Part III: Nursing management for patients with Renal disorders

Lecture Outlines

Assessment and diagnostic test

Cardinal signs and symptoms

Urinary tract Infection

Renal stone

Prostatic hyperplasia

Acute and End stage of renal failure.

Learning Objectives

At the end of this lecture, the students should be able to:

1. Describe the diagnostic studies used to determine upper and lower urinary tract function.
2. Identify the assessment parameters used for determining the status of upper and lower urinary tract function.
3. Identify factors contributing to upper and lower urinary tract infections
4. Initiate education and preparation for patients undergoing assessment of the urinary system.
5. Develop a teaching plan for the patient undergoing treatment for renal calculi (kidney stones).
6. Describe prostate gland: its causes, clinical manifestations, and medical and surgical management.
7. Describe the causes of acute and chronic renal failure and compare and contrast treatment options: hemodialysis, peritoneal dialysis, and continuous renal replacement therapy.
8. Describe the nursing management of the hospitalized patient on dialysis.
9. Use the nursing process as a framework for the care of patients with acute and chronic renal failure.

**Diagnostic Tests for Patients with Renal Disorders**

Ultrasound, CT Scan, MRI, IVP (Intravenous Pyelogram), Renal scan, Renal Arteriogram are some commonly used methods to image the kidneys.

**Imaging studies of kidney are used to**

1. Study the location and size of the kidneys.
2. To identify presence and the size of obstruction.
3. To visualize blood supply to the kidneys.
4. To detect and characterize any malformations such as cysts, tumors.

**Intravenous pyelogram (IVP)**

The IVP is called as intravenous pyelogram. It involves the intravenous injection of iodinated contrast material which is filtered at the glomerulus and gets concentrated within the tubules. It provides an opportunity to determine:

- the number of kidneys, their size, their configuration and if there are any filling defects.
- It allows visualization of the ureters and the bladder.
- It help to detect obstructions in the urinary tract such as kidney stones or tumours.
- IVP is contraindication in case of pregnancy, very young children, and in people with renal impairment.

**Ultrasound image**

Ultrasonography represents a major advance in the non-invasive visualization of the kidney. The principal used is that of ultrasound waves which generate an echo when their passage is impeded by tissues air fluid etc. it is used to:
1. Determine the size of the kidneys.
2. See if there is any obstruction to the flow of urine.

CT Scan

Uses

- Detect cyst, and tumours.
- Haemorrhage.
- Infections.

Renal Arteriography

Renal arteriography means the visualization of the renal arteries by the injection of dye into the arteries. It is mainly used to:

- diagnose any narrowing of the renal arteries (renal artery stenosis) which are commonly seen in advanced atherosclerosis or people who are smokers.

Renal Scan

The renal scan provides information about:

a. the blood flow within the kidney.

b. Delayed excretion of the agent which may signify intrinsic renal disease.

c. decreased blood flow or,

d. obstruction to the flow of urine.

Cystourethrogram

- A cystourethrogram is an X-ray test that takes pictures of the bladder and urethra while the bladder is full and while urinating.
A thin flexible tube (urinary catheter) is inserted through urethra into the bladder. A liquid material that shows up well on an X-ray picture (contrast material) is injected into the bladder through the catheter, then X-rays are taken with the contrast material in the bladder. More X-rays may be taken while urine flows out of the bladder, in which case the test is called a voiding cystourethrogram (VCUG).

If X-rays are taken while contrast material is being injected into the urethra, the test is called a retrograde cystourethrogram because the contrast material flows into the bladder opposite the usual direction of urine flow.

**Purposes of A Cystourethrogram**

1. Find the cause of repeated urinary tract infections.
2. Look for injuries to the bladder or urethra.
3. Find the cause of urinary incontinence.
4. Check for structural problems of the bladder and urethra.
5. Look for enlargement (hypertrophy) of the prostate or narrowing (striction) of the urethra in men.
6. Find out if urine is flowing the wrong way, from the bladder back towards the kidneys (vesicoureteral reflux).
7. Look more carefully at abnormalities first found by intravenous pyelography.

**Cystoscopy**

cystoscopy is a procedure used to see inside the urinary bladder and urethra.
Cystoscopy may use to:

- learn the causes of signs and symptoms such as blood in the urine, frequent urinary tract infections, incontinence, overactive bladder and painful urination.
- diagnosing bladder cancer, bladder stones and bladder inflammation (cystitis).
- indicating an enlarged prostate (benign prostatic hyperplasia).

Urinalysis

The urine sample you provide will be assessed for pH, color, cloudiness and cell content. This test can help detect cells, bacteria or chemicals within the urine that are suggestive of illness.

Urine Culture

Urine culture is used to evaluate the presence or type of bacteria within the urine. This test is typically in case of a bacterial urinary tract infection.

Blood Urea Nitrogen (BUN)

A deciliter of normal blood contains 7 to 20 milligrams of urea. A BUN more than 20 mg/dL might indicate that kidney function is impaired. Dehydration and heart failure may also cause BUN to become elevated.

Urinary Tract Infection

Learning Objectives
On completion of this chapter, the learner will be able to:

- Identify factors contributing to upper and lower urinary tract infections (UTIs).
- Use the nursing process as a framework for care of the patient with a UTI.
Infections of the urinary tract

Urinary tract infections (UTIs) are group of infections caused by the presence of pathogenic microorganisms in the urinary tract, with or without signs and symptoms (the normal urinary tract is sterile above the urethra). UTIs are generally classified as infections involving the upper or lower urinary tract and further classified as uncomplicated or complicated, depending on other patient-related conditions.

Classifying Urinary Tract Infections

Lower UTIs include:

- bacterial cystitis (inflammation of the urinary bladder).
- bacterial Prostatitis (inflammation of the prostate gland), and
- bacterial Urethritis (inflammation of the urethra).

There can be acute or chronic nonbacterial causes of inflammation in any of these areas that can be misdiagnosed as bacterial infections.

Upper UTIs are much less common and include acute or chronic Pyelonephritis (inflammation of the renal pelvis).

Interstitial nephritis (inflammation of the kidney), and

Renal abscesses.

The normal urinary tract is sterile except near the urethral orifice.

- The bacteria most commonly responsible for urinary tract infections are Escherichia Coli (E.coli).
- The majority of U.T.I.s arise by ascent of bowel organisms from the perineum.
In male the length of urethra and anti-bacteria properties of the prostatic secretions tend to ward off ascending urethral infection.

