Nursing Care of Patients with Disorders of the Urinary Tract

Urinary Tract Infections (UTI)

- Invasion of bacteria into urinary tract
- Second most common bacterial disease
- Described by location
  - Lower Urinary Tract
    - Urethritis, prostatitis, cystitits
  - Upper Urinary Tract
    - Pylonephritis, ureteritis

UTI

- Predisposing factors
  - Stasis of urine
  - Contamination of perineal and urethral areas caused by fecal soiling, sexual intercourse
  - Instrumentation and/ or catheterization
  - Reflux of urine and neurogenic bladder (congenital or acquired)
  - Previous UTI's
  - Older adult's

UTI

- Signs and symptoms
  - Dysuria, hematuria, urgency, back pain,
  - Frequency, incontinence, nocturia
  - Cloudy foul smelling urine
  - In the older adult
    - Generalized fatigue, change in cognitive function,
    - decline in mental status, fever in any patient with a catheter

UTI

- Urethritis – inflammation of urethra
  - Causes
    - Chemical irritant
    - Bacterial infection
    - Trauma
    - Exposure to STD's
    - Bubble bath/ spermicidal agents
    - Gonorrhea/chlamydiosis in men
- Post traumatic urethritis- catheterization or instrumentation of urethra

- Signs and symptoms
  - Urinary frequency, urgency, dysuria, discharge from penis
  - Urine and urine c/s done for dx.
  - Tx.
    - Bacterial = antibiotic
    - Inc. water consumption
    - Cranberry juice
    - Pyridium

- Cystitis- inflammation and infection of the bladder wall caused by bacteria, viruses, fungi or parasites.
  - Fungal infections can result from long term antibiotic therapy usually caused by E. Coli.

- Signs and symptoms of cystitis
  - Dysuria, frequency, urgency
  - Cloudy urine
  - Dx. By a UA colllected as a clean catch specimen
    - Inc. wbc's, bacteria and sometimes RBC's, nitrites+, leukocyte esterase +
    - Hospital acquired uti's usually resistent to the usual antibiotics

immunity

- Pyelonephritis
  - Infection of the renal pelvis, tubules, and interstitial tissue of one or both kidneys
    - A pre-existing condition is usually present such as obstruction, strictures, stones or vesicoureteral reflux
    - Risk factors
      - urological surgery
      - Lymphatic infection
      - Urinary stasis
      - Decreased immunity

- Acute pyelonephritis – begins in the renal medulla and extends to the cortex
  - Pathophysiology
    - Formation of small abscesses in kidney
    - Gross enlargement of the kidney
    - Urosepsis – is a systematic infection arising from a source within the urinary system. Prompt dx. And tx. is essential to prevent septic shock and death

- Signs and symptoms
  - Fatigue, urgency, frequency, dysuria, flank pain, fever, chills, castovertebral tenderness on the right or left side (tenderness posteriorly at the angle where the rib and vertebrae join when gently struck with the heel of the fist) is assoc. with renal disease

Therapeutic Interventions

- Antibiotics based on C&S
- Hx. Recurrent UTI's may require 6wk regimen
- Repeated infections may result in scarring and loss of kidney function=renal failure
- Septicemia may occur (when this has a urinary cause called UROSEPSIS)

Urological Obstructions

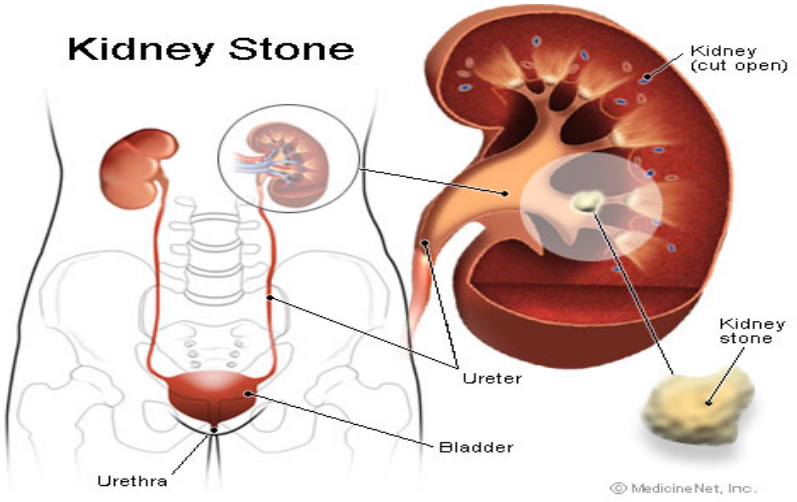
- Urethral Strictures
  - Inc. due to rise of STD's
  - Most occur from injury/ infection
    - Straddle injuries
    - Untreated gonorrhea
    - Congenital abnormalities
  - Often seen in older adult male
  - s/s diminished urinary stream
  - Prone to UTI"S

