Nursing Care of the Urinary System

Quick review notes – SN Lumbini

Nursing Care of the Urinary System (6.3.3)

The urinary system regulates fluid and electrolyte balance, removes waste products, and maintains acid-base homeostasis. Disorders of the urinary system can lead to significant complications, requiring comprehensive nursing care to manage symptoms, prevent progression, and promote recovery. Below is a detailed breakdown of nursing care for the specified urinary conditions.

6.3.3.1. Urinary Tract Infection (UTI)

Definition: UTI is an infection in any part of the urinary system (urethra, bladder, ureters, or kidneys), most commonly affecting the lower urinary tract (cystitis).

Causes:

- Bacteria: *Escherichia coli* (most common), *Klebsiella*, *Proteus*.
- Risk factors: Female anatomy (shorter urethra), catheter use, poor hygiene, urinary stasis.

Symptoms:

- Dysuria (painful urination), urgency, and frequency.
- Cloudy or foul-smelling urine, hematuria.
- Fever, chills, and flank pain (if pyelonephritis—kidney infection).

Nursing Assessment:

- Assess for dysuria, frequency, and urgency; note urine characteristics (color, odor).
- Monitor vital signs for fever and signs of systemic infection.
- Check for costovertebral angle (CVA) tenderness (indicating pyelonephritis).

Nursing Interventions:

- **Antibiotics**: Administer prescribed antibiotics (e.g., nitrofurantoin, trimethoprim-sulfamethoxazole) and ensure completion of the full course.
- **Hydration**: Encourage increased fluid intake (2-3 liters/day) to flush bacteria.
- **Pain Management**: Administer analgesics (e.g., phenazopyridine) for dysuria; apply heat to the lower abdomen.
- **Infection Control**: Teach proper perineal hygiene (wipe front to back); encourage voiding after intercourse.
- **Monitor Complications**: Watch for signs of pyelonephritis (fever, flank pain) or sepsis (tachycardia, hypotension).
- **Urinalysis**: Collect urine for culture and sensitivity to confirm the diagnosis and guide treatment.

Patient Education:

- Educate on proper hygiene and hydration to prevent recurrence.
- Teach to avoid irritants (e.g., caffeine, alcohol) that may exacerbate symptoms.
- Advise reporting symptoms of worsening infection (e.g., fever, flank pain).

6.3.3.2. Nephritic Syndrome

Definition: Nephritic syndrome is a glomerular disorder characterized by hematuria, hypertension, and renal dysfunction due to inflammation.

Causes:

- Post-streptococcal glomerulonephritis (common after *Streptococcus* infection).
- Autoimmune diseases (e.g., systemic lupus erythematosus).
- Infections (e.g., hepatitis B or C).

Symptoms:

- Hematuria (cola-colored urine), proteinuria.
- Hypertension, edema (periorbital, lower extremities).
- Oliguria (decreased urine output), fatigue, and azotemia (elevated BUN/creatinine).

Nursing Assessment:

- Monitor for hematuria, proteinuria, and oliguria (measure urine output).
- Assess for hypertension and signs of fluid overload (edema, dyspnea).
- Check for signs of infection (e.g., recent sore throat for post-streptococcal cause).

Nursing Interventions:

- **Fluid Management**: Restrict fluids and sodium to manage edema and hypertension.
- **Antihypertensives**: Administer medications (e.g., ACE inhibitors) to control blood pressure.
- **Monitor Renal Function**: Track BUN, creatinine, and electrolyte levels (e.g., hyperkalemia).
- **Dietary Restrictions**: Implement a low-sodium, low-protein diet to reduce kidney workload.
- **Infection Treatment**: Administer antibiotics (e.g., penicillin) if post-streptococcal glomerulonephritis is confirmed.
- **Monitor Complications**: Watch for progression to acute renal failure or hypertensive crisis.

Patient Education:

- Teach about dietary restrictions (low sodium, low protein) to manage symptoms.
- Educate on monitoring blood pressure and reporting signs of worsening (e.g., headache, swelling).
- Advise follow-up to monitor renal function and prevent chronic kidney disease.

6.3.3.3. Renal and Bladder Calculi

Definition: Renal and bladder calculi (kidney stones) are hard deposits of minerals and salts that form in the urinary tract.