**Contributing Factors for Urinary Tract Infection**

1. Any obstructed urinary flow caused by:
   - Congenital abnormalities.
   - Urethral strictures.
   - Contracture of the bladder neck.
   - Bladder tumors.
   - Calculi (stones) in the ureters or kidneys.
   - Compression of the ureters

2. Decreased natural host defenses or immunosuppression

3. Instrumentation of the urinary tract (eg, catheterization, cystoscopic procedures).

4. Urethrovesical reflux refers to reflux (flowing back) of urine from the bladder into the urethra.

5. Stasis of urine in the bladder.

6. Sexual intercourse play a role in the ascent of organisms from the perineum into the bladder in women.

7. Fecal soiling of the urethral meatus is another common way in which bacteria are introduced into the urinary tract.
Common Symptoms of UTIs

1. Pain

Genitourinary pain is usually caused by distention of some portion of the urinary tract as a result of obstructed urine flow or inflammation and swelling of tissues. Severity of pain is related to the sudden onset rather than the extent of distention.

2. Changes in Voiding

Common problems associated with voiding include frequency, urgency, dysuria, hesitancy,

3. Gastrointestinal Symptoms

a. nausea & vomiting.

b. diarrhea.

c. abdominal discomfort, and abdominal distention.

Diagnostic tests

1. Urine Cultures and sensitivity

2. Cellular Studies

Microscopic hematuria is present in about half of patients with an acute UTI. Pyuria (greater than 4 white blood cells [WBCs] per high-power field) occurs in all patients with UTI; however, it is not specific for bacterial infection. Pyuria can also be seen with kidney stones, interstitial nephritis, and renal tuberculosis.

3. Computed tomography (CT) scan may detect pyelonephritis or abscesses.
4. **Ultrasonography** is extremely sensitive for detecting obstruction, abscesses, tumors, and cysts.

5. **Transrectal ultrasonography** (to assess the prostate and bladder) is the procedure of choice for men with recurrent or complicated UTIs.

6. A **cystourethroscopy** may be indicated to visualize the ureters or to detect strictures, calculi, or tumors.

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### Preventing Recurrent Urinary Tract Infections

1. **Hygiene**
   
   a. Shower rather than bath in tube because bacteria in the bath water may enter the urethra.
   
   b. After each bowel movement, clean the perineum and urethral meatus from front to back. This will help reduce concentrations of pathogens at the urethral opening and, in women, the vaginal opening.

2. **Fluid Intake**
   
   a. Drink liberal amounts of fluids daily to flush out bacteria.
   
   b. Avoid coffee, tea, colas, alcohol, and other fluids that are urinary tract irritants.

3. **Voiding Habits**
   
   a. Void every 2 to 3 hours during the day and completely empty the bladder. This prevents over distention of the bladder and compromised blood supply to the bladder wall.
b. Both predispose the patient to UTI. Precautions expressly for women include voiding immediately after sexual intercourse.

4. Therapy

Take medication as prescribed.

Nursing Process for Patient With Urinary Tract Infection
A: Assessment
A history of signs and symptoms related to UTI is

B: Nursing Diagnoses

- Acute pain related to infection within the urinary tract
- Deficient knowledge about factors predisposing the patient to infection and recurrence, detection and prevention of recurrence, and pharmacologic therapy.

C: Planning and Goals
- relief of pain and discomfort,
- increased knowledge of preventive measures and treatment modalities, and
- absence of complications.

D: Nursing Interventions

1. Analgesic agents and the application of heat to the perineum help relieve pain and spasm.
2. The patient is encouraged to drink liberal amounts of fluids (water is the best choice) to promote renal blood flow and to flush the bacteria from the urinary tract.
3. Urinary tract irritants (eg, coffee, tea, citrus, spices, colas, alcohol) are avoided.
4. the patient must be taught to recognize early signs and symptoms, to test for bacteriuria, and to initiate treatment as prescribed.

5. Appropriate antimicrobial therapy, liberal fluid intake, frequent voiding, and hygienic measures are commonly prescribed for managing UTIs.

6. Careful assessment of vital signs and level of consciousness may alert the nurse to kidney involvement or impending sepsis.

**E: Evaluation**

1. Experiences relief of pain
   a. Reports absence of pain, urgency, dysuria, frequency, nocturia, or hesitancy on voiding
   b. Takes analgesic, antispasmodic, and antibiotic agents as prescribed

2. Explains UTIs and their treatment
   a. Demonstrates knowledge of preventive measures and prescribed treatments
   b. Drinks 8 to 10 glasses of fluids daily
   c. Voids every 2 to 3 hours
   d. Voids urine that is clear and odorless

3. Experiences no complications
   a. Reports no symptoms of infection (fever, dysuria, frequency)
   b. Has normal renal function, negative urine and blood cultures
   c. Exhibits normal vital signs and temperature; no signs or symptoms of sepsis (urosepsis)
   d. Maintains adequate urine output more than 30 mL per hour
Kidney stones

Renal stones are small, solid masses that form when salts or mineral normally found in urine become solid crystals inside the kidney. In most cases the crystals are too tiny to be noticed.

The condition of having kidney stones is termed nephrolithiasis.

Having stones at any location in the urinary tract is referred to as urolithiasis, and the term ureterolithiasis is used to refer to stones located in the ureters.

Urolithiasis and nephrolithiasis refer to stones (calculi) in the urinary tract and kidney,

The occurrence of urinary stones occurs predominantly in the third to fifth decades of life and affects men more than women. About half of patients with a single renal stone have another episode within 5 years.

Kinds of kidney stone

1. **Calcium Stone**: common types of kidney stones, there are either spiky or large and smooth, and are made up of calcium oxalate or calcium phosphate.

2. **Uric acid Stone**: are smooth, brown and soft. Excess amounts of uric acid can be caused by eating a lot of meat. Conditions such as gout and treatment such as chemotherapy can also increase the risk of getting uric acid stones.

3. **Struvite Stone** (infection stone): are usually large and have a horn-like shape. They develop when there is too much ammonia in the
urine this can happen if you have a urinary tract infection (UTI). Because the bacteria that cause these infection can generate ammonia. This kind of kidney stone is most often found in women.

4. **Cystine Stone**: are yellow and crystalline. They develop if you have high level of cystine in your urine, which happens if there is a hereditary disorder called cystinuria. Only one in a hundred kidney stones are caused by this condition. Cystine stones tend to develop earlier in life than other kidney stones.