Treatment

- Mechanical dilitation with placement of urinary catheter or surgically repaired urethroplasty
  - Done at the bedside
  - Pt. awake

Renal calculi

– s/s occur when stones become impacted in the urinary tract
– Nephrolithiasis- condition where stones are formed in the kidney
– Stones <5mm are readily passed in the urine



- Pathophysiology
  - Substances including salts are diluted and excreted. When salts are concentrated and settled they form calculi with a nucleus. Majority contain calcium.
    - Common urinary salts
      - Calcium oxalate
      - Calcium phosphate
      - Magnesium ammonia
      - Uric acid
      - Cystine

- Etiology
  - Family history
  - Chronic dehydration
  - Infection
  - Increased calcium in water
  - Immobility
  - More common in men than women
  - Risk peaks age 30-50.

- s/s
  - Excruciating flank pain
  - Hematuria
  - Dysuria
  - Frequency
  - Urgency
  - Enuresis
  - Costovertebral tenderness

- Diagnosis
- Therapeutic interventions
  - Flushed out
  - Ca+ stones treated with thiazide diuretics and allopurinol
  - Lithotripsy
  - Surgical Intervention

- Prevention of renal calculi
  - P. 785

- Complications of renal calculi
  - Shock
  - Sepsis
  - Hydronephrosis
    - Retention of urine damage to kidneys
  - Hydroureter
  - Renal failure

Tumors of the Renal System

- Cancer of the bladder
  - Most common kind of cancer of UT
  - Most commonly seen in men ages 50-70
  - 2X more common in men
  - rare < age 40
  - > in whites than African Americans

Signs and symptoms

- Progressive painless hematuria
- Bladder irritability
- Urinary retention
- Pelvic pain
- Pain in lower back
- cystoscopy, transurethral
- Changes in bladder habits
- Inability to void

Therapeutic interventions

- Chemotherapy
- BCG
- Photodynamic therapy
- Surgical
    - Cystoscopy and pyelogram with fulguration
    - Laser
    - Robotic and laparascopic techniques
        - Radical cystectomy with urinary diversion
        - P. 789

S

- Surgical tx. (cont.)
  - Incontinent urinary diversion
  - Continent urinary diversion
  - Orthotopic Bladder Substitution

Cancer of the Kidney

- Rare but serious
- 3% of adult malignancies
- Increased since 1973
- 2X more males
- Often metastasis before dx. Due to large amount of circulating blood
- Few early s/s

- Risk factors
  - Smoking
  - Hypertension
  - Radiation exposure
  - Exposure to industrial pollution
  - Obesity
  - Yrs. Kidney dialysis
  - asbestos

- s/s kidney cancer
  - 3 classic symptoms
    - Hematuria
    - Dull pain in flank area
    - Mass in the area
    - Less specific s/s after invasion
      - Fever, weight loss, night sweats, hypertension, anemia, polycythemia, swelling in legs, fatigue, anorexia and constipation

Therapeutic Interventions

- Surgical
- Radiation
- Immunotherapy
- Chemotherapy
- Nephron sparing surgery

Renal System Trauma

- Causes
  - Motor vehicle accidents
  - Sports injuries
  - Falls
  - Gunshot wounds, stabbings
  - Pelvic fractures

Polycystic kidney disease

- Hereditary disorder
- Affects men and women equally
- Characterized by formation of multiple cysts on the kidney that can replace normal kidney structures

- s/s adulthood disease
  - Initially
    - Dull heaviness in flank or liumbar region
    - hematuria
  - Other
    - Hypertension
    - UTI's
  - Inherited type
    - Aneurysms in the brain, diverticulosis, renal failure