Causes:

- Dehydration, high dietary oxalate (e.g., spinach), or calcium intake.
- Metabolic disorders (e.g., hyperparathyroidism, gout).
- Urinary stasis or infections (struvite stones).

Symptoms:

- Severe flank pain (renal colic), radiating to the groin.
- Hematuria, nausea, vomiting, and dysuria.
- Fever and chills (if infection is present).

Nursing Assessment:

- Assess for flank pain (intensity, location, radiation).
- Monitor for hematuria, fever, and signs of obstruction (oliguria).
- Evaluate hydration status and dietary history.

Nursing Interventions:

- **Pain Management**: Administer analgesics (e.g., NSAIDs, opioids) and antispasmodics (e.g., tamsulosin) to facilitate stone passage.

- **Hydration**: Encourage high fluid intake (3-4 liters/day) to promote stone passage and prevent recurrence.
- **Strain Urine**: Instruct the patient to strain urine to collect stones for analysis (calcium, uric acid, struvite).
- **Monitor Complications**: Watch for signs of obstruction (anuria) or infection (fever, pyuria).
- **Surgical Intervention**: Prepare for procedures like lithotripsy (shock wave therapy) or ureteroscopy if the stone does not pass.
- **Dietary Modifications**: Adjust diet based on stone type (e.g., reduce oxalate for calcium oxalate stones, limit purines for uric acid stones).

Patient Education:

- Educate on maintaining high fluid intake to prevent recurrence.
- Teach dietary modifications (e.g., reduce sodium, oxalate, or purine-rich foods).
- Advise reporting severe pain, fever, or inability to urinate immediately.

6.3.3.4. Renal Failure (Acute and Chronic)

Definition:

- **Acute Renal Failure (ARF)**: Sudden loss of kidney function, often reversible with treatment.
- **Chronic Renal Failure (CRF)**: Progressive, irreversible loss of kidney function over time.

Causes:

- ARF: Dehydration, sepsis, nephrotoxic drugs (e.g., NSAIDs), or obstruction.
- CRF: Diabetes, hypertension, glomerulonephritis, polycystic kidney disease.

Symptoms:

- ARF: Oliguria/anuria, edema, fatigue, nausea, and confusion.
- CRF: Fatigue, pruritus, anemia, hypertension, and uremic symptoms (e.g., metallic taste, pericarditis).

Nursing Assessment:

- Monitor urine output (oliguria/anuria in ARF, polyuria in early CRF).
- Assess for fluid overload (edema, dyspnea, crackles).
- Check labs: Elevated BUN, creatinine, hyperkalemia, metabolic acidosis.

Nursing Interventions:

- **ARF**:
  - **Fluid Management**: Administer IV fluids cautiously to correct dehydration; avoid overload.
  - **Treat Underlying Cause**: Address sepsis (antibiotics), remove nephrotoxins, or relieve obstruction (e.g., catheter for bladder outlet obstruction).
  - **Electrolyte Balance**: Manage hyperkalemia (e.g., calcium gluconate, insulin/dextrose).
  - **Dialysis**: Prepare for hemodialysis if severe (e.g., uremia, hyperkalemia).
- **CRF**:
  - **Dialysis**: Coordinate hemodialysis or peritoneal dialysis for end-stage renal disease (ESRD).
  - **Dietary Restrictions**: Implement a low-protein, low-sodium, low-potassium diet.
  - **Anemia Management**: Administer erythropoietin and iron supplements as prescribed.
  - **Monitor Complications**: Watch for uremic symptoms, bone disease (renal

osteodystrophy), or cardiovascular issues.
- **Positioning**: Elevate legs to reduce edema; semi-Fowler's for dyspnea.

Patient Education:

- ARF: Teach to avoid nephrotoxic drugs (e.g., NSAIDs) and maintain hydration.
- CRF: Educate on dialysis schedule, dietary restrictions, and medication adherence (e.g., phosphate binders).
- Advise regular follow-ups to monitor kidney function and manage comorbidities (e.g., diabetes, hypertension).

6.3.3.5. Prostatic Hyperplasia

Definition: Benign prostatic hyperplasia (BPH) is the non-cancerous enlargement of the prostate gland, common in older men, leading to urinary obstruction.

Causes:

- Age-related hormonal changes (increased dihydrotestosterone).
- Family history and lifestyle factors.