**Risk factors of kidney stone**

1. A family history of kidney stones.
2. Being aged between 20 and 40 years olds.
3. Taking certain medicines such as diuretics (water tablets), anti-acid and thyroid medications.
4. Having only one kidney, or abnormally shaped kidney.
5. Eating a diet in protein.
7. Having very poor mobility (e.g. being confined to bed).
8. Having a disease of the small intestine or a small intestinal.

**Predisposing factors for kidney stone**

1. Increased exercise with dehydration.
2. Medications that cause hyperuricemia (high uric acid)
3. History of gout.

The majority of stones pass spontaneously within 48 hours. However, some stones may not.
There are several factors which influence the ability to pass a stone.

These include:

1. The size of the person.
2. Prior stone passage.
3. Prostate enlargement.
5. Size of the stone.

Signs and Symptoms of kidney Stones

1. **Colicky pain**: "loin to groin". Often described as the worst pain ever experienced.
2. **Hematuria**: blood in the urine, due to minor damage to inside wall of kidney, ureter and/or urethra.
3. **Pyuria**: pus in the urine.
4. **Dysuria**: burning on urination when passing stones (rare). More typical of infection.
5. **Oliguria**: reduced urinary volume caused by obstruction of the bladder or urethra by stone, or extremely rarely, simultaneous obstruction of both ureters by a stone.
6. Abdominal distention.
7. **Nausea/vomiting**: embryological link with intestine – stimulates the vomiting center.
8. Fever and chills.
9. Sudden spasms of excruciating pain.
10. A frequent urge to urinate, or a burning sensation during urination.

**Diagnostic tests**

- Urinalysis shows red blood cells.
- Ultrasound shows stones.
- X-ray of kidneys, ureters, and bladder (KUB) shows stones.
- CT scan shows stones.
- MRI shows stones.

**Managements**

1. Provide pain relief (narcotics such as morphine, non-narcotics such as ketorolac, a nonsteroidal anti-inflammatory).
2. Administer antispasmodics as adjuncts for pain control.
3. Increase fluid intake to flush through the urinary tract.
4. Lithotripsy—shock waves are used to break the stone into very small pieces that can pass more easily.
5. Stent placement to allow free flow of urine and passage of small stones or stone pieces.
6. Calcium channel blockers such as nifedipine and alpha blockers such as tamsulosin. These drugs may be prescribed to some people who have stones that do not rapidly pass through the urinary tract.
7. For kidney stones which do not pass on their own, a procedure called lithotripsy is often used. In this procedure, shock waves are
used to break up a large stone into smaller pieces that can then pass through the urinary system.

8. Surgical techniques have also been developed to remove kidney stones. This may be done through a small incision in the skin (percutaneous nephrolithotomy) or through an instrument known as an ureteroscope passed through the urethra and bladder up into the ureter.

**Preventing Kidney Stones**

1. Avoid protein intake; usually protein is restricted to 60 g/day to decrease urinary excretion of calcium and uric acid.

2. A sodium intake of 3–4 g/day is recommended. Table salt and high-sodium foods should be reduced, because sodium competes with calcium for reabsorption in the kidneys.

3. Low-calcium diets are not generally recommended, except for true absorptive hypercalciuria. Evidence shows that limiting calcium, especially in women, can lead to osteoporosis and does not prevent renal stones.

4. Avoid intake of oxalate-containing foods (eg, spinach, strawberries, rhubarb, tea, peanuts, wheat bran).

5. During the day, drink fluids (ideally water) every 1–2 hours.

6. Drink two glasses of water at bedtime and an additional glass at each nighttime awakening to prevent urine from becoming too concentrated during the night.

7. Avoid activities leading to sudden increases in environmental temperatures that may cause excessive sweating and dehydration.

8. Contact your primary health care provider at the first sign of a urinary tract infection.
Medical Management

1. Opioid analgesics are administered to prevent shock and syncope that may result from the excruciating pain.
2. Non-steroidal anti-inflammatory drugs (NSAIDs) are effective in treating renal stone pain because they provide specific pain relief. They also inhibit the synthesis of prostaglandin E, reducing swelling and facilitating passage of the stone.
3. Hot baths or moist heat to the flank areas may also be useful.
4. Fluids are encouraged. This increases the hydrostatic pressure behind the stone, assisting it in its downward passage.
5. A high fluid intake reduces the concentration of urinary crystalloids, dilutes the urine, and ensures a high urine output.

Surgical Management

1. If the stone is in the kidney, the surgery performed may be a nephrolithotomy (incision into the kidney with removal of the stone) or a nephrectomy, if the kidney is nonfunctional secondary to infection or hydronephrosis.
2. Stones in the kidney pelvis are removed by a pyelolithotomy.
3. in the ureter by ureterolithotomy.
4. in the bladder by cystotomy.

Nursing process for patients with kidney tones

A: Assessment

- Assess for pain and discomfort as well as associated symptoms, such as nausea, vomiting, diarrhea, and abdominal distention.
observing for signs and symptoms of UTI (chills, fever, dysuria, frequency, and hesitancy) and obstruction (frequent urination of small amounts, oliguria, or anuria).

- The urine is inspected for blood and is strained for stones or gravel.
- history for current episode of renal or ureteral colic.

**B: Nursing Diagnosis**

- Acute pain related to inflammation, obstruction, and abrasion of the urinary tract
- Deficient knowledge regarding prevention of recurrence of renal stones.

**C: Planning**

1. Include relief of pain and discomfort.
2. Prevention of recurrence of renal stones, and ,
3. Absence of complications

**D: Nursing Interventions**

1. Monitor intake and output.
2. Monitor pain level and response to pain medications.
3. Strain urine to obtain stone for analysis in lab.
4. Adequate fluid intake at least three liters every 24 hours, or enough to make urine clear rather than a yellow color.
5. Medications used to reduce chance of recurrence.
6. Dietary modifications needed based on content of stone.

**E: Evaluation**

1. Reports relief of pain.
2. States increased knowledge of health-seeking behaviors to prevent recurrence

- Consumes increased fluid intake (at least eight 8-ounce glasses of fluid per day).
- Participates in appropriate activity.
- Consumes diet prescribed to reduce dietary factors predisposing to stone formation

3. Experiences no complications

**Benign Prostatic Hyperplasia**

Benign prostatic hyperplasia is characterized by progressive enlargement of the prostate gland (commonly seen in men older than age 50), causing varying degrees of urethral obstruction and restriction of urinary flow.