Chronic Renal Diseases

- Diabetic Nephropathy
  - Most common cause of renal failure
  - Damage to small vessels
  - Microalbuuminuria
  - Renal damage
    - Risk factors
      - Hypertension
      - Genetic predisposition
      - Smoking
      - Chronic hyperglycemia

Diabetic Nephropathy

- Pathophysiology
- Signs and symptoms
- Diagnostic tests
- Complications
- Tx.
- Nursing care

- Definitions
  - Microalbuminuria
  - Nonoliguria
    - P. 792

- Signs and symptoms
  - Microalbuminuria advancing to protienuria
  - Hypertension
  - Decreased urine output
  - Toxic waste accumulates
  - Chronic renal failure developing

Diagnostic tests

- Protein spillage
- Microalbuminuria (early s/s)
- Serum creatinine levels
- 24 hour creatinine clearance tests

Therapeutic interventions

- Strict control BG levels
- Control BP
- Restricted Protein diet
- Dialysis
- Kidney or kidney pancreas transplant

Complications

- Nephrotic Syndrome
- Impaired immune function
- Nutritional imbalances
- Increased blood coagulation

Complications

- Nephrotic Syndrome
  - Excretion of 3.5 gms.or > per day
  - Serum albumin and total serum protein decreased
  - Liver produces lipoproteins
  - Urine foamy
  - Increased blood pressure

- Tx.- focused on the cause of S/s

- Nursing Care
  - Daily weights
  - I-O
  - Abdominal girth measurement
  - Prevent malnutrition
  - Primary focus
    - Decrease edema
    - Prevent infection

Nephrosclerosis

- Definition:
  - Arteriosclerotic changes in the kidney
    - Decreased blood supply to the kidneys (ischemia)
  - Increased glomerular pressure and filtration
    - Increased pressure weakens the vessels and results in hemorrhage
    - s/s initailly protein in the urine, hyaline casts with progressive s/s of renal failure
  - Tx: decrease BP, low sodium diet , dialysis
  - Prognosis poor

Glomerulonephritis

- Definition
  - inflammatory disease of glomerulus
    - Causes glomerulus to be more porous
    - Allows wbc's, protein and rbc's to leak into the urine

Glomeulonephritis

- Causes
  - Acute poststreptococcal infection
    - Associated with group A beta hemolytic streptococcal infection
    - s/s – edema, oliguria, hypertension,
    - Develops 6-10 days after infection
    - Disease has abrupt onset

- Causes cont.
- Good Pastures Syndrome
  - Caused by auto immune response
  - Produce antibodies against own glomerular membrane
  - Usually progresses rapidly
  - Leads to renal failure
- Chronic Glomerularnephritis
  - Occurs over yrs. As a result of an inflam. dis.
  - Often found during an exam for another reason. Lupus erythematous, IDDM precede chronic glomerular injury

Chronic glomerulonephritis

- Diagnosis
  - Ultrasound
  - CT scan
  - Renal Biopsy
  - Serum Levels
    - Creatinine
    - Urea
- s/s
  - Fluid overload
  - Hypertension
  - Electrolyte imbalances
  - Edema
    - P. 794 Box 37.8

Glomerularnephritis

- Therapeutic Interventions
  - Diuretics
  - Antibiotics
  - Na + and fluid restrictions
  - symptomatic
- Complications
  - Prognosis good if acquired in childhood
  - Adults may recover or progress to CGN & then renal failure

Glomerularnephritis

- Nursing Care
  - Symptom relief
    - Vital signs
    - Rest
    - Fluid, Na+ and protein restrictions
    - Increased serum BUN and creatinine levels

Renal Failure
(kidney failure)

Can affect every system in our body

- fluid imbalances
- electrolyte imbalances
- decreased calcium levels
- increased phosphorous levels
- decreased red blood cell production

Acute Renal Failure (ARF)

- Acute Renal Failure
  - Sudden onset (hours or days)- loss of kidneys ability to clear waste & regulate f/e balance.
  - Rapid accumulation of toxic waste and protein in the blood (azotemia)
  - Reversible if diagnosis and tx. Early
  - Can lead to CRF
    - Azotemia – serum urea and creatinine levels inc.