Symptoms:

- Weak urine stream, hesitancy, and dribbling.
- Frequency, urgency, nocturia, and incomplete bladder emptying.
- Risk of urinary retention or UTI due to stasis.

Nursing Assessment:

- Assess for urinary symptoms (frequency, hesitancy, stream strength).
- Monitor for signs of urinary retention (distended bladder, overflow incontinence).
- Check for complications like UTI (dysuria, fever) or hydronephrosis.

Nursing Interventions:

- **Bladder Management**: Encourage scheduled voiding and double voiding (urinate, wait, urinate again).
- **Medications**: Administer alpha-blockers (e.g., tamsulosin) to relax the prostate or 5-alpha-reductase inhibitors (e.g., finasteride) to shrink it.
- **Catheterization**: Insert a catheter for acute urinary retention; monitor for infection.
- **Surgical Intervention**: Prepare for procedures like transurethral resection of the prostate (TURP) if severe.
- **Monitor Complications**: Watch for post-obstructive diuresis (excessive urination after relief) or hematuria post-surgery.
- **Hydration**: Encourage fluids to prevent urinary stasis but avoid overhydration before bedtime.

Patient Education:

- Teach to avoid bladder irritants (e.g., caffeine, alcohol) and to urinate when the urge arises.
- Educate on the importance of follow-up to monitor for complications or recurrence.
- Advise reporting signs of UTI or inability to void.

6.3.3.6. Hydronephrosis

Definition: Hydronephrosis is the swelling of the kidney due to urine backup, caused by an obstruction in the urinary tract.

Causes:

- Kidney stones, BPH, ureteral strictures, or tumors.
- Congenital abnormalities (e.g., ureteropelvic junction obstruction).
- Pregnancy (uterine compression of ureters).

Symptoms:

- Flank pain, nausea, and vomiting.
- Decreased urine output, hematuria, or urinary frequency.
- Fever and chills (if infection is present).

Nursing Assessment:

- Assess for flank pain and abdominal distension.
- Monitor urine output and characteristics (hematuria, cloudiness).
- Check for signs of infection (fever, dysuria) or renal impairment (elevated creatinine).

Nursing Interventions:

- **Pain Management**: Administer analgesics (e.g., NSAIDs) for flank pain.
- **Relieve Obstruction**: Assist with procedures like stent placement or nephrostomy to drain urine.
- **Hydration**: Encourage fluids to promote urine flow unless contraindicated by obstruction.
- **Infection Control**: Administer antibiotics if a UTI is present.
- **Monitor Renal Function**: Track BUN, creatinine, and electrolytes for signs of renal damage.
- **Surgical Intervention**: Prepare for surgery (e.g., pyeloplasty) if structural abnormalities are the cause.

Patient Education:

- Educate on maintaining hydration to prevent stone formation or urinary stasis.
- Teach to report symptoms of obstruction (e.g., decreased urine output, severe pain).
- Advise follow-up imaging to monitor kidney function and resolution.

6.3.3.7. Glomerulonephritis (Acute and Chronic)

Definition:

- **Acute Glomerulonephritis (AGN)**: Sudden inflammation of the glomeruli, often post-infectious.
- **Chronic Glomerulonephritis (CGN)**: Progressive glomerular damage leading to chronic kidney disease.

Causes:

- AGN: Post-streptococcal infection (e.g., after strep throat), IgA nephropathy.
- CGN: Prolonged AGN, autoimmune diseases (e.g., lupus), or diabetes.

Symptoms:

- AGN: Hematuria (cola-colored urine), proteinuria, hypertension, edema, and oliguria.
- CGN: Fatigue, proteinuria, hypertension, and progression to ESRD (anemia, uremia).

Nursing Assessment:

- Monitor for hematuria, proteinuria, and oliguria (measure urine output).
- Assess for hypertension, edema, and signs of fluid overload.
- Check labs: Elevated BUN/creatinine, hypoalbuminemia, and anti-streptolysin O (ASO) titers in AGN.

Nursing Interventions:

- **AGN**:
  - **Fluid and Sodium Restriction**: Limit intake to manage edema and hypertension.
  - **Antibiotics**: Administer penicillin for post-streptococcal AGN.