**Pathophysiology**

Bladder outlet obstruction  
↓

lumen  
Compression of the prostatic urethra  
↓

Enlarged nodular tissue of the prostatic  
Impinges on the urethra  
↓

Urethra elongates & compresses  
↓

Obstruction of urine flow
Increase the trabeculation of the bladder wall

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Urinary retention

**Causes and risk factors**

Possible causes of nonbacterial prostatitis include:

1. A past bacterial prostatitis infection.
2. Bacteria that are not typical (atypical), such as mycoplasma or ureaplasma.
3. Irritation caused by a backup of urine flowing into the prostate.
4. Irritation from chemicals.
5. Nerve problem involving the lower urinary tract.
6. Parasites (trichomonads).
8. Sexual abuse.
10. Increase androgen level.
11. Age above 50 years

**Signs and symptoms**

When the prostate enlarges, it may constrict the flow of urine. Nerves within the prostate and bladder may also play a role in causing the following common symptoms:

1. Urinary frequency.
2. Urinary urgency.
3. Hesitancy - Difficulty initiating the urinary stream; interrupted, weak stream.
4. Incomplete bladder emptying - The feeling of persistent residual urine, regardless of the frequency of urination.
5. Straining - The need strain or push (Valsalva maneuver) to initiate and maintain urination in order to more fully evacuate the bladder.
6. Decreased force of stream - The subjective loss of force of the urinary stream over time.
7. Dribbling - The loss of small amounts of urine due to a poor urinary stream.
8. Blood in the semen
9. Pain that is located:
   - Above the pubic bone (suprapubic).
   - Between the genitals and anus (perineal).
   - Low back.
   - Scrotum.
   - Tip of penis.
   - Urethra
10. Pain with ejaculation

**Diagnosis**

1. **Digital rectal examination**

During this examination, prostate size and contour can be assessed, nodules can be evaluated, and areas suggestive of malignancy can be detected. DRE reveals fullness of prostate, there is an area of increase firmness within the prostate. The more advance lesion is strong hard and fixed.

2. **Laboratory studies**
- Urinalysis, to assess for the presence of blood, leukocytes, bacteria, protein, or glucose.
- Urine culture, This may be useful to exclude infectious causes of irritative voiding.
- Prostate-specific antigen - Although BPH does not cause prostate cancer, men at risk for BPH are also at risk for this disease and should be screened accordingly (although screening for prostate cancer remains controversial). This test is done to help differentiate BPH from cancer of prostate.
- Electrolytes, blood urea nitrogen (BUN), and creatinine - These evaluations are useful screening tools for chronic renal insufficiency.
- Urography shows high volume of post-void residual urine.

3. Ultrasonography

Ultrasonography (abdominal, renal, transrectal) and intravenous urography are useful for helping to determine bladder and prostate size and the degree of hydronephrosis (if any) in patients with urinary retention or signs of renal insufficiency.

4. Endoscopy of the lower urinary tract

Cystoscopy may be indicated in patients scheduled for invasive treatment or in whom a foreign body or malignancy is suspected. In addition, endoscopy may be indicated in patients with a history of sexually transmitted disease (eg, gonococcal urethritis), prolonged catheterization, or trauma.

5. Cystourethroscopy is used to assess for outflow obstruction.
6. Uroflowmetry is a noninvasive procedure that can evaluate bladder emptying.

7. An intravenous pyelography (IVP) is a test that requires the injection of dye into the bloodstream to outline the urinary tract.

**IPSS**

The severity of BPH can be determined with the International Prostate Symptom Score (IPSS) which is based on answers to seven questions concerning urinary symptoms during the past month.

- Incomplete emptying
- Frequency
- Intermittency
- Urgency
- Weak stream
- Straining, and
- Nocturia.

Each question allows the patient to choose one of six answers (0-5) indicating increasing severity of the particular symptoms. The total score ranges from 0-30.

- Scores below 7 indicate mild symptoms.
- Scores from 8-19 indicate moderate symptoms.
- Scores from 20 and more indicate severe symptoms.
Management

1. Pharmacologic treatment

The main purpose of medication used in the treatment of BPH is to decrease the production of dihydrotestosterone.

- Finasteride (proscar), inhibits the activity of 5-alpha-reductase, so that it cannot turn testosterone to dihydrotestosterone and consequently can reduce the prostate size.
- Alpha-adrenergic receptor blockers, to relax muscles and reduce straining on urination.
- Anticholinergic agents.

2. Surgical treatment

Indications for surgery

- Urinary retention.
- Hydronephrosis (with or without impaired renal function).
- Recurrent urinary tract infections (secondary to residual urine).
- Bladder stone (secondary to residual urine).
- Severe obstructive symptoms (with or without bladder Instability)

Types of surgery

1. Transurethral resection of the prostate (TURP) is performed when major glandular exists in the medical lobe that directly surrounds the urethra. There must be a relatively small amount of tissue requiring resection. A resectoscope (an instrument similar to a cystoscopy but equipped with a cutting and cauterization loop attached to an electric current) is past through the urethra. This surgery is not usually done on
younger men, because it may cause retrograde ejaculation. This can lead to sterility, impotence, and incontinence.

2. **Suprapubic prostatectomy**

It is one of open procedures in the suprapubic resection, the prostate gland is removed from the urethra by way of the bladder. This procedure is performed when a large mass of tissue must be resected. Some type of homeostatic agent is placed in the prostatic fossa, and Foley catheter or cystotomy tube or both drain urine.

**Disadvantage**

- Difficulty in obtaining hemeostasis.
- Bladder spasms from suprapubic catheter.
- Much postoperative pain.
- Hematuria and wound infection.

3. **Retro Pubic Prostatectomy**

In this procedure, a low abdominal incision similar to that used for suprapubic prostatectomy is made, but the bladder is not opened, and the prostatic tissues removed through an incision in the anterior prostatic capsule.

**Disadvantages**

- Hemorrhage and wound infection.
- Postoperative urinary dribbling.

4. **Perineal prostatectomy**

This procedure done, if both the prostate and the capsule are removed, removal of the prostate by an open approach
through an incision between the ischial tuberosity, scrotum and rectum.

**Disadvantage**

- Risk of rectal incontinence.
- Urinary tract infection
- Persistent perineal urinary fistula.

**Complications**

Complications related to bladder outlet obstruction (BOO) secondary to BPH include the following:

1. Urinary retention
2. Renal insufficiency
3. Recurrent urinary tract infections
4. Gross hematuria
5. Bladder calculi
6. Renal failure or uremia (rare in current practice).