- ARF associated with:
  - Urine output > 30ml/hr. or 400ml. /day
  - Caused by:
    - Hypotension
    - Vascular obstruction
    - Glomerular disease
    - Acute tubular necrosis (ATN)
      - Tubules are damaged after administration of diagnostic contrast media

- ARF
  - Classified as:
    - Prerenal
    - Intrarenal
    - Postrenal
  - Categories relate to causes
    - » P. 795

Therapeutic Interventions for ARF

- Major Goal: prevention of permanent damage
  - Symptomatic relief
    - Restore F/E balance
    - Discontinue nephrotoxic drugs
    - Bypass Urinary Tract Obstructions with catheters
    - Short term renal replacement therapy
      - To filter blood and restore K+ and other electrolytes

Continuous Renal Replacement Therapy (CRRT)

Removes fluid continuously along with hemodialysis

Alone to remove fluid/solutes in controlled , continuous manner

Blood flows through hemofilter, excess fluids/solutes move into collection bag, blood returns to the patient.

Chronic Renal Failure (CRF)

Progressive irreversible deterioration in renal function

Gradual decrease in kidney function

Causes of CRF

Diabetic nephropathy

Chronic high BP causing nephrosclerosis

Glomerulonephritis

Auto immune diseases

– Pathophysiology
  - Large portion of nephrons damaged or destroyed
  - Progressive disease
    – Early= 50%- no symptoms
    – 75% =renal insufficiency
  - ESRD= 90% nephrons lost

» Figure 37.6 p. 799

Symptoms of renal failure

- Fliud accumulation
  - Edema, SOB, crackles, wheezing,distended neck vessels, increased BP and varying urine production
    - Polyuria, oliguria, or anuria
- Electrolyte imbalances
  - Hypernatremia
  - Hyponatremia
  - Hyperkalemia
  - Decreased Ca+
  - Increased Phosphorous levels

- Waste products retained
  - Azotemia –waste products of protein metabolilsm are not excreted and build in the blood.
  - Increased Bun and creatinine, weakness, fatigue, confusion, seizures, twitching of extremities, N&V, lack of appetite, metallic taste in mouth, smell odor of urine on breath, pale, gray or yellowish discoloration of skin and pruritis

- Acid-base imbalances
  - Resulting in metabolic acidosis, headache, fatigue, weakness, N/V, and lack of appetite with progression, lethargy, stupor, coma
  - Anemia
    - Decreased production of hormone erythropoietin
  - Nutritional def.
  - Blood loss
  - Decreased immune function
  - Decreased WBC's and platelets

Nursing Interventions

Fluid Accumulations

- daily weights
- I and O
- fluid restriction, usually 1000cc/24 hr.
- lung sounds
- document edema

Electrolyte Imbalances

- Monitor lab values
- Restricting K+ intake
  - Educate pts. On high K+ foods
  - Box 37.10 p. 799
- Kayexalate orally or retention enema
- Encourage ambulation
- Anti-pruritic medication
- Tums or caltrate

Waste products retained

- Monitor lab values
- Dietary education
- Assistance with ADL's
- Good oral hygiene and skin care
- Seizure precautions

Acid-base Imbalance

- Monitor respiratory rate
- Monitor LOC
- Monitor lab values

Anemia

- Procrit
  - Monitor blood presure, notify MD of severe hypertension or noted increase
  - Additional anti-hypertensives may be needed during initiation of therapy
  - Possibilities of seizures

Medical Management

- Diet
- Medications
- Dialysis
  - Hemodialysis
  - Peritoneal dailysis
- Kidney Transplant

Diet

- High Calorie
  - Maintain weight and energy needs
- Low protein
  - Unless on dialysis, then increase to compensate for the protein lost
- Low potassium
  - High K+ foods:

Diet

- Low sodium
  - Limit canned and processed foods
  - Read labels choose 140mg or </servng
  - Do not choose foods with 400mg/serving
  - Season instead of using salt--- basil, curry, dill, garlic, ginger,lemon,oregano and thyme