    - **Antihypertensives**: Control blood pressure with ACE inhibitors or diuretics.
    - **Monitor Recovery**: Most cases resolve spontaneously; monitor for complications like acute renal failure.
- **CGN**:
    - **Dialysis**: Initiate dialysis in advanced stages (ESRD).
    - **Immunosuppressants**: Administer steroids or cyclophosphamide for autoimmune causes.
    - **Dietary Management**: Implement a low-protein, low-sodium diet to reduce kidney workload.
    - **Monitor Complications**: Watch for uremic symptoms, anemia, or cardiovascular disease.

Patient Education:

- AGN: Educate on completing antibiotics and monitoring for recurrence of strep infections.
- CGN: Teach about dialysis, dietary restrictions, and managing comorbidities (e.g., hypertension).
- Advise regular follow-ups to monitor kidney function and prevent progression.

6.3.3.8. Acidosis and Alkalosis

Definition:

- **Acidosis**: A condition where blood pH <7.35, due to excess acid or loss of bicarbonate.
- **Alkalosis**: A condition where blood pH >7.45, due to excess base or loss of acid.

Causes:

- **Metabolic Acidosis**: Diabetic ketoacidosis (DKA), renal failure, diarrhea (loss of bicarbonate).
- **Respiratory Acidosis**: Hypoventilation (e.g., COPD, drug overdose).
- **Metabolic Alkalosis**: Vomiting (loss of H+), excessive antacid use.
- **Respiratory Alkalosis**: Hyperventilation (e.g., anxiety, fever).

Symptoms:

- Metabolic Acidosis: Kussmaul respirations (rapid, deep breathing), confusion, lethargy.
- Respiratory Acidosis: Dyspnea, confusion, cyanosis, and CO2 retention.
- Metabolic Alkalosis: Muscle twitching, nausea, and hypokalemia symptoms (weakness).
- Respiratory Alkalosis: Lightheadedness, tingling (paresthesia), and tetany.

Nursing Assessment:

- Monitor arterial blood gases (ABGs): pH, PaCO2, HCO3- to determine type and severity.
- Assess respiratory rate and depth (e.g., Kussmaul breathing in metabolic acidosis).
- Check for underlying causes (e.g., glucose levels in DKA, respiratory status in COPD).

Nursing Interventions:

- **Metabolic Acidosis**:
    - Treat underlying cause (e.g., insulin for DKA, fluids for diarrhea).
    - Administer sodium bicarbonate IV if severe (pH <7.1).
    - Monitor for hyperkalemia (ECG changes, peaked T waves).
- **Respiratory Acidosis**:
    - Improve ventilation: Use bronchodilators, assist with BiPAP, or mechanical ventilation.
    - Administer oxygen cautiously in COPD patients to avoid suppressing respiratory drive.
    - Monitor ABGs for CO2 levels.
- **Metabolic Alkalosis**:

    - Replace fluids and electrolytes (e.g., IV saline with potassium for hypokalemia).
    - Treat underlying cause (e.g., antiemetics for vomiting).
    - Monitor for hypocalcemia (tetany, Chvostek's sign).
- **Respiratory Alkalosis**:
    - Address hyperventilation: Encourage slow breathing or use a paper bag (if anxiety-induced).
    - Treat underlying cause (e.g., antipyretics for fever).
    - Monitor for hypokalemia and hypocalcemia.
- **Electrolyte Monitoring**: Correct imbalances (e.g., potassium, calcium) as needed.

Patient Education:

- Metabolic Acidosis: Educate on managing underlying conditions (e.g., diabetes control in DKA).
- Respiratory Acidosis: Teach breathing techniques (pursed-lip breathing) for COPD patients.
- Metabolic Alkalosis: Advise against excessive antacid use; teach to report prolonged vomiting.
- Respiratory Alkalosis: Educate on stress management techniques to prevent hyperventilation.

General Nursing Considerations for Urinary System Conditions

- **Hydration**: Promote adequate fluid intake unless contraindicated (e.g., in renal failure or fluid overload).
- **Infection Control**: Emphasize hygiene and catheter care to prevent infections like UTI.
- **Monitoring**: Regularly assess renal function (BUN, creatinine, urine output) and electrolyte balance.
- **Patient Education**: Focus on prevention (e.g., hydration, diet) and early recognition of symptoms.
- **Multidisciplinary Care**: Collaborate with nephrologists, dietitians, and urologists for comprehensive care.