**Nursing diagnosis**

- Risk for impaired urinary elimination.
- Urinary retention.
- Risk for urge urinary incontinence.
- Altered urinary elimination pattern r/t difficulties voiding
- Pain r/t straining with voiding.
- High risk for infection r/t surgical manipulation.

**Planning and goals**

2. Reduce level of pain.
3. Prevent infection

Nursing interventions

1. The patient should be instructed to urinate as soon as the first desire to do so is felt.
2. It’s important for the patient to know that regaining urinary control is a gradual process, and that even though he may continue to dribble after being discharged from the hospital, the dribbling should gradually diminish up to 1 year.
3. The urine may be cloudy for several weeks but should clear as the prostate area heals.
4. While the prostate fossa is healing (6-8 weeks), the patient should identify ways to reduce pressure on the operative area after prostatectomy while increasing the tendency to bleed:
   a. Avoid prolonged sitting (in a chair, long automobile rides), standing, walking.
   b. Avoid straining, such as during exercises, bowel movement, lifting, and sexual intercourse.
5. Monitor intake and output.
6. Monitor vital signs for changes.
7. Monitor postoperative patient’s bladder irrigation:
8. Monitor the amount of fluid instilled and the amount of fluid returned, and subtract the amount of fluid instilled from the amount returned to determine the actual urine output.
9. Document color of urinary output postoperatively; the greatest risk of hemorrhage is the first day after the operation.
10. Monitor for bladder spasms which may indicate blocked catheter drainage postoperatively.

11. Familiarize patient with ways of attaining/maintaining bladder control.

   a. Encourage urination every 2 to 3 hours; discourage voiding when supine.

   b. Avoid drinking cola and caffeine beverages; urge a cutoff time in the evening for drinking fluids to minimize frequent voiding during the night.

   c. Describe perineal exercises to be performed every hour.

   d. Develop a schedule with patient that will fit into his routine.

12. The patient is cautioned to drink enough fluid to avoid dehydration, which increase the tendency to clot to form, and obstruct the flow of urine.

13. Bleeding or decrease in the size of the urinary stream is to be reported to the physician.

### Renal Failure

**Learning Objectives**

**at the end of this session the student will be able to:**

1. Describe the anatomy and physiology of the kidneys.
2. Discuss the pathophysiologic changes seen with acute renal failure.
3. List the causes and risk factors associated with acute renal failure.
4. State the signs and symptoms that present with acute renal failure.
5. Explain how acute renal failure is diagnosed.

6. Describe the medical management for the patient with acute renal failure.

7. Discuss the appropriate nursing assessment and interventions when caring for the patient with acute renal failure.

8. List 3 nursing responsibilities when caring for the patient on continuous renal replacement therapy.

9. Discuss 3 important nursing diagnoses that will assist with planning patient care.

Renal Failure

- Renal failure results when the kidneys cannot remove the body's metabolic wastes or perform their regulatory functions.
- The substances normally eliminated in the urine accumulate in the body fluids as a result of impaired renal excretion, leading to a disruption in endocrine and metabolic functions as well as fluid, electrolyte, and acid–base disturbances.
- Renal failure is a systemic disease and is a final common pathway of many different kidney and urinary tract diseases. Each year, the number of deaths from irreversible renal failure increases.

Acute Renal Failure
Acute renal failure (ARF) is a reversible clinical syndrome where there is a sudden and almost complete loss of kidney function (decreased GFR) over a period of hours to days with failure to excrete nitrogenous waste products and to maintain fluid and electrolyte.

**Phases of Acute Renal Failure**

**Onset Phase:** this period represents the time from the onset of injury through the cell death period. This phase can last from hours to days and is characterized by:

1. Renal flow at 25% of normal
2. Oxygenation to the tissue at 25% of normal
3. Urine output at 30 ml (or less) per hour
4. Urine sodium excretion greater than 40 mEq/L.

In this phase only 50% of the patients are noted to be oliguric. With prompt treatment, irreversible damage can be achieved during this pre renal failure onset phase.

**Oliguric/Anuric Phase:** this phase usually lasts between 8-14 days and is characterized by further damage to the renal tubular wall and membranes. Other characteristics in the oliguric-anuric phase include:

1. Great reduction in the glomerular filtration rate (GFR)
2. Increased BUN/Creatinine
3. Electrolyte abnormalities (hyperkalemia, hyperphosphatemia and hypocalcemia)
4. Metabolic acidosis
**Diuretic Phase**: this phase occurs when the source of obstruction has been removed but the residual scarring and edema of the renal tubules remains. This phase usually lasts and additional 7-14 days and is characterized by:

1. Increase in glomerular filtration rate (GFR)
2. Urine output as high as 2-4 L/day
3. Urine that flows through renal tubules
4. Renal cells that cannot concentrate urine

Increased GFR in this phase contributes to the passive loss of electrolytes which requires the administration of IV crystalloids to maintain hydration.

**Recovery Period Phase**: The recovery phase can last from several months to over a year. During this phase, edema decreases, the renal tubules begin to function adequately and fluid and electrolyte balance are restored (if damage was significant, BUN and Creatinine may never return to normal levels). At this point the GFR has usually returned to 70% to 80% of normal.

**Causes of Acute Renal Failure**

**A: Prerenal Failure**

1. Volume depletion resulting from:
   a. Hemorrhage
   b. Renal losses (diuretics, osmotic diuresis)
   c. Gastrointestinal losses (vomiting, diarrhea, nasogastric suction)
2. Impaired cardiac efficiency resulting from:
   a. Myocardial infarction
   b. Heart failure
   c. Dysrhythmias
   d. Cardiogenic shock
3. Vasodilation resulting from:
a. Sepsis
b. Anaphylaxis
c. Antihypertensive medications or other medications that cause vasodilation

B: Intrarenal Failure

1. Prolonged renal ischemia resulting from:
   a. Pigment nephropathy (associated with the break-down of blood cells containing pigments that in turn occlude kidney structures)
   b. Myoglobinuria (trauma, crush injuries, burns)
   c. Hemoglobinuria (transfusion reaction, hemolytic anemia)
2. Nephrotoxic agents such as:
   a. Aminoglycoside antibiotics (gentamicin, tobramycin)
   b. Radiopaque contrast agents
   c. Heavy metals (lead, mercury)
   d. Solvents and chemicals (ethylene glycol, carbon tetrachloride, arsenic)
   e. Nonsteroidal anti-inflammatory drugs (NSAIDs)
   f. Angiotensin-converting enzyme inhibitors (ACE inhibitors)
3. Infectious processes such as:
   a. Acute pyelonephritis
   b. Acute glomerulonephritis

