intractable pain despite optimized analgesic medication

• Recurrent UTI's

• Persistent bleeding

• Stone in solitary kidney

• Immune compromised patient

• Chronic steroid use

• Diabetic

• Stone > 6 mm in diameter

• Intractable nausea and vomiting

• Urosepsis

• Elderly / debilitated patient

• Clot or debris in renal pelvis, or perinephric abscess on studies