Diet

Increased Calcium and decreased

Phosphorous

- Ca+ increased or supplemented
- Foods allowed in limited quantities
  - Milk,choclate, cheese, beer, yogurt, firm tofu and ice cream
- Forbidden foods
  - Cola drinks, dried or baked beans, nuts and seeds of all kinds and peanut butter

Diet

- Review p. 801

Diet

- Vitamins, Iron, and Minerals
  - Supplemented
  - Take iron between meals if using phosphate binders at mealtime-the iron can get caught by the binder and be eliminated from the body
  - Eat high fiber foods to prevent constipation-fresh fruits and vegetables low in potassium
  - Stool softener

Diet

- Fluid restriction
  - Usual 1000cc/24hr
  - May change daily-depending on amount of urine output the previous day-500cc plus amount of urine output yesterday=total fluid restriction
  - Helpful hints
    - Drink from small cup or glass
    - Divide your fluids for the day :meals, b/w meals, and snacks

Diet

- Helpful hints with fluid restrictions
  - Take medications at mealtime
  - Limit amounts of liquid foods
  - Rinse mouth with water rather than drink it
  - Chew sugar free gum and suck on hard candy
  - Suck on lemon wedge in moisten mouth
  - Freeze grapes, berries, or small pieces of fruit and let them thaw slowly in your mouth-remember needs to be counted in with total fluid volume

Diet

- What counts as fluid
  - Ice cubes, ice chips
  - Water, coffee, tea, sodas, milk, juices, cream, liquid creamers
  - Soups
  - Popsicles
  - Ice cream sherbets
  - Gelatin

Medical management

- Medications
  - Diuretics-early in disease to increase output
  - Antihypertensives-control BP and decrease damage
  - Phosphate binders-Tums with meals
    - Bind to the phosphorus in the food you eat , keeps the phosphorus from being absorbed into your body, passes out of body with stool
    - Phosphate binders can cause constipation

Medical Management

- Calcium/vitamin D supplements
  - Prevent fractures
- Kayexalate
  - Orally or retention enema
  - Potassium will be eliminated through bowels
  - Lower potassium levels
  - Hemodialysis best treatment for increased K+ levels

Medical Management

- Dialysis is started when symptoms of severe fluid overload, high potassium levels, acidosis, or symptoms of uremia are life threatening
- Dialysis
  - Hemodialysis-filters blood through a machine, cleansed, and returned
  - Peritoneal dialysis- uses the natural lining of your abdomen, cleansed, and fluid removed

Hemodialysiss

- Use of artificial kidney – dialyzer
- Tx. Takes 3-4 hrs., 3-4 X per week
- Rapid efficient way to remove waste
- Corrects excessive fluid overload states
- Not without side effects

Hemodialysis

- Requires a permanent way to access the bloodstream for blood removal and return to the body during dialysis
- Ideally an access site should be prepared weeks, or months before dialysis is started.

Hemodailysis

- Side effects
  - Pt feels weak, fatigued; sometimes too tired to eat.
  - Decreased BP resulting in weakness, dizziness and nausea
  - Cardiac dysrhythmias, angina, lethargy, muscle cramps, bleeding from puncture sites, GI tract, nose, or other sites of injury.

Hemodialysis

- A trained nurse or technician connects patient to dialysis machine, watches for problems, and makes patient as comfortable as possible
- Problems to watch for: chest pain , bleeding from the needle site, SOB, fever or chills, headache or lightheadedness, nausea or vomiting, itching, and muscle cramps
- Sudden drops in BP can occur

Hemodialysis

- During the dialysis, only about 250 ml of blood is out the patient's body at any one time
- Initially patient may experience headache, muscle cramps, or feel nauseated. These should decrease as their body gets used to the dialysis
- Patients are given large doses of heparin to prevent the blood from clotting while in the dialyzer. Monitor for bleeding

Hemodialysis

- Following a dialysis treatment, the patient normally feels weak and fatigued, sometimes even too tired to eat

Hemodialysis

- Before hemodialysis can be done, an access, is necessary. To maximize amount of blood cleansed during dialysis. Provides high volumes of blood flow continuously during treatment
- Ideally an access site should be prepared weeks or months before dialysis is started
- Three basic types
  - Venous catheter
  - Arteriovenous(AV) fistula
  - AV graft