C: Postrenal failure

1. Urinary tract obstruction, including:
   a. Calculi (stones)
   b. Tumors
   c. Benign prostatic hyperplasia
   d. Strictures
   e. Blood clots
Clinical Manifestations of ARF

The following signs and symptoms are consistent with acute renal failure:

1. Decreased urine output (urine may be pink or reddish in color)
2. Edema (face, arms, legs, feet eyes)
3. Flank pain/Pelvic pain
4. Poor appetite (nausea, vomiting)
5. Bitter or metallic taste in mouth
6. Dry itchy skin
7. Easy bruising
8. Fatigue
9. Seizures/LOC
10. Shortness of breath
11. Arrhythmias
12. Sudden weight gain

Probable Cause of ARF Based on Physical Findings

<table>
<thead>
<tr>
<th>Physical Finding</th>
<th>Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated Temperature</td>
<td>Infection</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Nephrotic syndrome/malignant hypertension</td>
</tr>
<tr>
<td>Hypotension</td>
<td>Weight loss or gain</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Volume depletion/sepsis</td>
<td>Hypovolemia/hypervolemia</td>
</tr>
</tbody>
</table>

**Pharmaceutical Interventions**

- **Furosemide (Lasix)**: a loop diuretic that can be used to increase urinary flow with the intent of flushing out cellular debris that may be causing an obstruction.

- **Mannitol**: an osmotic diuretic that can be used to dilate renal arteries by increasing the synthesis of prostaglandins (resulting in restored renal flow).

- **Dopamine**: at low doses (1-5 mcg/kg/min), dopamine dilates renal arterioles and increases renal blood flow and glomerular filtration. Because dopamine (even at low doses) can cause tachycardia, myocardial ischemia and arrhythmias it use should be considered carefully.

- **N-acetylcysteine (Mucomyst)**: this medication can help reverse acute renal failure when the cause is thought to be from a
Preventing Acute Renal Failure

1. Provide adequate hydration to patients at risk of dehydration:
   a. Surgical patients before, during, and after surgery
   b. Patients undergoing intensive diagnostic studies requiring fluid restriction and contrast agents (eg, barium enema, intravenous pyelograms), especially elderly patients who may have marginal renal reserve
   c. Patients with neoplastic disorders or disorders of metabolism (eg, gout) and those receiving chemotherapy
2. Prevent and treat shock promptly with blood and fluid replacement.
3. Monitor central venous and arterial pressures and hourly urine output of critically ill patients to detect the onset of renal failure as early as possible.
4. Treat hypotension promptly.
5. Continually assess renal function (urine output, laboratory values) when appropriate.
6. Take precautions to ensure that the appropriate blood is administered to the correct patient in order to avoid severe transfusion reactions, which can precipitate renal failure.
7. Prevent and treat infections promptly. Infections can produce progressive renal damage.
8. Pay special attention to wounds, burns, and other precursors of sepsis.
9. To prevent infections from ascending in the urinary tract, give meticulous care to patients with indwelling catheters. Remove catheters as soon as possible.
10. To prevent toxic drug effects, closely monitor dosage, duration of use, and blood levels of all medications metabolized or excreted by the kidneys.

**Chronic Renal Failure**

**Chronic renal failure** is a progressive, irreversible kidney injury. Kidney function does not recover. When kidney function is too poor to sustain life, it is called end-stage-renal disease (ESRD).

CRF has a gradual onset of months to years as opposed to ARF. Approximately 90-95% of nephrons are affected by CRF, damage is permanent and irreversible, and the disease is fatal without renal replacement therapy such as dialysis or transplant.

- Azotemia and uremia are terms used with chronic renal failure.
- Azotemia is collection of nitrogenous waste in the blood.
- Uremia is azotemia with clinical symptoms

**Stages in CRF**

1. **Stage 1-** GFR > 90 ml/min-**normal renal function**

2. **Stage 2 (Renal Insufficiency).**
   - GFR 60-89 ml/min- mild decrease in GFR.
   - No buildup of waste but nephrons are still working overtime, may have an increase in BP which causes an increase in glomerular pressure on healthy nephrons.
   - There is no S&S of renal failure in this phase.

3. **Stage 3 (Moderate CRF)-** GFR 30-59 ml/min-
   - moderate decrease in GFR.
- buildup of waste- Not enough healthy nephrons to prevent it.
- There is an increase in BUN, creatinine, uric acid and phosphorous.
- An increase managing fluid volume and an increase in BP and edema.
- There are fluid and electrolytes changes.
- If the pt. can manage their BP and diet, they can slow down the progression.

4. **Stage 4 (Severe CRF).**

- GFR 15-29 ml/min—there is a severe decrease in GFR.

5. **Stage 5 (End-stage renal disease).**

- GFR is less than 15 ml/min.
- S&S and kidney failure are seen.
- ESRF will result from severe fluid and electrolytes imbalances.

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**Pathophysiology**

Renal function declines

The products of protein metabolism accumulate in the blood

Uremia develops
The rate of glumural filtration increase & protein exceed & decline

Develop hypertension

So the patient goes through 3 well-recognized stages of CRF

Reduced renal reserve, Renal insufficiency & ESRD

**Causes of Chronic Renal Failure**

1. Hypertension

2. Diabetes

3. Long history of analgesic abuse - Phenacetin

4. Chronic urinary tract infections

5. Glomerulonephritis.


7. Polycystic kidney disease

8. Systemic Lupus erythematosus (SLE).

**Clinical Manifestations of Renal Failure:**

1. **Cardiovascular Signs:**
   
a. Anemia.
b. Pericarditis/ Pericardial Effusion

c. Hypertension

d. Congestive Heart Failure
e. Hyperkalemia and edema

2. **Pulmonary Signs:**

a. Pulmonary Edema

b. Dyspnea
c. Pleural Effusion

3. **Gastrointestinal Signs:**

a. Anorexia

b. Nausea/Vomiting
c. Diarrhea or Constipation
d. Mucosal Ulcerations- GI Bleeding

4. **Integumentary Signs:**

a. Pruritus

b. Uremic Frost (rare)
c. Easy Bruising

5. **Neuromuscular/Behavioral signs:**

a. Headache

b. Daytime drowsiness/insomnia
c. Confusion/ disorientation

d. Asterixis

e. Muscle weakness and cramping

f. Peripheral Neuropathy

h. Body image/ Self-Concept disturbances

6. Endocrine/ metabolic Signs

a. Calcium/Phosphorus Imbalance- Renal osteodystrophy

b. Metabolic Acidosis

7. Psychosocial Signs

a. Denial

b. Depression/ Grief

c. Dependency

8. Reproductive

a. Amenorrhea

b. Testicular atrophy

c. Infertility

d. Decreased libido

Complications

1. Hyperkalemia due to decreased excretion, metabolic acidosis, catabolism, and excessive intake (diet, medications, fluids).
2. Pericarditis, pericardial effusion, and pericardial tamponade due to retention of uremic waste products and inadequate dialysis.

3. Hypertension due to sodium and water retention and malfunction of the renin–angiotensin–aldosterone system.

4. Anemia due to decreased erythropoietin production, decreased RBC life span, bleeding in the GI tract from irritating toxins and ulcer formation, and blood loss during hemodialysis.

5. Bone disease and metastatic and vascular calcifications due to retention of phosphorus, low serum calcium levels, abnormal vitamin D metabolism, and elevated aluminum levels.

**Renal Medications**

a. Multivitamin, Iron supplements (ferrous fumarate), Folic acid

b. Epogen - to prevent anemia

c. Tums (Calcium carbonate) or Basalgel- phosphate binders, can cause constipation

d. Shohl’s solution- bicarbonate replacement, used for chronic metabolic acidosis

e. Rocalcitrol- Vitamin D supplement

f. Stool softeners

g. Sorbitol- artificial sweetener used as a laxative

h. Kayexalate- resin that binds K in GI tract, causes diarrhea

**Renal Nutrition**


2. Less restricted diet for PD patients, lose protein through PD.
3. Beware of salt substitutes, frequently contain KCl.
4. Frequently require fluid restrictions - 1 liter/day.
5. More liberal diet for PD patient.

Nursing Diagnoses & Interventions for Clients with ESRD

**ND:** Fluid volume excess & electrolyte imbalance related to decrease urine output & dietary & fluid restriction.

**Goal:** maintain of fluid & electrolyte balance.

**Nursing intervention with Rational**

- Assess serum electrolyte level to provide base line data.
- Daily weight the patient before & after doing dialysis to determine if the weight achieve & decreased to normal, which was recorded by the doctor.
- Assess skin turgor to determine if there is presence of edema.
- Assess V/S (BP, pulse, respiratory rate & rhythm) to monitoring changes.
- Provide foods & fluid with dietary restriction to promote dietary changes.

**ND:** Altered nutrition less than body requirement RT dietary restriction

**Goal:** maintain adequate nutritional status.

1. Assess nutritional status by daily weight the patient & laboratory values to determine base line data for monitoring changes.
2. Provide patient’s food preference within dietary restriction to increase dietary intake.
3. Encourage high calorie, low protein, low potassium & low sodium snacks between meals to reduce sources of restricted
food & provides calories for energy while low protein for growth & tissue healing.

4. Explain to patient & family rational for restrictions of certain foods & fluid.

5. Assist patient to cope with discomforts resulting from restriction to increase patient comfort with dietary restriction.

ND: Activity intolerance related to fatigue & dialysis procedure.

Goal:

Participation in activity within tolerance.

1. Assess factors contributing to fatigue (anemia, fluid & electrolyte imbalance, depression) to provide indication of severity of fatigue.

2. Promote independence in self-care activities to promote & improve self-esteem.

3. Encourage the patient to alternate activity within rest to promote activity & exercise within limits & adequate rest.

4. Encourage the patient to rest after dialysis treatment because the dialysis treatment will exhaust the patient.

5. Place the patient in high fowler position to facilitate diaphragmatic expansion.

Sensory and perceptual alterations related to uremia
1. assess mental status. Watch for confusion, irritability, behavioral changes, decreased attention.
2. Educate patient/family on relationship of uremia to mental status changes
3. Provide calm, non-stimulating environment
4. Provide short teaching sessions.
5. Safety measures as appropriate.
6. Reorient patient as necessary. Provide supportive environment.

**Risk for infection related to uremic effects on immune system**

1. Maintain aseptic technique for procedures.
2. Assess for signs of infection (fever, chills, redness, edema, or drainage of site).
3. Instruct patient to avoid people with infections

**Knowledge deficit related to lack of information about diet, meds, dialysis, self-monitoring**

1. Teach patient/family about dietary restrictions and rationale for these. 2. Dietary consult helpful.
3. Instruct patient/family about meds and administration times.
4. Provide information about dialysis treatment options, procedures, etc
5. Assess patient/family’s understanding of above and reinforce as necessary.

**Evaluation**
1. The patient is able to maintain dietary & fluid intake with restriction.
2. The patient explained in his own word the rational for dietary restriction & his appetite is increased at meal time.
3. Patient reports an increase in sense of well-being & he is more able to participate in activity & exercise.

**Dialysis**

Dialysis is the procedure which is used to restore fluid and electrolyte balance and acid base balance and to remove wastes and toxic materials from the body when the kidney is unable to do.

**Indications for dialysis**

1. Renal failure that can no longer be controlled by conservative management (i.e. Dietary modification and administration of mediations.
2. Glomerular filtration rate (GFR) less than 5 ml/min.
3. Serum creatinine level greater than 10mg/dl, blood urea nitrogen (BUN) greater than 100mg/dl.
4. Unmanageable hyperkalemia.
5. Drug overdose.

**Basic Goals of Dialysis Therapy:**
1. To remove the end products of protein metabolism, such as urea and creatinine, from the blood.

2. To maintain a safe concentration of serum electrolytes.

3. To maintain acid-base balance.

4. To remove excess fluid from the blood.

Types of dialysis
- Hemodialysis
- Peritoneal dialysis.

Hemodialysis

HD is a process of cleansing the blood of accumulated waste products and restore fluid and electrolyte balance. It is used for patients with end stage of renal failure (ESRF), or for acutely ill patients who require short-term (day to week) dialysis.

The processes involved in hemodialysis are diffusion, osmosis, and ultra-filtration.

1. **Diffusion**: is the movement of toxins and wastes from an area of greater concentration in the blood to an area to lower concentration in the dialysis.

2. **Osmosis**: is the removal of excess water from an area of higher solute concentration (blood) to lower solute concentration (the dialysis bath).
3. **Ultra–filtration**: is the removing of water under high pressure to an area of lower pressure.