Hemodialysis

- Venous catheter
  - Temporary access
  - Catheter inserted into large vein in neck, chest, or groin
  - Two ports to allow two-way flow of blood
  - Extremely important to ensure clamps in place
  - Not recommoended for permanent access: can block easily,become infected, or cause narrowing of the veins in which they are placed
  - Used for initial hemodialysis and several weeks or months until permanent access is developed

Hemodialysis

- Arteriovenous (AV) fistula
  - Best type of long term vascular access: provides adequate blood flow for dialysis, lasts a long time, and has lower complication rate
  - Surgical procedure-local anesthetic- connecting an artery to a vein to allow more blood to flow into the vein. The vein grows larger and stronger- making repeated insertions for hemodialysis treatments easier
  - Takes time to develop-months-rare up to 24 months
  - Less likely to clot or become infected

Hemodialysis

- Arteriovenous (AV) graft
  - Graft does not need to develop like AV fistula-can be used soon after placement-often within 2 to 3 weeks
  - If patient has small veins that wont develop properly into a fistula-a synthetic tube is implanted under the skin-connecting vein to artery-the tube becomes an artificial vein for repeated needle access for dialysis
  - Compared to fistulas, grafts have increased tendency to clot or develop infection and need to be replaced sooner
  - Some well cared for grafts can last for several years

Taking care of access site

- Check access q8h in hospital, at home daily, at each treatment
- Keep site clean at all times
- USE ACCESS SITE ONLY FOR DIALYSIS
- Careful not to bump or cut site
- No blood pressure on that arm or draw blood
- Don’t wear jewelry or tight clothes over sight

Taking care of access site

- Do not sleep with access arm under your head or body
- Do not lift heavy objects or put pressure on access arm
- Check pulse every day
- Check for thrill or bruit
- Wash hands often

Taking care of access site

- Problems to watch for
  - Cant feel a thrill
  - Pain or numbness in arm or hand
  - Bleeding, redness, or warmth around access site
  - Sudden bulging out-normal to have slight bulge
  - Fever 101 or greater

Medical management

- Peritoneal dialysis
  - Peritoneal membrane used as filter for blood
  - Dialysate solution used in process
  - Three steps: filling, dwelling, and draining
  - Access: peritoneal catheter placed into abdomen through stab wound just below umbilicus
  - End is capped when not in use
  - Dietary restrictions not as strict

Peritoneal dialysis

- Peritoneal dialysis is done at home
- 4 to 5 exchanges are needed daily, taking about 30 minutes each
- CAPD (continuous ambulatory peritoneal dialysis)
- CCPD(continuous cyclic peritoneal dialysis
  - A machine does most of the exchages at night while you sleep

Peritoneal dialysis

- Steps involved in PD
  - Instill bag of sterile dialysate into peritoneal cavity through the catheter
  - Usually 1500 to 2000ccs
  - Left in peritoneal cavity for several hours-allowing waste products from blood to pass through the peritoneal membrane into the dialysate solution
  - Solution then drained into bag and discarded
  - Type of PD will be determined by patient and physician to best fit that individual

Peritoneal dialysis

- Patient and family education is vital for success
- Sterile technique is imperative
- Wash hands prior to handling catheter
- Exchanges need to be done in clean environment
- Major complication: peritonitis-related to poor technique-first sign: abdominal pain

Peritoneal dialysis

- Call doctor if :
  - Fever or chills
  - Pain in abdomen or around your catheter
  - Warm, red, or draining skin around catheter
  - Blocked flow into or out of your catheter
  - Dialysate that’s cloudy or bloody when it drains from your body

Peritoneal catheter

- Always wash hands prior to touching catheter
- Keep catheter clean and covered
- Anchor catheter
- Do not let clothes rub or pull at it
- Do exchanges in clean place
- Never use a cloudy or leaking bag of dialysate
- Do not swim in lakes or streams

Medical management

- Kidney transplant
  - Living donor
  - Cadaver donor
  - Waiting list of month to years, depending on patient's blood type
  - Medications to prevent rejection
  - psychological

Medical management

- Kidney transplant
  - Living-related donor or cadaver donor
  - Antirejectiondrugs