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**Types of dialysis**

**Hemodialysis (HD)**

- **HD** is the most commonly used method of dialysis and a highly efficient for removing waters and waste products from the body.

- It is used for patients who are acutely ill and require short-term dialysis (days to week) and for patients with End Stage renal disease (ESRD) who require long-term or permanent therapy.

- HD patients require treatment three times a week for an average three to four hours per dialysis.

- Within dialysis machine, blood and dialysate compartment are separated by semi permeable membrane. Blood is removed from the arterial end of the vascular access device, pumped through the machine at a rate of 100 to 200 ml/min, and returned to the body through the venous access.

- Heparin may be added to the blood at the arterial end to prevent blood clotting while in the machine.
Vascular Access for Hemodialysis

A vascular access should be prepared weeks or months before starting dialysis.

Type of vascular access

1. Arteriovenous fistula.
2. Arteriovenous graft.
3. Eternal arteriovenous shunt.
4. Femoral vein catheterization.
5. Sub clavian vein catheterization.

Complications of HD

A: short-term complications

1. Hypotension may occur during treatment as fluid removed. Nausea and vomiting, diaphoresis, tachycardia, and dizziness are common signs of hypotension.
2. Painful muscle cramping occurs late in dialysis as fluid and electrolytes rapidly leave the extracellular space.
3. Exsanguination may occur if blood lines separate or dialysis needles accidently dislodge.
4. Dysrhythmias may result from electrolyte and PH changes or from removal of antiarrhythmic medications during dialysis.
5. Air embolism is rare but can occur if air enters the patient's vascular system.
6. Chest pain may occurs because of anemia or in patients with ischemic heart diseases.
7. Dialysis disequilibrium result from cerebral fluid shifts. It is more likely to occur in acute renal failure or when blood urea nitrogen levels are very high (exceeding 150 mg/L). Manifestation includes:

- Headache.
- N & V.
- Restlessness.
- Decrease level consciousness, or seizure.

Long-term complications of HD

1. **Anemia:** is one of the major clinical problems of CRF patients

   **Causes:**

   - Less production of erythropoietin.
   - Loss of renal parenchyma.
   - Toxic effect of uremia on CBC membrane.
   - Secondary causes include infection, malnutrition, iron deficiency, and folic acid.

2. **Bone disease.**

**Peritoneal Dialysis (PD)**

**Definition**

- Peritoneal dialysis is a way to remove waste products from the blood when the kidneys can no longer do the function adequately.
- During peritoneal dialysis, blood vessels in the abdominal lining (peritoneum) fill in for the kidneys, with the help of a fluid (dialysate) that flows into and out of the peritoneal space.
• It is involves the introduction of sterile dialyzing fluid through an implanted catheter into the abdominal cavity, the dialysate bathes the peritoneal membrane.

• PD works by using peritoneal membrane, which is inside the abdomen as a semi permeable membrane. By the processes of osmosis, diffusion, and active transport, excess fluid & solutes travel through peritoneal membrane and into the dialyzing fluid.

• After a selected period about (20-30) minute, then the fluid is drained out of the abdomen by gravity.

• Peritoneal dialysis differs from hemodialysis as:
  a. a more commonly used blood-filtering procedure.
  b. use fewer medications and,
  c. eat a less restrictive diet than you can with hemodialysis.

Types of Peritoneal Dialysis (PD)

1. Continuous Ambulatory P.D. (CAPD) :

• Between 1.5 and 3 liters of fluid is run in four times a day, exchanging for the fluid from the previous exchange. This takes about 30-40 minutes.

• Gravity moves the fluid through the tube and into and out of the belly.

• Each exchange includes filling the abdomen with dialysate fluid, letting the fluid dwell in the abdomen, then draining the fluid.

• Patient may need three to four exchanges during the day and one with a longer dwell time while sleeping.
• Patient is free to go about the normal activities while the dialysis solution dwells in the abdomen between exchanges.

2. Continuous Cycle P.D. (CCPD):

• a machine called an automated cycler performs three to five exchanges at night while you sleep.
• The cycler automatically fills the abdomen with dialysis solution, allows it to dwell there and then drains it to a sterile drainage bag that empties in the morning.
• The machine will exchange 8-12 liters over 8-10 hours and then leave 1-2 liters to dwell during the day.
• This gives the patient more flexibility during the day, but he must remain attached to the machine for 10 to 12 hours at night.
• In the morning, patient begins one exchange with a dwell time that lasts the entire day.

Contraindication of PD

Peritoneal dialysis is not recommended if the patients have:

• extensive surgical scars in the abdomen.
• a large abdominal hernia.
• inflammatory bowel disease or frequent bouts of diverticulitis.

Procedure of PD
• In peritoneal dialysis, a sterile cleansing solution (dialysate) flows through the catheter into the abdomen.

• The solution stays in the abdomen for a prescribed period of time, known as dwell time.

• During this dwell time, waste, chemicals and extra fluid in the blood pass from tiny blood vessels (capillaries) in the lining of the abdominal cavity (peritoneum) into the dialysis solution.

• The solution contains a sugar that draws wastes and extra fluid through the capillaries in the peritoneum.

• The belly may feel fuller than usual while the dialysis solution is there, but it's generally not uncomfortable.

• When the dwell time is over, the solution, along with waste products drawn from the blood and any excess fluid, drains into a sterile collection bag.

• The process of filling and then draining the abdomen is called an exchange.

Peritoneal dialysis complications

• **Peritonitis.** An infection can develop at the site where the tube (catheter) is inserted to carry the cleansing fluid into and out of your abdomen.

• **Weight gain.** The fluid used to clean the blood in peritoneal dialysis contains sugar (dextrose). Patient may take in several hundred calories each day by absorbing some of this fluid, known
as dialysate. Weight gain may follow. The extra calories can also lead to high blood sugar especially in diabetic patients.

- **Weakening of the abdominal muscles (hernia).** Holding fluid in the abdomen for long periods may strain the belly muscles.
- Fluid obstruction.
- Dehydration, and shoulder pain.

**Nursing managements for peritoneal dialysis patients**

1. The client should be urinate before insert the catheter into the peritoneum, to prevent the bladder puncture.
2. Place the bottles of dialysate in warm water.
3. Keep accurate intake and output records related to the amount of dialysis fluid entering the peritoneal cavity and the amount in the drainage.
4. Monitor the client's vital signs every 15 minutes.
5. Monitor the client's weight daily.